STEPPING OUTSIDE OF THE CLASSROOM: THE IMPACT OF HEALTH, NEIGHBORHOODS, AND PARENTING ON SCHOOL READINESS FOR CHILDREN IN A HIGH QUALITY EARLY EDUCATION PROGRAM

A DISSERTATION

SUBMITTED ON THE NINETEENTH DAY OF APRIL 2017

TO THE DEPARTMENT OF GLOBAL COMMUNITY HEALTH AND BEHAVIORAL SCIENCES

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

OF THE SCHOOL OF PUBLIC HEALTH AND TROPICAL MEDICINE

OF TULANE UNIVERSITY

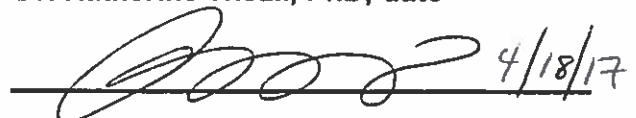FOR THE DEGREE

OF

DOCTOR OF PHILOSOPHY

BY

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Dissertation Abstract

Background: Early life and learning experiences have the potential to influence a person's health throughout the lifespan. These influences, for children of low socioeconomic status in the United States, are compounded by the existence of racial and socioeconomic disparities exist in both child health and development. One of the pathways through which early life and learning experiences affect adult health is through educational attainment, which is initially exhibited through school readiness (i.e. how prepared children are for school). Research in this area traditionally focuses on early learning environments and family level dynamics as predictors of school readiness, although evidence suggests that non-academic factors, like child health, and even more distal factors such as neighborhood structural and social context, contribute to how ready a child is for school. While many have theorized about the relation between both physical health and school readiness and neighborhood social context and school readiness, empirical evidence is limited.

Objective: The objective of this research was to investigate non-academic factors related to the behavioral and cognitive domains of school readiness (language and literacy, social-emotional, numeracy/cognitive) including physical health and neighborhood social context.

Methods: The research was conducted as a mixed methods design: 1) a longitudinal, retrospective matched cohort study, using data from the Educare Learning Network's 2007-2015 data set which included data from 26,810 children enrolled in 20 Educare schools across the United States with children propensity matched on exposure, either by health status (see Aim 1 p. 15) or parental perceived neighborhood support (see Aims 2-3 p 16); and 2) a qualitative study conducted with parents of children ages 0-5 in

New Orleans, Louisiana and aimed at a deeper understanding of parent perceptions of school readiness, neighborhood, child health and the intersection of these concepts.

Results: Results from Paper 1 indicate that there is an association between asthma and school readiness outcomes, however this may be confounded by child and family level factors and may also differ by child race or sex. Paper 2 Quantitative results indicate that there is an association between perceived neighborhood support and child health and school readiness, particularly social emotional development, and that these results may differ by child race and sex and that there are significant interactions between neighborhood and race playing a role. Qualitative analysis in Paper 2 indicated common themes of perception of neighborhood, neighborhood safety, and stress and these discussed in relationship to their impact on their children. Paper 3 Results indicate that parental stress and parent-child relationship, individually and in sequence, are mediators of the relationship between perceived neighborhood support and receptive vocabulary scores, but mediation was not significant for other child cognitive, language, and physical health outcomes.

Conclusions: Findings from this study contribute to the current understanding of external factors, outside of the early learning environment, that contribute to disparities in child health and school readiness in a vulnerable population. Not only as they relate to childhood, but also to adult health and well-being across the life course. The data will provide empirical evidence to inform programs and policies related to external factors that may impact school readiness for a high quality early education programs.

Chapter 1. Background and Significance

1.1 EARLY LIFE AND LEARNING CONDITIONS AFFECT ADULT HEALTH

There is a growing body of evidence that life and learning conditions in early childhood may have a significant impact, whether direct or indirect, on adult health.[1-7] Adverse childhood experiences such as child abuse and household dysfunction are associated with a significant increase in risk for multiple risky health behaviors like alcohol and drug abuse, smoking, and physical inactivity. These risk factors are associated with many of the leading causes of death in adults, and prevention of adverse experiences in childhood could result in lower rates of cancer and cardiovascular disease (CVD) in our country.[8] Disadvantageous early life conditions are linked to health across the life course due to their impact on health and development during early childhood, which may persist throughout the lifecourse and increase vulnerability across physiologic and psychological outcomes.[9-14] The relationship between socioeconomic status (SES) and health has been consistent, with lower SES being associated with poorer health status and an increased risk of chronic disease in both childhood and adulthood. [15-24]

One of the proposed mechanisms of this association is the impact of chronic stress on children living in low socioeconomic, disadvantageous social situations. This term is often referred to as "toxic stress,"[10,25] and is based on the theory that that this chronic stress, manifested externally by an inability to cope,[26] is having a physiologic impact on children through inflammation and immune responses.[10] This "toxic stress" has the potential to impact a person's risk for poor mental health (e.g., depression, anxiety) and chronic disease (e.g., cancer, diabetes, hypertension (HTN) and CVD in adulthood.[10,25] Another proposed mechanism for how stress impacts individuals, is the

Adaptive Calibration Model which also takes into consideration mental health, environmental stressors and how responsive and individual is to stress.[27-33]. This model highlights that the relationships between these developmental exposures to stress, how an individual responds to stress and behavioral and health influences should all be considered within an evolutionary-developmental framework and not strictly through physiological responses.[29]

Early life conditions that are disadvantageous, either socially or economically have also been linked to poorer behavioral and cognitive outcomes in young children, which is also associated with health across the life course. [10,25,26,34] Poor social-emotional skills and delays in executive functioning, have been strongly linked through empirical evidence to mental health (depression), chronic diseases (HTN, CVD, diabetes, obesity) and health behaviors (smoking, drug use) in adulthood.[35] One of the proposed mechanisms for these associations is lack of cognitive stimulation by and lack of a sensitive and responsive relationship with a caregiver, in addition to other components of "toxic stress" which contribute to delays in brain development and inhibited biological stress responses which are associated with the morbidities mentioned above [10,25]

School readiness is one of the most important child development outcomes that has the potential to impact health in adulthood, and both the public health and educational fields, through their connections to education and employment, can potentially be impacted with policies that address it. School readiness is a term that is used to denote concepts, competencies, and skills that children should have when they begin Kindergarten, and traditionally includes behavioral and cognitive outcomes.[36-41]

Behavioral outcomes refer to social-emotional skills, i.e. how well a child can pay attention and follow directions, their relationships with peers and teachers, how much they know about emotions and can express and regulate them, and how well they can solve social problems.[42-45] Cognitive outcomes often refer to language, literacy, or academic concept (letters, numbers, colors, shapes, etc.) recognition. [37,46-48] These components of school readiness are important not only for academic success during the first years of school but also for life-long academic, economic, and social success. [37-41,49,50] Children who begin school "less-ready" than their peers are less likely to catch up and have poorer academic outcomes as they continue in school.[36,51-56] School readiness has been associated with high school graduation rates,[57] and employment outcomes in adulthood.[37,38,58]

Strong evidence exists that level of education often acts as a determinant of adult health,[59-61] with some arguing that this relationship is causal.[62] Potential pathways for the association between lower education and increased mortality,[62-64] and earlier onset of chronic disease, [61,65] are thought to involve the link between level of education and health behaviors. Lower education level has been associated with a variety of risk factors such as smoking,[66,67] poor diet,[67] lack of physical activity,[67] early sexual activity,[68] teenage pregnancy,[68] and delinquent or criminal behavior.[69] A potential more specific mechanism is self-regulation, which has been linked to impulsivity and other factors that may lead to negative health behaviors.[10]

Early learning conditions, specifically high quality early childhood programs, are associated with health in adulthood.[70] Recent results from a long-term longitudinal cohort in the United States have revealed that children who participated in a high-quality

early education program were significantly less likely to have cardiovascular disease and diabetes as adults, compared to the control group.[4] Health behaviors have also been associated with enrollment in a high-quality early education program including teen pregnancy,[5-7] diet and drug use.[3] Additionally, adults who participate in high-quality early education programs as children are less likely to suffer from depression.[1,2] There is also evidence connecting developmental and social outcomes to adult health that are relevant.[71] Participation in high-quality early learning programs has not only been associated with improved cognitive outcomes, [2,6,7,72,73] but also directly with social skills like self-regulation,[74,75] and social outcomes such as high-school graduation rates,[2,5,7,72] college attendance,[2,5-7,72,76] and arrests and incarcerations.[2,6,7,72,76]

The relationship between early learning and life conditions and health in adulthood is compounded for children of low socioeconomic status, [70] due to racial, ethnic, and socioeconomic disparities in child health, neighborhood stress, and child development (i.e. school readiness). This makes it important to not only understand the mechanisms that are occurring within this relationship, but to take into consideration the differential impact of these disparities.

1.2 DISPARITIES IN CHILDHOOD HEALTH AND SCHOOL READINESS
1.2.1 Racial, Ethnic, and Socioeconomic Disparities in Childhood Health

In the United States, children who are racial or ethnic minorities are more likely to have poorer health in early childhood and conditions that contribute to health disparities later in life, compared to their non-Hispanic white counterparts.[16,17,23,77-85] Black and Hispanic children are nearly 15% or more likely than white children to have poor health,[23,83-85] regardless of income in some cases.[86] Specifically, racial and ethnic disparities in risk factors for chronic conditions such as obesity, [47,48] and asthma, [45]

have been documented during early childhood. Among children, asthma is the most common, serious chronic disease,[87] and Non-Hispanic Black children have prevalence rates almost twice as high as white and Hispanic children.[88] Minority children are also more likely to be uninsured,[83,84] especially Hispanic children.[83-85,89,90] Children from non-white racial and ethnic groups are also less likely to attend well-child visits, and if they do see a physician, have lower rates of receiving preventive screening services and being prescribed medications. [83,84]

Additionally, there is a strong association between these health disparities and income, with the poorest children being more likely to have negative health outcomes including a poorer overall health status and increase in poor health behaviors or chronic diseases in both childhood and adulthood.[15-24] Lower socioeconomic status (SES) children may be less likely to be vaccinated or attend well-visits at a young age,[17,19,23,91] and have higher rates of injuries and poor health behaviors such as smoking and sedentariness as they age.[17-19] High-rates of, and complications as a result of, chronic diseases such as asthma are also seen more frequently in low-SES children.[17-19,21] Studies have aimed to better describe the interrelationship of race and SES and how they affect child health,[17,20,22,23,83] with the evidence base suggesting that it is it not these two factors alone that are contributing to the health disparities.[24,92,93] A broader span of influences, particularly social risks and determinants (i.e. low education, poverty, family structure, race/ethnicity, family conflict, maternal mental health, and parent perception of neighborhood safety) appear to impact child health, [24,92] which is explored in further detail in this dissertation.

It is well understood that the racial and socioeconomic health disparity gap, evident early in life, builds over time and can result in more pronounced health disparities into adulthood.[15,77-82] With these socioeconomic, racial and ethnic disparities in health existing during early childhood,[80-82] and continuing over time,[78] it is critical to better understand the role of amenable conditions that may impact early childhood factors, create developmental and early health disparities, and contribute to health across the life course.

1.2.2 Racial, Ethnic, and Socioeconomic Disparities in School Readiness

Racial, ethnic and socioeconomic disparities are present in other facets of early childhood, specifically school readiness, and these disparities start early. Black children are less likely than their white peers to be ready for school, based on reading and math scores on subtests of the Woodcock-Johnson Psycho-Educational Battery-Revised, and this is seen as early as 18 months of age.[94] Many racial and ethnic minority children have been shown to have lower scores on standardized tests and lower cognitive, language, and socioemotional skill levels compared to their non-Hispanic white peers when they start Kindergarten. [58,61,94-99] To compound this issue, among black children, the gap in test scores increases as they continue through elementary school, with scores in both reading and math falling behind an average of 0.10 standard deviations from their white peers each year from Kindergarten to Third Grade.[100]

Socioeconomic disparities in school readiness also exist,[97,101-105] with less than twenty-percent of children living in families below the poverty line demonstrating pre-literacy skills before they enter school, compared to forty-five percent of children living above the poverty line.[106] Additionally, many children in poverty have lower scores in

reading and math in Kindergarten, and like the racial gaps in readiness, these children were still behind their more affluent peers by third grade.[105] Socioeconomic gaps in readiness have been identified by researchers in children as young as 18 months of age, demonstrated by lower language skills and vocabulary levels in children of lower compared to higher socioeconomic status. [34]

1.2.3 Contributors to Gaps in School Readiness

Two of the factors contributing to these disparities in school readiness that have been examined in more detail are the early care and education environments,[94-96,107-111] as well as differences in family level dynamics—quality of the home environment,[10,95,112] maternal characteristics (sensitivity, responsivity, consistent, nurturing, protective),[10,94,99] and family socioeconomic resources. [95,99,102] However it is important to note that these should be embedded within broader contexts such as environmental stress, and that they are likely many other drivers of these disparities. Nationally, while black children are more likely to attend preschool, especially Head Start programs, than white children,[110] they are more likely to attend lower quality programs, even when controlling for low-socioeconomic status.[94,110,113] At the family level, variances in a mother's responsivity and sensitivity,[94] learning stimulation in the home environment,[99,112,114] and economic resources,[26,102-104] have been shown to contribute to this racial and ethnic gap in readiness. One study found that when the number and quality of learning materials in the home are controlled for, the racial gaps in readiness decreased by 20-50 percent.[112,115,116]

While parenting and access to resources are important to consider, factors other than the early learning environment and family dynamics, such as child health and

neighborhood, may be contributing to gaps in school readiness. Since the majority of children in the US do not experience major health conditions in early childhood, research examining the association between child health and school readiness is limited. Existing research in this area has used parent rating of child physical health or presence of a chronic condition to study the role that health plays in school readiness.[117] One of the specific chronic conditions that has been most commonly studied in relationship to child social-emotional and cognitive development is asthma.[118-133] Children with asthma demonstrate more behavioral problems compared to children without asthma,[134] and miss more days of school, which are both linked to cognitive and social-emotional development.[120] Research on asthma and school readiness, specifically, is itself limited. It appears that there is an association with asthma and lower school readiness skills (simple word recognition, counting, and color identification),[130,131] However, such a relation may be driven by study design limitations such as school readiness measures obtained from parent report, lack of control or accounting for missed days due to illness, control of symptoms, and generalizability of the sample populations.[123,124] As previously mentioned, racial and economic disparities exist for childhood asthma, which increases its pertinence as a health condition to study as it relates to school readiness.[135-137]

An additional factor that may be contributing to disparities in school readiness is the neighborhood in which a child lives. Even when controlling for family level characteristics, structural neighborhood factors (e.g. poverty, concentrated disadvantage, crime) are negatively associated with child development and school readiness and social neighborhood factors (social capital and support) are positively

correlated. [138-151] Structural factors related to neighborhood disadvantage such as neighborhood poverty,[36,139,145,148,152-155] concentrated disadvantage,[146,156-158] exposure to violent crime, [45] or additional neighborhood factors (family structure, average household income, education, employment),[37] have been the primary focus of research examining the relationships between neighborhood and child development.[139] Well-established theories exist for proposed mechanisms that facilitate a relationship between social neighborhood factors and child development;[148,159-163] however, research empirically demonstrating these connections is limited.[139,164,165]

A few studies have examined social contexts such as social capital,[139,145] and perception of safety, [166] but have not included multiple measures at the family and child levels. Perceived parental neighborhood support and safety have been linked to parenting practices,[167,168] which is the basis for hypothesis that parenting may be acting as a moderator, [169-173] or mediator, [132,140,150,157] in the assoction between neighborhood structural and social factors and child health and development. Parenting in the peer-reviwed literature is often defined broadly and ranges from parent child relationship quality, parent activities with the child, and parent stress. [139,147,157,164] Furthermore, these differing parenting definitions may be associated with each other, as researchers hypothesize that neighborhood factors act through parent stress, and or mental health, to impact children, though again empircal evidence is limited for this hypothesis. [148,155,174-176] Mechanistic research is needed to examine the impact of neighborhood social support and how it may operate within families to impact child behavioral and cognitive development. [139,145,147,177] Qualitative research to explore how neighborhoods

impact children from the parent or caregiver perspective is also scarce and has not focused on neighborhoods and school readiness specifically. [164,178,179]

More information is needed both quantitatively and qualitatively to better understand how parent perspectives of neighborhood support impact child health and development. Furthermore, examining a positive neighborhood aspect, such as support, opposed to a negative (e.g., poverty, disadvantage, crime) may have the potential to inform prevention efforts related to early childhood health, development, and school readiness.

It should also be noted that health and neighborhood as individual factors may not impact school readiness, but rather the intersection between the two may do so. Neighborhood poverty is associated with poorer mental health and physical health in children and it is thought that these are occurring through pathways such as access to neighborhood level resources (child care, schools, clinics), parent behaviors and resources in the home environment, and social norms and collective efficacy.[148] In a study that included physical health as a domain of school readiness, neighborhood poverty was associated only with physical health and not other behavioral and cognitive domains of school readiness.[36] It is also hypothesized that neighborhood may be influencing child development, which ultimately impacts school readiness, *through* its relationship to child health. Neighborhood has been directly linked to an increased risk for pediatric asthma, specifically poverty,[180] and environmental pollutants.[181,182] Additionally, a neighborhood environment that is perceived as stressful may contribute to "toxic stress" in the parent which may impact parenting practices and ultimately child development.[183-186] It could also contribute to "toxic stress" directly in the child which

may lead to poorer health.[35] The physiologic impact on children of "toxic stress", through inflammation and immune responses,[10] could result in an increased risk for asthma specifically which is associated with dysregulated immunity.[187]

While theoretical hypotheses and empirical evidence between certain contexts exist (i.e. school readiness and child health, neighborhood and child health, neighborhood and school readiness), research examining the intersection between these constructs and contexts is limited, particularly for young children. This dissertation research not only examines the associations between health, neighborhood social context, and school readiness but will contribute to the evidence base on the mechanisms through which they are effecting child outcomes, likely through their impact on parents.

1.3 OVERALL DISSERTATION PURPOSE

Although research examining more distal, non-academic factors, i.e. neighborhood and child health, and their relationship to child development and school readiness has increased in popularity,[36] the construct of[36] the school readiness has not always been clearly and consistently defined.[38,40,56,188] While traditional definitions of school readiness are more academic and cognitive in nature,[37,46-48] recent definitions have been more holistic and include components such as physical well-being, social-emotional development, and behavioral concepts.[36-38,56,188,189] Even with a more comprehensive definition, there is a need for additional research that contributes to the body of evidence addressing how child health is associated with school readiness. [36,37,55,61,117,118,120,134] A better understanding of the common proposed mechanisms of the relationship between child health and school readiness are behavior problems,[134]

attendance, [120 120] and the less studied factors of how parenting and family functioning

play a role, particularly with parents of children with asthma, is needed. [17-19,21,124]

Additionally, exploring more distal factors, like the importance of a child's

neighborhood structural and social environments and the impact of these factors on

child development outcomes, including school readiness has also been the focus of

more contemporary research.[138-151,164] While the concept of school readiness, and

research on the contributors to it, are expanding beyond the traditional academic

definitions, a better understanding of the relationship between child health and school

readiness, in addition to the mechanisms between neighborhood and school readiness

and other factors impacting both health and neighborhood are needed. To contribute to

a more interdisciplinary approach, including a public health perspective, the objective of

this research was to investigate, in a low-income sample of children, the relationship of

non-academic factors (including physical health and neighborhood social context) to

behavioral and cognitive domains of school readiness (language and literacy, social-

emotional, numeracy/cognitive), in order to: 1) better understand the role of physical

health in school readiness and potential pathways to disparities in child health and

school readiness, and 2) to provide empirical evidence for a better understanding of the

vulnerability and variability of these distal factors. This research will inform programs

and policies that may impact child health and school readiness for a high quality early

education program (Educare) for better and more targeted prevention.

Three specific aims contributed to meeting the research objective:

<u>Aim 1.</u> **To examine the association between physical health, measured by asthma,
and behavioral and cognitive domains of school readiness.**

Hypothesis 1a: Children without asthma will have higher scores on the behavioral and cognitive domains of school readiness than those children with asthma.

Aim 2. **To determine the impact of neighborhood context, specifically parents' perceived level of neighborhood support, on physical health and behavioral and cognitive domains of school readiness.**

Hypothesis 2a: Children living in neighborhoods with low perceived neighborhood support will have a lower rating of overall health compared to children living in neighborhoods with higher perceived neighborhood support.

Hypothesis 2b: Children living in neighborhoods with low perceived neighborhood support will have lower scores in behavioral and cognitive domains of school readiness than those who live in neighborhoods with higher perceived neighborhood support.

Hypothesis 2c: Parents of young children will identify a common set of neighborhood factors as the most important contributors to physical health and school readiness.

Aim 3. **To test specific mechanisms through which neighborhood context, specifically parents' perceived level of neighborhood support, influence physical health and behavioral and cognitive domains of school readiness, through parent stress and parent-child relationship quality.**

Hypothesis 3b: *Neighborhood support influences physical health and behavioral and cognitive domains of school readiness through parental stress and parent- child relationship quality (mediators).*

This mixed method research was conducted utilizing two study designs: **1) a longitudinal, retrospective matched cohort study**, with children matched on propensity for exposure, either by health status (Aim 1) or parental perceived neighborhood support (Aims 2-3). Exposed and non-exposed cohort selection occurred from data for children who are in their last year of preschool, with exposure beginning at baseline/entry into Educare. Data from children with multiple exposure (Parent Interview) time points was also be analyzed to examine the temporal impact of exposures (e.g., increase in parental support) on outcome in the last year of preschool and overtime. This study examined the differences in these novel, contributing drivers of readiness including physical health and well-being and neighborhood factors. 2) **A qualitative study** aimed at better understanding parent perceptions of school readiness, neighborhood, child health and the intersection between these concepts. The qualitative study included four focus groups with parents of children 0-5 years of age, and used purposive and snowball sampling, based on the principle of saturation.

Conceptual Framework: The conceptual model is based off of Muhajarine, Vum and Labonte's multilevel conceptual framework of determinants and consequences of childhood development[190] and Vaden-Kiernan, et al.'s adapted conceptual model outlining the multiple levels and contexts that impact child development.[145,191] Two major contexts that influence child development outcomes are included: neighborhood social context and family context. Neighborhood social support in this research study is

limited to subjective measures of perceived social capital and perceived safety, which have both been linked theoretically to child outcomes, [139,161,177,192] and associated with each other.[192] Family context is categorized as parent distress (e.g., parent stress and mental health) and parent behaviors (e.g., parent child interactions and activities with a child) based on components of the previously mentioned models,[145,191] in addition to a proposed pathway that outlines how family level factors influence child development developed by Halfon et al. and the UCLA Center for Healthier Children, Families and Communities adapted from the National Center for Children in Poverty. [193,194] The concept of parenting as social capital within the family context is based on Sampson's theoretical work.[160,192,195] Theories and conceptual models have addressed the relationship between these three factors—neighborhood social context, family context, and child development outcomes; [139,145,147,161,177,148,159-163,196-201] however empirical evidence of these processes are limited, [31,37] and most existing studies have not included multiple parenting or child outcome measures.

Figure 1. Conceptual Framework
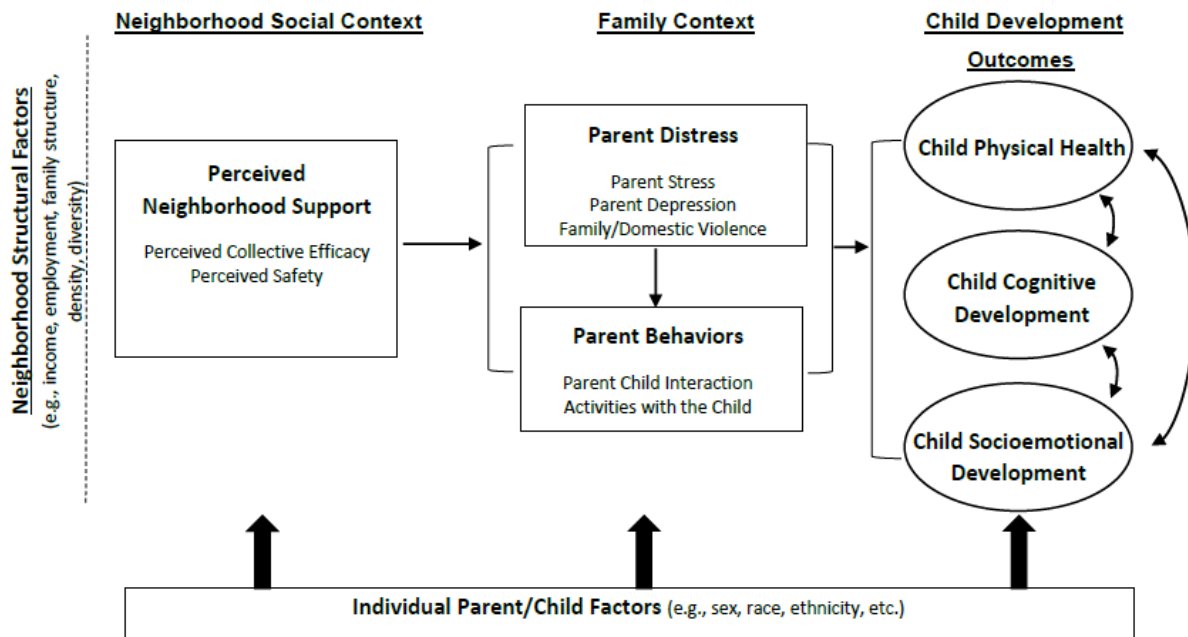
1.4 OVERALL DISSERTATION CONCLUSIONS

Findings from this research reveal the complex relationship between non-academic factors and child health and school readiness, including potential differences by race and sex. This large, racially, diverse low-income sample allowed for exploration of these associations and highlights the need for future research specifically designed to study non-academic factors such as health and neighborhoods and their impact on school readiness. More detailed specification of health, neighborhood and family level variables are needed, grounded in theory, in addition to intersectional and interdisciplinary research designed to study the impact of neighborhood social context on child development and school readiness outcomes. Particularly, research is needed to better understand how parenting variables and the parent's perspective are defined

and measured. This will be essential moving forward to further elaborate on and validate existing theories on the impact of neighborhood context on child development.

Regarding the differences by race and sex within these associations, it will be particularly important for early childhood experts and policy makers to take these factors into consideration when designing programs and interventions. It will be critical for the focus to not only be on increasing enrollment in high-quality early education programs for non-White children [103] but to also consider neighborhood and parent level factors when designing programs and policies to close the racial school readiness gap. Programs should also make a two-generation approach a priority,[202] designing services and activities that meet the needs of children and parents together. This approach focuses on multifaceted aspects outside of early childhood education including social capital, health and well-being, economic assets, and post-secondary and employment pathways that contribute to positive outcomes for both children and their families. This holistic approach, considering non-educational factors, and both parent and child inputs and outcomes will be essential for programs to consider if they want to reduce disparities in health and readiness for low-income children.

Locally this work will have the potential to be incorporated into evaluation and programming related to early childhood education and through partnerships within the Educare Network, and relationships with local early learning centers and non-profits.

Chapter 2. The Association between Physical Health and School Readiness

2.1 PRIOR LITERATURE

2.1.1 The Connection between Child Health and School Readiness

While specific health conditions such as, Attention Deficit Hyperactivity Disorder (ADHD), asthma, and high blood lead levels have been identified as factors that may be contributing to the racial and income gaps in school readiness,[118] little is known about the connection between child health and school readiness, particularly because health in early childhood for US children is generally favorable, with few likely to experience chronic or infectious disease. There is limited evidence in the literature that child health, often defined by parent rating of child physical health or presence of a chronic condition, plays a role in school readiness,[117] however less is known about the mechanisms through which this association occurs. Research has documented that children with chronic diseases, like asthma and juvenile arthritis, are more likely to have behavior problems,[134] and may miss more days of school due to their illness, which are both linked to cognitive and social-emotional development;[120] however, there is not a wide body of evidence on these associations.

One study using the Early Development Instrument (EDI), which is a well-known and utilized instrument used to measure school readiness at the community level, found that even when controlling for socioeconomic status and family factors, children with "less than perfect health," based on caregiver rating of child health status, were twice as likely (OR=2.37, CI 95%= 1.82,3.10) to have a lower school readiness score compared to children with "perfect health."[55] Additional studies using EDI data have examined physical health and well-being as a component of school readiness, however the

domain includes child physical development measures, such as physical readiness for the school day, physical independence, and gross and fine motors skills, rather than child health specifically. [36,37,55] Furthermore, studies of this nature have not been replicated in low-income populations specifically.

2.1.2 Asthma and School Readiness

Child health is likely to have a larger impact on school readiness for children with chronic physical health conditions.[118] Asthma is the most common, serious chronic disease in children in the United States. [87] The 2013 National Health Interview Survey (NHIS) reports that 8.3% of children less than eighteen years of age have been diagnosed with asthma, with a slightly higher percentage of boys (9.3%) compared to girls (7.3%). Prevalence rates are higher for Non-Hispanic black children (13.4%) compared to white (7.5%) and Hispanic children (7.4%). Asthma prevalence is also higher for children living below the federal poverty line, defined by ratio of family income to poverty threshold, (11.7%) compared to those children living above the poverty line (7.2%).[88] Childhood asthma is defined by repeated wheezing,[203] occurring apart from a cold,[204] and a physician's diagnosis based on symptoms of airflow obstruction and exclusion of alternate diagnoses.[205] Asthma is difficult to definitively diagnosis in early childhood, although there are indices that physicians can use including family history of asthma diagnosis, child eczema and allergic rhinitis diagnosis, and an elevated eosinophil count.[204] Common causes of asthma in early childhood include environmental exposures,[206,207] diagnosis of an infectious disease in early childhood,[208] recurrent respiratory infections,[209] and eczema in early childhood or a parent diagnosis of asthma.[210,211]

Asthma has serious consequences for children. Not only is asthma a significant predictor of childhood disability,[212] it is the primary reason for emergency room visits and hospitalizations among children in the United States.[118] It has the potential to explicitly impact school readiness by limiting a child's activity, ability to learn, and is the number one factor contributing to missed school days among children.[87,118] There are also longer term consequences in terms of direct medical costs and indirect costs as a result of missed school and work days.[213]

Asthma is the most commonly studied chronic health condition in childhood in the United States as it relates to cognitive development,[119-121] psychological adjustment,[122,123] child behavior,[124-126] and school performance.[127-133] Childhood asthma is also relevant to the discussion of school readiness because of the racial and economic disparities that exist, with children who are racial/ethnic minorities and especially those that are living below the poverty line,[135] being more likely to be diagnosed with asthma.[136,137] Children of racial/ethnic minorities and/or poor children are more likely to have limited activity as a result of asthma,[214] less likely to have doctors' visits,[180] more likely to be hospitalized because of their asthma,[136,180,215] and less likely to use asthma medications.[137,216] Additionally, it has been demonstrated that doctors are often less likely to prescribe asthma medications to minority children compared to white children.[130,137,217,218]

There are several proposed pathways between asthma and cognitive development, the first through psychological stress.[219] Stress in children has been associated with asthma,[219-222] and it is believed that this association occurs through an immune process of stress to inflammatory reactions, [219] [223] with inflammation being

linked directly to cognitive impairment.[224] An additional proposed pathway involving inflammation is related to environmental pollution leading to inflammation and ultimately to decreased cognitive functioning in children.[225] The pathway between asthma and behavior outcomes in children is less clear, however there is evidence documenting that the association is a product of family level factors such as social support,[226] conflict in the home, and parental mental health.[124]

There are several proposed pathways between asthma and cognitive development, the first through psychological stress.[219] Stress in children has been associated with asthma,[219-222] and it is believed that this association is occurring through an immune process of stress to inflammatory reactions, [219] [223] with inflammation being linked directly to cognitive impairment.[224] An additional proposed pathway involving inflammation is related to environmental pollution leading to inflammation and ultimately to decreased cognitive functioning in children.[225] The pathway between asthma and behavior outcomes in children is less clear, however there is evidence documenting that the association is a product of family level factors such as social support,[226] conflict in the home, and parental mental health.[124]

Existing evidence on the relationship between asthma and child development is conflicting, with some research stating that asthma is not associated with cognitive development or school performance.[121,129,132] However, many of these study samples included children with well controlled asthma, and the children included were predominately white males. On the contrary, it is documented in the literature that even for preschool-aged children with controlled asthma, they are more likely than children without asthma to have behavior problems.[124,226] Asthma has also been associated with

an increase in school absences, which may impact academic performance and social development.[120,128]

Only two studies have examined asthma and school readiness specifically.[130,131] Halterman et al., found that children with asthma were less likely to have school readiness skills (simple word recognition, counting, and color identification) and that the association was stronger for boys compared to girls. Differences were not seen in language, motor, and socioemotional skills, although it should be noted that all development measures were based on parent report.[130] A more recent study conducted in New Zealand, found that children who began school with asthma had lower reading scores at the end of the school year, the same association was not seen for math scores, and all results were based on standardized achievement tests. The association with reading scores remained, even when controlling for covariates such as missed days, race, sex, family structure, socioeconomic status, and academic skills at school entry. [131]

With a limited evidence base and conflicting results from studies focusing on factors related to school readiness, there is a need for research that examines the role of asthma on school readiness, especially research that includes large samples of the most vulnerable children, and standardized measures of child outcomes. This proposed study also has the potential to improve on confounding present in previous studies by matching children with and without asthma based on exposures.

2.2 RESEARCH QUESTION AND RESEARCH HYPOTHESES
Aim 1.

It is hypothesized that physical health may be contributing to gaps in school readiness;[118] however evidence is limited that addresses the specific factors playing a

role in this association.[117,120,134] Research in this area has not been nationally representative, and has commonly used one tool for assessing physical health as a component of school readiness, that may not be comprehensive in both physical health and school readiness measures.[36,37,55] Therefore, to better understand the connection between child health and school readiness, *Aim 1 is to examine the association between physical health, measured by asthma, and behavioral and cognitive domains of school readiness.* This association was tested through a longitudinal, quantitative study design utilizing the National Educare Learning Network's 2007-2015 data set which includes data from 26,810 children enrolled in 20 Educare schools across the United States. Specific associations of physical health, using data from Parent Interviews questions which include parent reports of physical health or specific health diagnoses, with individual domains of school readiness will also be tested to assess whether health is more closely associated with one over the other. Therefore, the **first hypothesis**, ***Hypothesis 1a is that: Children without asthma will have higher scores on the behavioral and cognitive domains of school readiness than those children with asthma.*** This research will contribute to the evidence base of racial disparities in both child health and school readiness among children in a similar SES group, in order to better understand contributors to these disparities in a vulnerable population.[227]

2.3 RESEARCH METHODS

2.3.1 Study Sample

The proposed study utilized data from the Educare Learning Network (ELN) Implementation Study, which is designed to document the features of Educare and how implementation of the model contributes to program quality and links to child and family

outcomes. Nationally, there are 20 Educare schools from 14 states that are part of the ELN. The evaluation is led by a national evaluator at the Frank Porter Graham Child Development Institute (FPG) at University of North Carolina-Chapel Hill. Each Educare school (or geographically close groups of schools) works with a Local Evaluation Partner (LEP) to collect data for the Implementation Study.

Data is collected in three main domains 1) Child Progress Measures 2) Family Progress Measures and 3) Classroom/Teacher Progress Measures. Child Progress Measures are collected by members of the LEP team for each site, as well as, by the child's classroom teachers. These child progress measures are outlined in detail below in *2.4.2 Variable Specification*. Family Progress measures are collected during a Parent Interview that is administered annually to the child's primary caregiver by a Family Support Staff or LEP research team member at each Educare site. The Parent Interview includes a variety of demographic information about the child and family, parental beliefs and attitudes, and their perceptions of the Educare program.

The primary quantitative dataset for this study was provided by FPG and includes all data collected for the ELN Implementation Study from 2007-2015 (N=26,810). Due to changes in versions of several child progress measures, only data from 2012-2015 was used in this study, and children with identified disability plans or any identified serious chronic diseases such as diabetes, sickle cell, and high lead levels were excluded from this study due to potential confounding. Additionally, this study included only children in their transition year at Educare (who would be leaving at the end of the year to go to kindergarten) whose parents provided information on child health. The study sample included children from 3 to less than six years of age. This study sample also excluded

any child with a reported Individual Education Plan (IEP) or Individual Family Support Plan (IFSP) which is included in the FPG data set (N=4410). Child with IEP's or IFSP's were included because in the available dataset, there is not information available on what the IEP or IFSP is assigned for (i.e. mental or physical disability, speech, or behavioral concern) and therefore it was not possible to determine the severity of the condition for each child so all children with reported IEP's or IFSP's were excluded due to potential confounding. After children were matched by Propensity Score (matching process described below) and attendance the final sample was N=1970.

Sample Size/Power

Based on the literature demonstrating a large effect size (OR=2.37, CI 95%= 1.82,3.10) between exposed (less healthy) and unexposed (healthy children) for school readiness outcomes,[55] and given the available sample, these analyses were able to achieve the necessary sample size, even after matching. A sample size of 1,200 was needed to detect an effect size of 2.0 if it exists with 90% power, and a sample size of 2,100 was needed to defect an effect size of 1.5 if it exists with 80% power, either can be achieved with this sample. An effect size of 1.5 would be the smallest difference that would have been important to detect; however, if it is large, this sample size would have achieved greater power. The available sample size also allowed for adjustment for the variance inflation factor (VIF), using the formula for design effect $n_{eff} = N (1+ (n_{clus} - 1) \rho)$[228] to account for clustering of children by classroom and Educare site. The design effect represents the amount by which a sample size that has been calculated at the individual-level needs to be multiplied to obtain the sample size required for analysis of

clustered data. With ICC (ρ) set at 0.02, 0.05, and 0.10, respectively this sample was large enough to give sufficient power.

2.3.2 Study Design

This was a longitudinal, retrospective matched cohort study. Children were matched based on propensity for exposure, asthma vs. no asthma, based on confounding factors as well as predictors of asthma and readiness. Matching also occurred based on attendance, which was not included in the Propensity Score Model, to take into account attendance as a key confounder in the relationship between asthma and school readiness. A 4:1 match was used, although a 2:1 match would have allowed for the desired effect size and 80% power as described above. Exposed and non-exposed cohort selection occurred from data for children who were in their last year of preschool, based on if they were ever exposed, i.e. if the parent ever reported that the child had asthma on the Parent Interview. Exposure data--specific health conditions, i.e. asthma, are collected through the Parent Interview in the fall of each school year. Outcome data was restricted to scores on assessments for these measures that were collected during the spring of the school year before the child left Educare to attend Kindergarten. Data from children with multiple outcome data time points was also analyzed.

2.3.3 Variable Specification

The *independent, exposure, variable* in this study that was a proxy for physical health was parent report of an asthma diagnosis. This was operationalized using a question from the ELN Parent Interview where parents were asked to answer "Yes" or "No" to any specific health needs (conditions) that the child has been diagnosed with.

In the ELN Parent Interview **specific health conditions** was measured by asking parents "Does your child have special health needs?", and if they answered "Yes" they were asked to tell the interview all that applied including—allergies, diabetes, sickle cell disease, high lead levels, anemia, eczema, hearing difficulties, asthma, obesity, vision programs, or other. For the purposes of this study, when analyzing outcomes for children with specific health conditions only children with asthma were included. Children with diabetes, sickle cell, high lead levels, anemia, hearing difficulties, and vision problems were excluded due to low sample sizes and potential confounding when analyzing the association between physical health and well-being and the behavioral and cognitive domains of school readiness.

The *dependent, outcome, variables* in this study, **behavioral and cognitive domains of school readiness**, was measured using scores from four validated assessment tools in three categories—Language and Communication which includes the Preschool Language Scale (PLS), 5th Edition,[229] and the Peabody Picture Vocabulary Test (PPVT), 4th Edition; [230] Social Emotional which is measured by the Devereaux Early Childhood Assessment (DECA); [231] and Numeracy/Cognitive which is measured by the Bracken Basic Concept Scale-Revised. [232] School readiness was defined based on standard scores within or above the average or typical range for the PLS, PPVT and Bracken; for the DECA it was based on typical or above T-scores. These variables were analyzed continuously as described below in *2.3.4 Statistical Analysis*.

Language and Literacy

1. The **Preschool Language Scale, 5th Edition (PLS)** measures a child's receptive and expressive language abilities, including auditory comprehension and expressive communication. Children are given an Auditory Comprehension, Expressive Communication, and Total Language Score. The measure is collected by a member of the Local Evaluation Partner (LEP) team for each Educare School. For this study population, it is administered in the spring. Standard scores in these three categories was used for analysis and are classified as follows: a score of 85-115 is considered typical for language development for a child's age; a score of greater than 115 is considered advanced for language development for a child's age; and a score of less than 85 is considered delayed for language development for a child's age.[229] School readiness for this measure was defined as a standard score of 85 or higher. Children with a score of less than 65 were excluded due to potential developmental delays.

2. The **Peabody Picture Vocabulary Test, 4th Edition (PPVT)** measures a child's receptive vocabulary skills, i.e. how many words they can understand. It is used to better understand a child's age-appropriate language skills and emergent literacy skills. The measure is collected by a member of the LEP team for each Educare School. For this study population, it is administered in the spring. Children are given a standard score that is classified as follows: a score of 85-115 is considered average for receptive vocabulary skills for a child's age; a score of greater than 115 is considered high for receptive vocabulary skills for a child's age for a child's age; and a score of less than 85 is considered low for receptive vocabulary skills for a child's age. [230] School readiness for this measure was defined as a standard score of 85 or higher. Children with a score of less than 65 were excluded due to potential developmental delays.

Social Emotional

3. The **Devereaux Early Childhood Assessment--Preschool form (DECA)**, represents a strengths based approach to measuring a child's social-emotional skills. The measure is collected by the child's classroom primary caregiver, i.e. the teacher in the classroom that knows the child best. It is completed in the fall and spring. T-scores and percentiles are scored for two scales 1) Protective Factors which includes initiative, attachment, self-control (scored individually and for Total Protective Factors) and 2) Behavioral Concerns. For the Protective Factor Scales, T-scores of 60 and above indicate a strength; T-scores of 41-59 are typical; T-scores of 40 and below indicate an areas of need. For the Behavioral Concerns Scale, T-scores of 60 and above indicate an area of need and T-scores of 59 and below are typical. [231] School readiness for this measure was defined as a T-score of 41 or higher on the Protective Factor Scales.

Numeracy/Cognitive

4. The **Bracken Basic Concept Scale-Revised (Bracken)** is a standardized measure of general cognitive skills and school readiness abilities. The Bracken evaluates children's comprehension of concepts including colors, letters, numbers/counting, sizes/comparisons, and shapes, that are essential to early communication development and school readiness. The measure is collected by a member of the LEP team for each Educare School. It is administered in the spring, and at some Educare sites both in the fall and spring, before children leave Educare for elementary school. Children are given a School Readiness Composite (SRC) Standard Score that is classified as follows: a score of 85-115 is considered average for school readiness skills for a child's age; a score of greater than 115 is considered advanced for

school readiness skills for a child's age for a child's age; and a score of less than 85 is considered delayed for school readiness skills for a child's age.[232] School readiness for this measure was defined as a SRC standard score of 85 or higher. Children with a score of less than 65 were excluded due to potential developmental delays.

Potential confounders in this study were individual sociodemographic characteristics including child age, sex, race/ethnicity, parent level of education, family structure, parent employment status, maternal age, and language. *Potential moderators* include parent distress (parent stress, and depression), parent behaviors (parent-child relationship and activities with the child), and time in Educare. Race/ethnicity, and child sex were also tested as moderators. Parent distress and behavior were tested as mediators in Paper 3. Educare school site was included to examine differences by site, using multilevel modeling, additionally to account for cultural site differences. All of these variables are available in the ELN national dataset. Classroom was not available for a large portion of children in this dataset, therefore it is not possible to examine differences by classroom.

2.3.4 Statistical Analysis

Univariate, bivariate, and multivariable analyses were conducted. All analyses were performed using SAS version 9.4. Standard errors, 95% confidence intervals and unless otherwise stated, a p-value <0.05 were used to define statistically significant associations. It should be noted that throughout the analyses, scores from the assessments measuring the behavioral and cognitive domains of school readiness were analyzed as continuous variables. Descriptive, univariate analyses included frequency distributions, means, and standard deviations for demographic, independent, and

dependent variables. Outcomes were tested for normal distribution and non-parametric analyses were conducted.

Bivariate analyses were conducted to examine crude associations between physical health, measured by asthma, and the behavioral and cognitive domains of school readiness, in addition to potential confounding variables. To demonstrate that exposed and unexposed groups are similar except for parent report of asthma, Propensity Score matching was used based on a profile of confounders (child age, sex, race/ethnicity, parent level of education, family structure, parent employment status, and language). Overlap of propensity scores (PS) were assessed and children were matched by both attendance days (caliper of 20 days) and PS score (Caliper of 0.05). Children were matched on propensity score and attendance days due to the fact that attendance may be one of the main mechanisms between asthma and behavioral and cognitive outcomes (N=1970). The association between physical health, measured by asthma, and each individual domain of school readiness were analyzed, in addition to, calculating how much variance in the behavioral and cognitive domains of school readiness is explained by asthma as a marker for physical health. Rao-Scott χ2 for Pearson's Chi-square test, Odds Ratios with 95% Confidence Intervals were used to measure bivariate associations for categorical variables and T-test/ANOVA for means and Pearson's Regression (R) for continuous variables.

Multivariable analyses included multiple regression models to examine whether there was an association between physical health, measured by asthma, and the behavioral and cognitive domains of school readiness after adjusting for covariates. All covariates with significant statistical associations to both the outcome and exposure in

bivariate analyses were included in the regression models, in addition to variables that were not statistically significant but that are commonly controlled for or are important theoretical confounders or predictors of readiness or asthma (child sex, race, language, age at entry into Educare, age at last assessment, and if the child's mother was a teenager when they were born). Remaining covariates were only kept in final models if they had a p value of < 0.25. Interactions by potential effect modifiers (race, sex, and parental education) were tested and results were stratified by these variables if differences existed (p< 0.20).[233]

Multi-level modeling was used to account for the fact that children are nested by school site for: Level-1 variance in readiness attributed to the individual level; Level-2 variance attributed to the site level.

$$Y_{ijk} = \beta_{0j} + \beta_{0j}X_{ij} + r_{ij}$$ *Level 1*

$$\beta_{0jk} = \delta_{00k} + U_{0jk}$$ *Level 2 (intercept)*

$$\beta_{1jk} = \delta_{10k} + U_{1jk}$$ *Level 2 (slope)*

Where Y_{ijk} is readiness for individual i in site j, β_{0jk} is the mean outcome in site j, and r_{ij} is the variance related with individual i in site j. δ_{00k} denotes the grand mean for readiness across all sites in the Educare network. U_{0jk} is the random effect associated with area.

Random slope models were used to assess if school readiness and if the association between physical health and school readiness varies across Educare sites.

2.4 RESULTS
2.4.1 Descriptive Statistics

Sample characteristics for the pre-matched sample, children in their last spring at Educare before going to Kindergarten (N=4410) are presented in Table 1. The mean age of children in the sample was approximately 5 years of age (59.3 months) and the mean entry age was 3.3 years of age indicating that the mean time in an Educare program is approximately 2 years. On average, children were in attendance for 166 days of the school year (around 80% of the days the schools were open). Approximately 80% of the sample was either Black (40%) or Hispanic (40%) with the remaining 20% identifying as White (10%) or other (10%). The sample was evenly divided in regards to sex with 49.7% males and 50.3% females. The majority of caregivers had a high school education or less (55.5%) and were employed full-time (63.6%). Almost 21% of parents screened positive for depressive symptoms. Approximately 10% of children had parent report of asthma over their time in Educare. Social emotional school readiness outcome t-scores for protective factors and behavioral concerns, measured by the DECA, were close to the validated mean for the assessment (52.9, SD 9.45 and 49.51, SD 10.65 respectively). Language and cognitive score sample averages ranged from 91.6, SD 13.2 for the PLS-5 AC Spanish to 96.4, SD 12.7 for the PLS-5 AC English, with all averages below the 100 validated assessment averages.

Table 1: Descriptive Statistics

Characteristic	All N=4410	
	N	Mean (SD) or %
Entry Age (yrs)	4410	3.33 (1.19)
Age Last Assessed (months)	4410	59.34 (5.60)
Attendance (Days Present, Max 200)	3555	166 (25.28)
Sex		
Male	2220	49.66
Female	2190	50.34
Race/Ethnicity		

White	417	9.55
Black	1755	40.18
Hispanic	1753	40.13
Other	443	10.14
Primary Language Spoken at Home		
English	2961	67.14
Spanish	1281	29.05
Other	168	3.81
Family Structure		
Single Parent	1996	51.14
Two Parent	1830	46.89
Teen Mom (< 19 years)		
No	3282	86.05
Yes	532	13.95
Parent Education*		
Less Than High School	1645	38.50
High School Diploma/GED	725	16.97
Some Coll/Tech/ Associates Degree	1568	36.70
Bachelors' Degree or Higher	337	7.88
Parent Employment*		
Employed, Full-Time	2744	63.64
Employed, Part-Time/Part-Year	751	17.42
Unemployed/Not in Labor Force	817	18.95
Depressive Symptoms		
No	2982	79.18
Yes	784	20.82
Parent Child Home Activities*[1]	3523	1.58 (0.35)
Community Activities*[2]	2330	0.86 (0.53)
Parent Stress Index (PSI) Parental Distress Mean Score*[3]	3518	1.79 (0.68)
Parent Child Relationship[4]	2390	4.34 (0.50)
Asthma		
No	3967	89.95
Yes	443	10.05

	Child Health*[5]	3758	4.32 (0.76)
	School Readiness Outcomes		
	DECA Protective Factors T-Score	3912	52.85 (9.45)
	DECA Behavioral Concerns T-Score	3912	49.51 (10.65)
	Peabody Picture Vocabulary Test SS	3897	93.09 (14.97)
	Preschool Language Scale Auditory Comprehension English SS	2077	96.35 (12.72)
	Preschool Language Scale Auditory Comprehension Spanish SS	356	91.61 (13.16)
	Bracken Basic Concept Scale SS	3448	92.35 (14.40)

*Averaged over the enrollment period.

[1] Mean number of times over the past week the parent or someone in the child's family read/told them a story, sang songs, described/narrated what the child was experiencing, taught letters/words/numbers, taught songs/music, worked on arts, played with toys/games indoors, played a game/sport/exercised, talked while doing errands, talked about what happened at Educare, talked about TV/videos, or played counting games.

[2] Mean number of times over the past month that the parent or someone in the child's family did the following things with the child: visited a library, playground/park, art gallery/museum/historical site, zoo/aquarium/petting farm or went to a play/concert/live show

[3] As measured by the Parent Stress Index (PSI) Short Form. Scored 1-5 with a higher score indicating higher stress

[4] As measured by the Pianta Parent Child Relationships Scale. Scored 1-5 with a higher score representing a higher relationship quality (higher closeness and lower conflict)

[5] Parent reported score of Child Health. Scored on a scale of 1-5 with 1= Poor and 5 = Excellent

Table 2 presents correlations among school readiness outcomes, asthma, and child and family covariates from the pre-matched sample. All covariates were significantly associated with school readiness outcomes and asthma, except for maternal age (Teen Mom) and Language. Both language and teen mom were included in the multivariable analyses due to their contextual relevance to the exposure (teen mom) and school readiness outcomes (language). As mentioned above child sex, race, language, age at last assessment, and age of entry into Educare were also included in all multivariable analyses.

Table 2: Exposure, Outcome, and Covariate Correlations

	Social-Emotional		*Language*			*Cognitive*	*Asthma*
	DECA Protective Factors	**DECA Behavioral Concerns**	**PPVT**	**PLS AC English**	**PLS AC Spanish**	**Bracken**	

Entry Age	0.0414**	-0.06492**	-0.17306***			-0.1882***	-0.14601**	-0.20121***	-0.05755***
Child Age	0.19957***	-0.09102***	0.02903	-0.05964**		-0.07366	-0.07127***	0.03538*
Sex	-0.21843***	0.21242***	-0.014	-0.1041***		-0.07159	-0.06903***	0.089***
Race/Ethnicity	0.06824***	-0.10672***	-0.2462***	-0.07575***	.		-0.16776***	-0.03342*
Language	0.10334***	-0.15523	-0.36869***	-0.1653	.		-0.21538	-0.07258
Family Structure	0.06719***	-0.11161***	-0.0907***	-0.02945		0.04243	-0.05355**	-0.04166**
Teen Mom	-0.04139*	0.03994*	-0.02242*	-0.01663		-0.13506*	-0.04777**	-0.00952
Parent Education	0.0243	0.04408**	0.30375***	0.1857***		0.11972*	0.28138***	0.1263***
Parent Employment	-0.00776	-0.03525*	-0.04328**	-0.05399*		-0.01727	-0.06423***	0.05341***
Depressive Symptoms	-0.03554*	0.07121***	0.00223	-0.03225		-0.0609	-0.03512	0.07466***
Parent Child Activities	-0.02116	-0.00947	0.13807***	0.05617*		0.09721	0.1147***	0.03423*
Community Activities	-0.02058	0.01791	0.05747**	0.00972		0.018	0.02879	0.05052*
Parent Stress	-0.04417**	0.08062*	-0.01366***	-0.02253		-0.10635	0.06347***	0.07414***
Parent Child Relationship	0.0795***	-0.10662***	0.13915***	0.10341***		0.09156	0.13339***	-0.03774***
Child Health	0.02191	0.01233	0.11736***	0.0612**		0.04009	0.11646***	-0.18185***
Asthma	-0.03581*	0.04913**	0.04965**	0.00521		0.00429	0.01227	

Based on Pearson Correlation Coefficients *p < 0.05 **p < 0.01 ***p < 0.001

2.4.2 Multivariable/Multilevel Modeling

Asthma was crudely associated (results not tabled) with receptive vocabulary (PPVT) and social emotional protective factors and behavioral concerns (DECA). Children with asthma had slightly higher PPVT scores than children without asthma (β= 1.33, SD= 0.76, p< .10). For social emotional outcomes, children with asthma had lower protective factors scores (β= -1.19, SD= 0.53 p <0.05) and higher

behavioral concern scores (β= 1.59, SD= 0.63 p < 0.01) than children without asthma. However, when taking into consideration child and family covariates, with and without including potential confounders (parent education, race, and sex) in the models these associations were no longer significant. Table 3 presents the results of multivariable modeling in the matched sample. Tests for collinearity for all models revealed no significant collinearity with Tolerance levels all above 0.73 for all variables in all models and Variance Inflation Factors all less than 1.36 (indications of collinearity are Tolerance levels below 0.2 or a VIF greater than 5). Multivariable analyses were conducted to control for a child's first assessment. For children with more than one time-point for each school readiness outcome (n=3308), controlling for time varying readiness outcomes before the final assessment not change the outcome of the initial multivariable analyses.

Analysis of potential effect modifiers revealed that association seen between asthma and school readiness outcomes may be confounded by child and family level factors and may also differ by child race or sex. Interactions were significant for receptive vocabulary skills (PPVT) between asthma and race (p < 0.10) and for behavioral concerns (DECA) and parent education (p< 0.10). When stratified by race (stratification results not tabled), the association remained only for non-white Hispanic children with asthma who had higher PPVT scores (β=3.21, SD= 1.62, p<0.05) than non-white Hispanic children without asthma. When stratified by parent education, the association remained only for children with asthma whose parents had attended some college or had a technical or associates degree. Within this group, children with asthma

had higher DECA behavioral concerns scores compared to children without asthma

(β=2.04, SD= 2.50, p<0.10).

Table 3: Multivariable Results: Adjusted Linear Models of Asthma and School Readiness Outcomes

	Social-Emotional		Language			Cognitive
	DECA Protective Factors	DECA Behavioral Concerns	PPVT	PLS AC English	PLS AC Spanish	Bracken
	N=1787 B (SE)	N=1787 B (SE)	N= 1686 B (SE)	N=985 B (SE)	N=148 B (SE)	N=1522 B (SE)
Intercept	32.90 (3.27)***	76.50 (4.61)***	85.13 (5.52)***	102.96 (6.06)***	89.54(4.32)***	97.64 (6.39)***
Asthma (yes)	-0.50 (0.70)	0.07 (0.80)	0.96 (0.87)	-0.16 (0.99)	2.61 (2.94)	0.78 (1.08)
Entry Age (years)	-0.31 (0.22)	-0.17 (0.26)	-1.90 (0.31)***	-1.35 (0.35)***	-0.58 (0.88)	-1.89 (0.36)***
Child Age (months)	0.35 (0.05)***	-0.25 (0.06)***	0.27 (0.07)***	-0.13(0.07)+	-0.14 (0.17)	0.08 (0.08)
Sex (male vs. female)	4.04 (0.54)***	-4.67 (0.57)***	0.14 (0.71)	2.8 (0.83)***	2.70 (2.12)	1.5255 (0.80)*
Race/Ethnicity						
White (referent)	0.00	0.00	0.00	0.00	0.00	0.00
Black	--0.76 (1.09)	-0.66 (1.32)	-7.44 (1.24)***	-6.42 (1.34)***		-1.55(1.41)
Hispanic	0.05 (1.28)	-3.49 (1.50)*	-7.86 (1.73)***	6.47 (1.59)***		-6.76 (1.43)***
Other	-0.07 (1.27)	0.44 (1.51)	-4.64 (1.71)**	-2.72 (1.85)		-1.42 (1.93)
Primary Language Spoken at Home						
English (Referent)	0.00	0.00	0.00	0.00	0.00	0.00
Spanish	1.17 (0.96)	-0.22 (1.06)	-9.14 (1.44)***	-3.88 (1.88)*		-3.59 (1.56)*
Other	-0.31 (1.46)	-5.63 (1.91)**	-5.67 (2/07) **	-6.11 (2.28)**		0.19 (2.50)
Family Structure (single vs. two parent)	-0.87 (0.59)	1.55 (0.52)**				
Teen Mom (yes)	-1.04 (0.82)			-1.75 (1.18)	-5.57 (3.07)+	
Parent Education						
Less than HS Diploma/GED			-7.95 (1.39)***	-8.33 (1.69)***	-10.5 (4.42)**	-9.01 (1.68) ***
High School Diploma/GED			-7.39 (1.33)***	-6.97 (1.54)***	-4.72 (4.64)	-8.32 (1.69)***
Some Coll/Tech/ Associates Degree			-3.69 (1.22)**	-3.57 (1.37)**	-8.42 (5.29	-4.01 (1.49) **
Bachelors' Degree or Higher (Referent)			0.00	0.00	0.00	0.00
Parent Employment						

Employed, Full-Time (Referent)			0.00	0.00		0.00
Employed, Part-Time/Part-Year			1.23 (0.97)	1.75 (0.97)+		0.90 (1.06)
Unemployed/Not in Labor Force			-1.27 (0.86)	-1.12 (0.96)		-2.14 (1.07)*
Depressive Symptoms (yes)	-	1.56 (0.80)*				
Parent Child Home Activities (0 to 3)				2.20 (1.46)		
Parent Stress (1 to 5**)**			0.95 (0.60)			-1.08 (0.62)
Parent Child Relationship (1 to 5)	-0.84 (0.33)**	-2.11 (0.65)**	2.80 (0.78)***	2.19 (0.88)**	4.24 (1.91) *	1.61 (0.92)+

+p < 0.10 *p < 0.05 **p < 0.01 ***p < 0.001

2.5 DISCUSSION

This study examined the relationship between health, asthma and school readiness. Results indicate that there is an association between asthma and school readiness outcomes, however this may be confounded by child and family level factors and may also differ by child race or sex. We found that non-white Hispanic children with asthma had higher receptive vocabulary skills than non-white Hispanic children without asthma. Previous studies that have examined asthma and school readiness have found a relation between asthma and school readiness skills and asthma and receptive vocabulary (a prerequisite for reading skills);[130,131,234] however, these associations were in the opposite direction. Halterman et al., found that boys with asthma had lower school readiness skills compared to girls with asthma, [131] and in this study the interaction between asthma and Bracken scores (general school readiness skills) was not significant. The one other study that has examined the relationship

between asthma and school readiness found an association between asthma and reading scores [130], which in this study was also dissimilar. Children with asthma had higher receptive vocabulary scores than children without asthma, and the association remained significant when taking into consideration other child and family factors for non-white Hispanic children only. This inverse association is most likely due to limitations of the measures that are discussed in detail below.

The association of asthma with behavior problems was also seen in this study, as documented in the literature, [117,215] but did not consistently remain when controlling for covariates, including parent stress and mental health which have been proposed as mechanisms for the pathways between asthma and behavior outcomes. [117] An association was seen between asthma and behavioral concerns, but only among children whose parents reported attending some college or having a techinical or associates degree. Parental stress, depressive symptoms, and parent-child relationship were associated with both social emotional protective factors and behavioral concerns in this sample, therefore there may be potential mediation by these factors.

2.5.1 Study Limitations

The hypothesis for this study, that children without asthma would have higher scores on the behavioral and cognitive domains of school readiness than those children with asthma was not observed in the larger sample; however, the lack of significant findings in this analysis could be due to several factors. The prevalence of asthma in this study sample (10%) was higher than the national prevalence (8.3%) and comparable to that of children living below the federal poverty line (11.7%).[88] However asthma is difficult to diagnose in early childhood, because it is confused with other types

of infections or assumed based on a family history of asthma, and these numbers may be under representative of the prevalence in this sample, specifically in non-white children. Additionally, parents reporting that they received a diagnosis of their child having asthma is also subjective. Furthermore, there is not information on how well the child's asthma is controlled or data on respiratory medications, and there may be differences in access to care and prescriptions which may result in under reported asthma diagnoses. The fact that the exposure variables are based solely on self-report has the potential to lead to information bias. Children with IEP's and IFSP's in addition to those with severe health conditions were also excluded from these analyses and their conditions may provide additional insight into the discussion of child health and school readiness, such as lead exposure which has been linked to cognitive functioning and ultimately school readiness.[118] Furthermore, with more information on the categorization of a child's IEP or IFSP, those children could potentially be included in analyses. Lastly, there may have been a lack of power in these groups, who are more likely to be diagnosed with asthma.[135] [136,137] Another factor could be due to the relationships between the covariates available in this dataset. While tests for collinearity were not significant, many of the covariates in these models are closely related (employment, education, family structure, etc.) There was also limited information in this dataset on family level factors, specifically social support,[226] and conflict in the home, [124] both of which have been hypothesized as factors contributing to this association.

Due to changes in the measures of the behavioral and cognitive domains of school readiness, the data available for these analyses was restricted to only three years of data out of the seven years collected. While this is a large sample from 20

Educare schools, approximately 60% of the sample only attended an Educare school for one year, which does not allow for examining child development longitudinally in a large proportion of the available sample. This may also lead to selection bias based on the differences in characteristics of families who stay at Educare longer than one year. However, children were matched on attendance, which strengthens the study design and contributes to gaps in previously conducted research.

2.6.1 Conclusions

Despite insignificant findings after accounting for key confounders, this analysis contributes to the research examining the role of health on school readiness. A large, racially diverse sample allowed for matching based on exposures and attendance, and this is the first study that examined the association between school readiness and asthma specifically in a sample of low-income children. While the generalizability of these findings to the general population may be limited since it is a sample of children enrolled in a high quality early learning program with income eligibility requirements, the vulnerable population in which this research is being conducted is a strength of this paper as it will add to the literature on race disparities in a similar SES group.[227] It highlights the importance of examining this association further and the mechanisms that are part of its pathways in subsets of vulnerable children. It will be critical for future research to pay attention to how the associations are manifested in different race and sex groups, and particularly how a wide range family factors are affecting these associations to inform policy and program recommendations for low income children and their families.

Chapter 3. Parent Perceptions of Neighborhood, Health, and School Readiness

3.1 PRIOR LITERATURE

There is a substantive body of evidence demonstrating the association between neighborhood and child development, even when controlling for family level characteristics such as income or parent involvement. [138-151] Structural factors related to neighborhood disadvantage such as neighborhood poverty,[36,139,145,148,152-155] concentrated disadvantage,[146,156-158] exposure to violent crime, [45] or additional neighborhood factors (family structure, average household income, education, employment),[37] have been the primary focus of research in this area.[139] While extensive theoretical literature exists outlining the hypothesized associations between neighborhood and child outcomes,[148,159-163,196-201] little empirical research exists outlining the specific characteristics and mechanisms that play a role in this association.[139,164,165]

Original sociological theories about the mechanism of how neighborhoods impact children included epidemic and collective socialization models which focus on the influences of peer and adult role models, namely for adolescents.[159] Sampson and Sharkey et al. provide a more thorough explanation, outlining that it is the social contexts of a neighborhood, social disorganization, collective socialization, and social capital, which may mediate the relationship between neighborhood structural factors and child behavioral and cognitive development.[161,235] The pathway from social disorganization to lower social cohesion and social control is well documented.[161,236,237] Bridging this concept to social capital, Sampson and colleagues defined collective

efficacy as the combination of social control and social cohesion;[177] arguing that it is this collective efficacy at the neighborhood level that ultimately influences child development through social capital at the family level.[161,238]

This may manifest for families in several ways, one of which being that if parents perceive low levels of social control and social cohesion in their neighborhood, they may find it more challenging to employ positive parenting practices,[195] which are closely associated with social and cognitive development in young children.[239-243] Additionally, parents may have anxiety about the negative behaviors or values demonstrated in the neighborhood having an impact on their child,[244] which may result in increased parental stress which can lead to a decrease in the quality of the parent-child interaction. [245,246]. This decrease in the quality of the parent-child interaction has the potential to result in poorer social and cognitive development for the child. [239-243] While these postulations exist, scarce research has focused on a deeper understanding of how social constructs and contexts influence children through families.[139,164]

While sociologists have studied how the relationship between neighborhood concentrations of social problems and social processes within neighborhoods impact health via network ties, shared norms, collective efficacy, institutional resources, and routines, [141,152-156] there are other perspectives to be considered. Psychologists have taken an approach which includes the ecological-transaction model, viewing the children within various systems of risk and protective factors across individual, family, neighborhood, and social levels.[196-199] Additionally, Coulton et al. have expanded on and improved both sociological and psychological theories in their work that addresses alternative pathways for how neighborhoods influence parenting and child outcomes

taking into consideration neighborhood structure, neighborhood processes (collective efficacy and social organization, transactional processes (environmental stressors and social support).[200,201]

It is hypothesized that social capital not only effects child development on the pathway between neighborhood poverty and child development, [154,211] but that markers of social capital may directly impact behavioral and cognitive development. [139,145,166] The few studies that have focused on neighborhood social contexts and their impact on social and cognitive development have included neighborhood social capital,[139] social support,[145] and perception of safety.[139,166] One study examined neighborhood level social capital and its effect on cognitive development in early childhood, and found that the only component of social capital that was significantly associated with neighborhood level differences in child development was willingness to intervene, which is a marker of social control.[139] Furthermore, neither neighborhood social capital nor social support have been shown[139] Furthermore, empirically, to mediate the effect of poverty on cognitive development, as researchers have hypothesized.[139,145] This body of research addressing neighborhood social contexts and child health and development often cites lack of comprehensive measures at the family level,[139,145,164] in addition to limitations of child outcome measures, with most studies not including both cognitive and strengths based social emotional development assessments.[139,145] In light of Sampson's hypothesis that the neighborhood social constructs are impacting children through the family, it is imperative to better understand these mechanisms from the parent perspective.[164,178,179]

There is a small body of qualitative literature that aims to capture parent perspectives on how the neighborhood they live in impacts their children,[164,178,179] but this research has been conducted with either parents of adolescents,[179] or parents of children with a wide range of ages, limiting application of results to early childhood.[164,178] One study found that the majority of parents viewed low collective efficacy as the primary neighborhood factor influencing their children's behavior, above peer influences, exposure to crime, and quality resources in their neighborhood. Although this study was conducted primarily with parents from upper to middle-class income neighborhoods, results demonstrated that parents living in low income neighborhoods were more likely to share perceptions of neighborhood influence. The majority of low-income parents, two-thirds, reported that they believed their neighborhood did effect their child; however, the remaining one-third reported that they did not think that their neighborhood effected their child because their children were too young or that they as a parent provided a buffer.[178] Lastly, qualitative work with parents or caregivers has focused broadly on how neighborhoods impact children, either focusing on general social risk or child outcomes and not specific components of child development or school readiness. [164,178,179]

School readiness has only been qualitatively explored in one study with parents of young children thus far.[247]School readiness has only being explored qualitatively in one study with parents of young children.[247] The main findings from discussions with parents revealed three key themes—how school readiness was affected by their child's social emotional health, parent perspectives of how school environments shaped school readiness, and what role the parents play in their child's school readiness. While this

study provided in-depth parent perspectives, and there is the mention that neighborhood was discussed by parents, the study did not purposefully gather specific information on neighborhoods.[247]

3.2 RESEARCH QUESTIONS AND RESEARCH HYPOTHESES
Aim 2.

The evidence documenting the association between neighborhood and child outcomes is strong; [138-147] however many of the neighborhood factors included in existing research are more structural than social in nature, such as community economic disadvantage or poverty, density, and diversity to name a few . [28,36,145,146,148,152-158] A few studies conducted with young children have focused on social contexts including domains of social capital,[139,145] and others have focused on perception of safety, but these studies have not been conducted with young children.[166,199,248-254] Given the need to better understand the impact of social neighborhood contexts on child outcomes, *Aim 2 was to determine the impact of neighborhood context, specifically parents' perceived level of neighborhood support, on physical health and behavioral and cognitive domains of school readiness.* This component of the study included a mixed methods approach, utilizing both quantitative and qualitative methods, to assess both objective and subjective perspectives of parents. Information was analyzed and collected on how parents of young children characterize the impact of neighborhood conditions on their children's health and school readiness. The **second group of hypotheses** were as follows, *Hypothesis 2a: Children living in neighborhoods with low perceived neighborhood support will have a lower rating of overall health compared to children living in neighborhoods with higher perceived neighborhood support.*

Hypothesis 2b: ***Children living in neighborhoods with low perceived neighborhood support will have lower scores in behavioral and cognitive domains of school readiness than those who live in neighborhoods with higher perceived neighborhood support.***

Hypothesis 2c*: ***Parents of young children will identify a common set of neighborhood factors as the most important contributors to physical health and school readiness.***

*Hypothesis 2c for this mixed methods paper is related to the quantitative study design, but did not drive the qualitative design.

This research contributes to literature highlighting the impact of perceived neighborhood support versus objective measures, particularly on the health and social and cognitive development of children. [183-186] Findings from this study also contribute to the evidence base of racial disparities in both child health and school readiness among children in a similar SES group, providing a better understanding of potential contributors to these disparities in a vulnerable population, particularly those related to neighborhood social context.[227]

3.3 QUANTITATIVE RESEARCH METHODS
3.3.1 Quantitative Study Sample

The proposed study utilized data from the Educare Learning Network (ELN) Implementation Study, described in detail above in *2.3.1 Study Sample*. Data was collected in three main domains 1) Child Progress Measures 2) Family Progress Measures and 3) Classroom/Teacher Progress Measures. Child Progress Measures are collected by members of the LEP team for each site, as well as, by the child's classroom teachers. These child progress measures are outlined in detail in *2.4.2*

Variable Specification. Family Progress measures are collected during a Parent Interview that is administered annually to the child's primary caregiver by a Family Support Staff or LEP research team member at each Educare site. The Parent Interview includes a variety of demographic information about the child and family, parental beliefs and attitudes, and their perceptions of the Educare program.

The primary quantitative dataset for this study was provided by FPG and includes all data collected for the ELN Implementation Study from 2007-2015 (N=26,810). Due to changes in versions of several child progress measures, only data from 2012-2015 was used in this study, and children with identified disability plans or any identified serious chronic diseases such as diabetes, sickle cell, and high lead levels are excluded from this study due to potential confounding. Additionally, this study includes only children in their transition year at Educare (would be leaving at the end of the year to go to kindergarten) whose parents provided information on neighborhood support. The study sample includes children from 3 to almost 6 years of age, and excludes any child with a reported Individual Education Plan (IEP) or Individual Family Support Plan (IFSP) which is included in the FPG data set (N=4410). After children were matched by Propensity Score (matching process described below) the final sample was N=2263.

Sample Size/Power

Based on the difference between exposed (low parental perceived neighborhood support) and unexposed (higher parental perceived neighborhood support) for school readiness outcomes in this study sample (OR=1.5) these analyses were able to achieve the necessary sample size with the available given sample. A sample size of 1,834 was needed to detect an effect size of 1.5 if it existed with 80% power, and a sample size of

2424 was needed to detect an effect size of 1.5 if it existed with 90% power. The available sample size also allowed for adjustment for the variance inflation factor (VIF), using the formula for design effect neff =N (1+ (nclus − 1) ρ)[228] to account for clustering of children by classroom and Educare site. The design effect represents the amount by which a sample size that has been calculated at the individual-level needs to be multiplied to obtain the sample size required for analysis of clustered data. With ICC (ρ) set at 0.02, 0.05, and 0.10, respectively this sample was large enough to give sufficient power.

3.3.2 Quantitative Study Design

This was a longitudinal, retrospective matched cohort study. Children were matched based on propensity for exposure, high parental perceived neighborhood support vs. low parental perceived neighborhood support, based on their confounding factors as well as predictors of neighborhood support and readiness — child age, child sex, race, if the mother was a teenager or not when the child was born, family structure, parent education, parent employment, and language spoken at home. A 2:1 match was used and allowed for the desired effect size and 80% power as described above. Exposed and non-exposed cohort selection occurred from data for children who were in their last year of preschool, based on their first exposure, i.e. data from the first Parent Interview of record for each child. Exposure data—parental perceived neighborhood support, was collected through the Parent Interview in the fall of each school year. For children with more than one Parent Interview, the first report of neighborhood support was used. Outcome data was restricted to scores on assessments for these measures that were collected during the spring of the school year before the child left Educare to

attend Kindergarten. Data from children with multiple exposure (Parent Interview) time points was analyzed to examine the temporal impact of exposures and outcomes.

3.3.3 Quantitative Variable Specification

The *independent, exposure, variables* in this study that comprise perceived neighborhood support, which includes perceived collective efficacy (social cohesion and social control) and perceived safety, were operationalized using a scale of six questions from the ELN Parent Interview that were adapted from the National Survey of Children's Health 2003. [192,255,256] Neighborhood Support is calculated into a continuous (with question 6 reverse coded) and categorical score (each question is worth 4 points, range 6-24, 4 categories: Least Supportive, Moderately Low Support, Moderately High Support, and Most Supportive). For this study the categorical score was recoded into a binary variable, high vs low support (Least Supportive and Moderately Low Support vs. Moderately High Support and Most Supportive).This binary variable was used for matching and descriptive, bivariate and multivariable analyses. The response set of questions is included below:

Table 3. Neighborhood Questions

Think about the people in your neighborhood/community and how supportive you think that they are toward your family and your child.

How would you rate your neighborhood?	Definitely Disagree	Somewhat Disagree	Somewhat Agree	Definitely Agree
1. Your child is safe in your neighborhood.	1	2	3	4
2. People in your neighborhood watch out for each other's children.	1	2	3	4
3. People in the neighborhood help each other out.	1	2	3	4
4. There are people you can count on in your neighborhood.	1	2	3	4
5. There are adults nearby who you trust to help your child if she/he got hurt playing outside.	1	2	3	4
6. There are people in the neighborhood who might be a bad influence on your child.	1	2	3	4

The *dependent, outcome, variables* in this study, are child development outcomes—child physical health and behavioral and cognitive domains of school readiness. **Physical health** was operationalized using a question on the ELN Parent Interview—parent overall rating of child health.

In the ELN Parent Interview **parent overall rating of child health** was measured by the question "Overall, would you say your child's health is…?" with answers categorized into "Excellent, Very Good, Good, Fair, or Poor."

Behavioral and cognitive domains of school readiness were measured using scores from four validated assessment tools in three categories—Language and Communication which includes the Preschool Language Scale (PLS), 5th Edition (English α=0.79, Spanish α=0.0.79) [229] and the Peabody Picture Vocabulary Test (PPVT), 4th Edition (α=0.94); [230] Social Emotional which is measured by the Devereaux Early Childhood Assessment (DECA) (Protective Factors α=0.82, Behavioral Concerns α=0.80); [231] and Numeracy/Cognitive which is measured by the Bracken Basic Concept Scale-Revised (α=0.83). [232] School readiness was defined based on standard scores within or above the average or typical range for the PLS, PPVT and Bracken; for the DECA it was based on a typical or above T-scores. These variables are described in detail above in Chapter 2 (*2.3.3 Variable Specification).*

Potential confounders in this study include individual sociodemographic characteristics such as child age, sex, race/ethnicity, parent level of education, family structure, the child's mother was a teenager when they were born, parent employment status, maternal age, and language. *Potential moderators* include parent distress (parent stress, and depression), parent behaviors (parent-child relationship and

activities with the child), and time in Educare. Race/ethnicity, and child sex were also tested as moderators. Parent distress and behavior are tested as mediators in Paper 3. Educare school site was included to control for differences by site, using multilevel modeling, additionally to account for cultural site differences. All of these variables were available in the ELN national dataset. Classroom is not available for a large portion of children in this dataset, therefore it is not possible to examine differences by classroom. All of these variables are available in the ELN national dataset.

3.3.4 Statistical Analysis

Statistical analyses for this paper followed the same overall guidelines and specifics outlined for univariate analyses described above in *2.3.4 Statistical Analysis*. All analyses were performed using SAS version 9.4. Bivariate analyses were conducted to examine crude associations between parental perceived neighborhood support and 1) physical health, measured by parent report of overall health status and 2) the behavioral and cognitive domains of school readiness, in addition to potential confounding variables. In order to demonstrate that exposed and unexposed groups are similar except for parental perceived neighborhood support, Propensity Score matching was used based on a profile of confounders (child age, sex, race/ethnicity, parent level of education, family structure, if the child's mother was a teenager when they were born, parent employment status, and language). Overlap of propensity scores was assessed and then children were matched by level of parental perceived neighborhood support (high or low) within 0.2 caliper range. Rao-Scott χ2 for Pearson's Chi-square test, Odds Ratios with 95% Confidence Intervals were used to measure bivariate association for

categorical variables and T-test/ANOVA for means and Pearson's Regression (R) for continuous variables.

Multivariable analyses included multiple regression models to examine the association between parental perceived neighborhood support and 1) physical health and 2) the behavioral and cognitive domains of school readiness after adjusting for covariates. All covariates with significant statistical associations with both the outcome and exposure in bivariate analyses were included in the regression models, in addition to variables that are not statistically significant but that are commonly controlled for or are important theoretical confounders or predictors of readiness (child sex, race, language, age at entry into Educare, age at last assessment. Remaining covariates were only kept in final models if they had a p value of < 0.25, or if they were contextually/theoretically relevant to a particular outcome such as parent education, parent employment, depress, parent stress, parent-child relationship quality, and parent activities with the child in the social-emotional outcome models. Interactions by potential effect modifiers (child race and sex) were tested and results were stratified by these variables if differences ($p < 0.20$).[233]

Multi-level modeling was used to account for the fact that children are nested by school site for: Level-1 variance in readiness attributed to the individual level; Level-2 variance attributed to the site level.

$Y_{ijk} = \beta_{0j} + \beta_{0j}X_{ij} + r_{ij}$ *Level 1*

$\beta_{0jk} = \delta_{00k} + U_{0jk}$ *Level 2 (intercept)*

$\beta_{1jk} = \delta_{10k} + U_{1jk}$ *Level 2 (slope)*

Where Y_{ijk} is readiness for individual i in site j, β_{0jk} is the mean outcome in site j, and r_{ij} is the variance related with individual i in site j. δ_{00k} denotes the grand mean for readiness across all sites in the Educare network. U_{0jk} is the random effect associated with area.

Random slope models were used to assess if school readiness and if the association between parental perceived neighborhood support and 1) physical health and 2) school readiness varied across Educare sites.

3.4 QUANTITATIVE RESULTS
3.4.1 Descriptive Statistics

Sample characteristics are provided in Table 1. The mean age of children in the sample was approximately 5 years of age (59.3 months) and the mean entry age was 3.3 years of age, indicating that the mean time in an Educare program was approximately 2 years. Eighty percent of the sample was either Black (40%) or Hispanic (40%) with the remaining 20% identifying as White (10%) or other (10%). The sample was evenly divided with respect to sex, with 49.7% males and 50.3% females. The majority of caregivers had a high school education or less (55.5%) and were employed full-time (63.6%). Roughly 21% of parents screened positive for depressive symptoms. Slightly more than half of the parents interviewed perceived their neighborhood support to be low (52.9%). Social emotional school readiness outcome t-scores for protective factors and behavioral concerns, measured by the DECA, were close to the validated mean for the assessment (52.9, SD 9.45 and 49.51, SD 10.65 respectively). Language and cognitive score sample averages ranged from 91.6, SD

13.2 for the PLS-5 AC Spanish to 96.4, SD 12.7 for the PLS-5 AC English, with all

averages below the 100 validated assessment averages.

Table 1: Descriptive Statistics

Characteristic	All N=4410	
	N	**Mean (SD) or %**
Entry Age (yrs)	4410	3.33 (1.19)
Age Last Assessed (months)	4410	59.34 (5.60)
Attendance (Days Present, Max 200)	3555	166 (25.28)
Sex		
Male	2220	49.66
Female	2190	50.34
Race/Ethnicity		
White	417	9.55
Black	1755	40.18
Hispanic	1753	40.13
Other	443	10.14
Primary Language Spoken at Home		
English	2961	67.14
Spanish	1281	29.05
Other	168	3.81
Family Structure		
Single Parent	1996	51.14
Two Parent	1830	46.89
Teen Mom (< 19 years)		
No	3282	86.05
Yes	532	13.95
Parent Education*		
Less Than High School	1645	38.50
High School Diploma/GED	725	16.97
Some Coll/Tech/ Associates Degree	1568	36.70
Bachelors' Degree or Higher	337	7.88
Parent Employment*		
Employed, Full-Time	2744	63.64
Employed, Part-Time/Part-Year	751	17.42
Unemployed/Not in Labor Force	817	18.95
Depressive Symptoms		

No	2982	79.18
Yes	784	20.82
Parent Child Home Activities*[1]	3523	1.58 (0.35)
Community Activities*[2]	2330	0.86 (0.53)
Parent Stress Index (PSI) Parental Distress Mean Score*[3]	3518	1.79 (0.68)
Parent Child Relationship[4]	2390	4.34 (0.50)
Neighborhood Support		
High	1653	47.09
Low	1857	52.91
Child Health*[5]	3758	4.32 (0.76)
School Readiness Outcomes		
DECA Protective Factors T-Score	3912	52.85 (9.45)
DECA Behavioral Concerns T-Score	3912	49.51 (10.65)
Peabody Picture Vocabulary Test SS	3897	93.09 (14.97)
Preschool Language Scale Auditory Comprehension English SS	2077	96.35 (12.72)
Preschool Language Scale Auditory Comprehension Spanish SS	356	91.61 (13.16)
Bracken Basic Concept Scale SS	3448	92.35 (14.40)

*Averaged over the enrollment period.

[1] Mean number of times over the past week the parent or someone in the child's family read/told them a story, sang songs, described/narrated what the child was experiencing, taught letters/words/numbers, taught songs/music, worked on arts, played with toys/games indoors, played a game/sport/exercised, talked while doing errands, talked about what happened at Educare, talked about TV/videos, or played counting games.

[2] Mean number of times over the past month that the parent or someone in the child's family did the following things with the child: visited a library, playground/park, art gallery/museum/historical site, zoo/aquarium/petting farm or went to a play/concert/live show

[3] As measured by the Parent Stress Index (PSI) Short Form. Scored 1-5 with a higher score indicating higher stress

[4] As measured by the Pianta Parent Child Relationships Scale. Scored 1-5 with a higher score representing a higher relationship quality (higher closeness and lower conflict)

[5] Parent reported score of Child Health. Scored on a scale of 1-5 with 1= Poor and 5 = Excellent

Table 2 presents correlations among school readiness outcomes, child health,

neighborhood support and child and family covariates. The correlation of family

covariates and school readiness outcomes varied, and about half of the family

covariates (child age, family structure, depression, parent child activities, community

activities, parent stress, and parent child relationship) were correlated with neighborhood support. Child entry age into the Educare program, current age, race, sex, and language were correlated with school readiness outcomes and were all included in multivariable models, even though they were not correlated with neighborhood support, due to their contextual relevance to the exposures.

Table 2: Exposure, Outcome, and Covariate Correlations

	Social-Emotional		Language			Cognitive	Health	Neighborhood
	DECA Protective Factors	DECA Behavioral Concerns	PPVT	PLS AC English	PLS AC Spanish	Bracken		
Entry Age	0.0414**	-0.06492***	-0.17306***	-0.1882***	-0.14601**	-0.20121***	-0.04612**	0.02411
Child Age	0.19957***	-0.09102***	0.02903	-0.05964*	-0.07366	-0.07127***	-0.00796	-0.08588***
Sex	-0.21843***	0.21242***	-0.014	-0.1041**	-0.07159	-0.06903***	-0.0627**	-0.01086
Race/Ethnicity	0.06824***	-0.10672***	-0.2462***	-0.07575***	.	-0.16776***	-0.09273***	-0.00585
Language	0.10334***	-0.15523***	-0.36869***	-0.1653***	.	-0.21538***	-0.10705***	0.01581
Family Structure	0.06719***	-0.11161***	-0.0907***	-0.02945	0.04243	-0.05355**	0.00293	0.0537**
Teen Mom	-0.04139*	0.03994*	-0.02242	-0.01663	-0.13506***	-0.04777**	0.00656	-0.00746
Parent Education	0.0243	0.04408**	0.30375***	0.1857***	0.11972*	0.28138***	0.1034***	-0.01028

Parent Employment	-0.00776	**-0.03525***	**-0.04328****	**-0.05399****	**-0.01727***	-0.06423	**0.00837****	-0.00648
Depression	**-0.03554***	**0.07121****	0.00223	-0.03225	-0.0609	-0.03512	**-0.06505****	**-0.05877****
Parent Child Activities	-0.02116	-0.00947	**0.13807***	0.05617	0.09721	0.1147	**0.13647****	**0.09506****
Community Activities	-0.02058	0.01791	**0.05747****	0.00972	0.018	0.02879	**0.08211****	**0.06775****
Parent Stress	**-0.04417****	**0.08062****	-0.01366	-0.02253	-0.10635	**-0.06347****	**-0.14725****	**-0.10805****
Parent Child Closeness	**0.0795****	**-0.10662****	**0.13915****	**0.10341****	0.09156	**0.13339****	**0.16314****	**0.09346****

Based on Pearson Correlation Coefficients *p < 0.05 **p < 0.01 ***p < 0.001

3.4.2 Multivariable/Multilevel Modeling

Neighborhood support was crudely associated (results not shown) with health (β= 0.03, SD= 0.02, p< .05), protective social emotional factors (β= -0.02, SD= 0.01, p< .05) and social emotional behavioral concerns (β= 0.02, SD= 0.01, p< .01), but it the overall association is masked by interaction with race and sex as described in this section. Table 3 presents the results of multivariable modeling in the matched sample. When taking into consideration child and family covariates, prior to testing interactions, we did not observe a relationship between neighborhood support and health or school readiness outcomes for social emotional development (DECA), auditory comprehension (PLS) in English and Spanish or cognitive skills (Bracken) in multivariable models.

For potential effect modifiers, interactions were significant for both DECA Protective Factors and Behavioral concerns between neighborhood and race (p <0.001) and for health between neighborhood and race (p< 0.10). Interactions were significant

for DECA Protective Factors between neighborhood and sex ($p < 0.05$). For DECA

Protective Factors and Behavioral concerns when the neighborhood X race interaction

term was included in multivariable models (results not tabled) children whose caregivers

reported low neighborhood support had slightly lower social emotional protective factor

(DECA) scores ($\beta = -0.06$, SD$= 0.03$, $p < .05$) and slightly higher social emotional

behavioral concern (DECA) scores ($\beta = 0.05$, SD$=0.03$, $p < .10$) compared to children

whose caregivers reported high neighborhood support. Additionally, with the

neighborhood X race interaction term in the model, children with caregivers who

reported lower neighborhood support were more likely to report poorer health status

than children whose caregivers reported high neighborhood support, remained but was

only marginally significant ($\beta = -0.33$, SD$= 0.16$, $p < .05$).

When stratified by race (stratification results not tabled), significant associations

between neighborhood support and social emotional protective factors and behavioral

concerns remained for Black children and children of other races. Black children and

children of other races whose caregivers reported low neighborhood support had lower

DECA protective factor scores (Black $\beta = -1.89$, SD$= 0.88$, $p < .05$; Other Races $\beta = -3.74$, SD$= 1.82$, $p < .05$) and higher DECA behavioral concern scores (Black $\beta = 1.63$,

SD$=0.95$, $p < .10$; Other Races $\beta = 4.13$, SD$= 2.07$, $p < .05$) than Black children and

children of other races whose parents reported high neighborhood support. For health,

associations between neighborhood support and health remained for non-white

Hispanic children only. Non-white Hispanic children whose parents reported low

neighborhood support had a slightly poorer reported health status ($\beta = -0.15$, SD$= 0.09$,

p< .10) compared to non-white Hispanic children whose parents reported high neighborhood support.

When stratified by child sex, significant associations between neighborhood support and social emotional protective factors remained for girls only. Girls whose caregivers reported low neighborhood support had slightly higher DECA protective factor scores (β= 0.09, SD= 0.04, p< .05) than girls whose caregivers reported high neighborhood support.

Table 3: Multivariable Results: Neighborhood Support and Child Readiness

	Social-Emotional		Language			Cognitive	Health
	Model 1: DECA Protective Factors	DECA Behavioral Concerns	PPVT	PLS AC English	PLS AC Spanish	Bracken	Health
	N=2043 B (SE)	N=2043 B (SE)	N=1694 B (SE)	N=1227 B (SE)	N=316 B (SE)	N=1431 B (SE)	N=2404 B (SE)
Intercept	0.22 (0.11)*	0.15 (0.07)*	90.20 (7.11)***	122.99 (8.41)***	102.25 (12.53)***	102.10 (8.04)***	3.91 (0.37)
Neighborhood Support	0.01 (0.01)	0.02 (0.01)	1.23 (0.78)	-0.24 (0.90)	-2.70 (2.59)	-0.36 (0.95).	-0.02 (0.05)
First Assessment	0.65 (0.04)***	0.79 (0.03)***	6.45 (2.73)**	1.21 (2.97)	-1.01 (0.61)+	1.39 (3.01)	
Entry Age (years)	-0.01 (0.01)	-0.01 (0.01)	-1.74 (0.30)***	-1.32 (0.32)***	-0.31 (0.69)	-2.00 (0.34)***	-0.02 (0.01)
Child Age (months)	0.01 (0.01)	-0.01 (0.01)	0.14 (0.09)	-0.45 (0.11)***		-0.16 (0.11)	-0.01 (0.01)
Sex (male vs. female)	0.01 (.01)	0.01 (0.02)	1.17 (0.71) +	2.94 (0.83)***	4.96 (1.88)**	3.15 (0.82)***	0.09 (0.04)*
Race/Ethnicity							
White (referent)	0.00	0.00	0.00	0.00		0.00	0.00
Black	-0.01(0.02)	0.01 (0.02)	-5.07 (1.20)***	-5.29 (1.40)***		-0.41 (1.51)	0.05 (0.07)

	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7
Hispanic	0.01 (0.02)	0.01 (0.01)	-7.22 (1.47)***	-3.36 (1.65)*		-5.45 (1.53)***	-0.08 (0.08)
Other	0.01 (0.02)	0.02 (0.02)	-2.60 (1.77)	-0.80 (1.84)		-0.59 (2.06)	-0.08 (0.10)
Primary Language Spoken at Home							
English (Referent)	0.00	0.00	0.00	0.00		0.00	0.00
Spanish	0.02 (0.01)	0.03 (0.01)*	-9.44 (1.27)***	-6.06 (1.55)***		-5.31 (1.53)***	-0.07 (0.07)
Other	0.02 (0.02)	-0.01 (0.02)	-10.67 (2.06)***	-5.50 (2.19)*		-3.56 (2.17)+	-0.09 (0.10)
Family Structure (single vs. two parent)	0.01 (0.01)	0.01 (0.01)	-1.26 (0.75)+			-1.18 (0.91)	0.01 (0.05)
Parent Education							
Less than HS Diploma/GED	-0.01 (0.02)	0.01 (0.01)	-6.91 (1.45)***	-6.66 (1.64)***	-8.79 (6.11)	-7.44 (1.68)***	-0.10 (0.08)
High School Diploma/GED	0.02 (0.02)	0.01 (0.01)	-7.81 (1.38)***	-6.32 (1.59)***	-3.61 (6.59)	-7.21 (1.68)***	0.02 (0.08)
Some Coll/Tech/Associates Degree	0.01 (0.02)	0.01 (0.01)	-3.29 (1.30)**	-3.46 (1.46)**	-2.27 (6.43)	-4.10 (1.51)**	0.05 (0.07)
Bachelors Degree or Higher (referent	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Parent Employment							
Employed, Full-Time (Referent)	0.00	0.00	0.00			0.00	0.00
Employed, Part-Time/Part-Year	-0.02 (0.01)	-0.01 (0.01)	0.89 (0.92)			0.37 (1.06)	0.05 (0.05)
Unemployed/Not in Labor Force	-0.01 (0.01)	0.01 (0.01)	-1.11 (0.93)			-1.42 (1.09)	0.06 (0.05)
Depressive Symptoms (yes)	-0.01 (0.01)	-0.01 (0.01)					-0.10 (0.06)+

Parent Child Home Activities (0-3)	-0.02 (0.02)	-0.01 (0.01)	3.01 (1.24) **	3.01 (1.34)*	5.86 (2.38)**	2.28 (1.34)+	0.11 (0.07)
Community Activities (0-3)	0.01 (0.01)	0.01 (0.01)	-1.45 (0.76)*				0.01 (0.05)
Parent Stress (1-5)	-0.01 (0.01)	-0.01 (0.01)	0.90 (0.69)		-1.66 (1.46)		-0.09 (0.04) +
Parent Child Relationship (1-5)	0.01 (0.01)	0.02 (0.01)*	2.26 (0.85)***	1.25 (1.00)	-2.35 (1.93)	2.14 (0.94)**	0.09 (0.05)+

+$p < 0.10$ *$p < 0.05$ **$p < 0.01$ ***$p < 0.001$

3.5 QUALITATIVE RESEARCH METHODS

3.5.1 Qualitative Study Design

Overview

Qualitative data was collected through four groups with parents of children recruited from two Early Head Start and Head Start facilities in New Orleans, LA and Crescent City WIC Services Inc. in Gretna, LA. Information was collected on parent perceptions of and buffers and barriers to school readiness, child health and school readiness, neighborhood and child health and school readiness, and parent's opinions on how parent stress and parent-child relationships impact health and school readiness. Focus groups were chosen as an appropriate method for this research because the concepts explored (neighborhood impacts on school readiness) are abstract in nature and group discussions were better suited for exploring connections and parent perceptions. The Consolidated criteria for reporting qualitative research (COREQ) 32-item checklist was used to help ensure transparency and quality of the design, and was used when writing the focus group guide.[257] The focus group guide is included in Appendix I.

The methodological orientation and theoretical framework for this study was grounded theory.[258,259] This inductive approach was used to generate a common set of neighborhood factors that caregivers of young children viewed as the as the most important contributors to child development outcomes (e.g. physical health, cognitive, and socioemotional development). Preparation of the focus group guide, data collection design, and analysis was guided by this theory, beginning with line by line open-coding, identifying in-vivo codes, and moving on to axial and selective coding.[260] Key-informant document reviews with selected leaders in the field of early childhood education in New Orleans were used as initial analysis to ensure that focus group guide questions were designed within the appropriate context. Two individuals with extensive experience working with both early learning centers and parents of young children (a prominent childcare center director and a community outreach coordinator with a local non-profit with a program focused on school readiness (Orleans Public Education Network) reviewed initial drafts of the focus group guide and provided feedback and edits on language, format, and content. Analysis of data collected from each step in the qualitative process continually informed the next steps. Constant comparative analysis was used and is described below in *3.5.3 Qualitative Analysis*. There is the potential to continue this area of study with a new project beginning at Educare New Orleans and themes and concepts identified during focus groups will continue to be explored.

Research Team

The research team consisted of the lead author and two graduate assistants. The lead author conducted all formative work (key-informant document review and pilot-testing of focus group guide questions) in addition to focus group facilitation. While it

was originally proposed to identify an external facilitator, the lead author had previous focus group facilitation experience and extensive experience working with and interacting with parents of young children in the proposed focus group settings. Three graduate assistants assisted with the project, one with notetaking, one with transcription and another served as a second coder for analyses. All graduate assistants were provided training in qualitative methods before assisting with study activities.

Focus Group Guide Development

Before focus group discussions occurred, the interview guide for the focus groups was refined by key-informant document reviews with selected leaders in the field of early childhood in New Orleans including a prominent childcare center director and a community outreach coordinator with a local non-profit with a program focused on school readiness (Orleans Public Education Network). These two individuals helped to ensure that the questions were contextually relevant, easy to understand, and were written at an appropriate reading level for the participants of the focus groups. Questions were pilot tested with two individuals whose demographics were similar to study participants. These individuals were selected through relationships with partner organizations (Healthy Start, New Orleans WIC), and organization staff identified women to pilot test the questions with.

All focus group procedures and materials were submitted to the Tulane Institutional Review Board (IRB) and participants were required to sign a consent form before focus group participation. Focus groups were audio recorded and field notes were made during and after the groups by two research team members in attendance (lead author and a graduate assistant). Duration of focus group discussions were 1-1.5

hours in length. Study site resources allowed for a maximum of four groups with the

potential of 30 participants.

Based on review and ongoing analysis of data, the focus group guide was

modified slightly to expand probes or provide additional scenarios, as it is an iterative

process.[261] Focus groups were transcribed, and although they were not returned to

participants for comment/correction, a summary of the transcripts and initial thoughts

and perceptions were discussed with teachers and family support staff at early learning

centers to gain perspectives and comments to check internal validity.[260]

Participant Selection and Description

Four focus groups were conducted with primary caregivers of children 0-5 years

of age at 3 separate sites. Two groups were conducted at Educare New Orleans (n=4

and n=7), one group at Kingsley House (n=8) and one at Crescent City WIC (N=10).

The final sample included 28 caregivers and participant characteristics are described in

3.5.2 Qualitative Study Sample. The youngest child of the caregiver was used as the

index child during focus group discussion. Purposive sampling was used to select focus

group participants,[261] utilizing both typical case (selection of typical or average cases, in

this case a typical parent of a low-income child who attends an Early Head Start/Head

Start Center or receives WIC services) and snowball sampling (participants referred

other people that they knew with children 0-5 to participate in the focus group)

strategies.[260] Participants were recruited by word of mouth in three locations in the

Greater New Orleans Area—2 Early Head Start/Head Start centers (Kingsley House

and Educare) and a Women Infant and Children's (WIC) (Crescent City WIC) Clinic.

Family Advocates and school leadership at the Early Head Start/Head Start centers and

staff at the WIC clinics recommended caregivers of children ages 0-5. Caregivers were able to participate if they were told about the study by an Early Head Start/Head Start or WIC staff or were told about the study by another caregiver (as long as their youngest child attended one of the centers or they received services at the WIC clinic). Participants contacted a provided phone number of the research team if they were interested in participating to collect preferred contact information and availability. Non-Participation was tracked to the extent that was possible tracking number of flyers distributed, number of participants who contacted the research team, number who agreed to participate but were not able to be scheduled for a group, and number who were scheduled but did not attend.

Focus Group Setting

Focus groups took place on site at the recruitment locations (Early Head Start/Head Start Centers and WIC Clinic) in provided rooms. All provided rooms were private rooms, at Educare New Orleans the two groups took place in a conference room with a conference table. The two other groups at the Early Head Start/Head Start Center and the WIC clinic took place in rooms with chairs in a circle. The distribution of the 4 groups across the 3 sites was based on participant and facility availability. Two groups were conducted at Educare New Orleans and one group each at the other two sites. In addition to the participants, the research team (the author and a graduate assistant, with training in qualitative methods) were present at each focus group. Participants were provided with a $25 gift card for their time; additionally, light refreshments were provided for all focus groups. The three groups that took place at early learning centers took place during the day so participants children were in

attendance at their respective centers. During the focus group that took place at the WIC clinic participants who had young infants brought the infants to the group. Groups were scheduled based on common availabilities of participants and recommendation of the partner sites. All of the groups took place in the morning right after drop-off at the early learning centers and during peak appointment time at the WIC clinic. The inclusion criteria to participate were 1) that the participants were older than 18 years of age and 2) that they spoke English as a first language.

3.5.2 Qualitative Study Sample

The final sample was 68% African-American, 96% female (either mothers or grandmothers), and approximately 80% were mothers with the remaining 20% grandmothers and one grandfather. Participants were asked to fill out a focus group information sheet (Appendix II) and the information provided was tabulated from those that filled out the form. Sample characteristics for questions with at least 80% response rates are provided in Table 4 below. Approximately 60% described their family structure as a single-parent home and parents reporting having anywhere from 1 to 12 children. Participants were divided between parents with children 0-3 years of age (46%) and 3-5 years of age (56%). The majority of the sample was within 18-50 years of age (80%), however 20% were over the age of 50 (grandparents). Participants living in Orleans Parish were from at least 16 different neighborhoods.

Table 4: Focus Group Participant Characteristics

Characteristic	All N=28	
	N	%
Age		
18-23	1	0.04%

24-29	8	28.57%
30-34	6	21.43%
34-39	6	21.43%
40-50	1	0.04%
50+	6	21.43%
Race		
Asian	2	7.14%
Black/African-American	19	67.86%
White	4	14.29%
Other	3	10.71%
Education		
Less than High School	3	10.71%
High School Diploma or GED	10	35.71%
Some College but no degree	6	21.43%
Associates Degree	6	21.43%
Bachelor's Degree or Higher	2	7.14%
Employment		
Employed Full Time	6	21.43%
Part Time	10	35.71%
Unemployed/Not in Labor Force	8	28.57%

3.5.3 Qualitative Analysis

Audio recordings of focus groups were transcribed and transcriptions were stored in Microsoft Word. NVivo qualitative analysis software (QSR International, Version 10 and 11), was used to manage and analyze the qualitative data. Using grounded theory, constant comparative methods were used for qualitative analysis, with themes being derived from the data.[260] After the first focus group was completed, the research team

began to independently review transcripts, using open coding to identify emerging ideas. Focus group guides for the remaining focus groups were modified to include major themes that were covered but may have been omitted from the guide. After conclusion of the groups and when transcriptions were complete for all groups, open coding continued to identify major themes. Major themes and field notes were used to develop an initial code book (coding tree), moving from individual meaning units to high-order categories. NVivo was used to code each complete transcript with each transcript being independently coded by two people. Cohen's Kappa coefficient was used to measure inter-rater reliability and Kappa values ranged between 0.7 and 1.0 for all codes. Memoing was also used to categorize connections and relationships between codes.

Research team members who participated in transcription (the author and a graduate assistant) met frequently to discuss coding decisions, adjudicate differences, and establish an expanded codebook with primary code categories and sub-themes within each category. Alterations were made to the codebook when a new theme emerged, and codes were refined and collapsed as needed. Major themes were then compared across caregiver groups. In the results section below, participant quotations are presented to illustrate major themes, and clarity of major and minor themes is discussed. Additionally, after focus groups were finished, validity checking was conducted with individuals with similar demographics to the focus group participants. Ideas and findings were shared with these individuals to confirm the validity of the conclusions from the community point of view to get an emic (insider) perspective. Summaries of ideas and findings were also shared with early childhood key informants.

3.6 QUALITATIVE RESULTS
Definition of School Readiness

Parents described characteristics of school readiness in two main categories: 1) content that they believed they should know before going to Kindergarten (e.g., alphabet, shapes, colors, numbers) and 2) physical skills (e.g., how to get dressed, how to tie shoes, being potty-trained). Some parents stated that children should know their name, address, and phone number, and a few stated they should be able to write their name.

Course I want my child to be potty-trained, um I want her to know her alphabets, that way she can learn how to read a little, you know, it will be a little easier for her.
-Mother of 1, African American

Because most children, they get to school, they have the knowledge of like knowing their ABC's. Knowing their numbers, stuff like that.
-Mother of 3, African American

Participants mentioned social-emotional aspects of school readiness and noted skills around listening, respecting adults and resolving conflict. Participants from one group mentioned social-emotional skills explicitly, while participants in other groups mentioned social-emotional skills, such as paying attention, more inadvertently while discussing other topics.

Listening, following, knowing who to talk to. Cause the biggest thing for me when my daughter started was like, we teach our kids like strangers and things like that. So when they go to school it's like everybody is a stranger. So you have to teach them, like, this is who you need to go to, this is how you identify this individual and things like that.
-Mother of 2, African American

A minor theme that emerged was health and school readiness. Parents shared health-related factors that they think contributed to school readiness including hunger, sleep, and routine/structure.

Because if they aren't physically ready and healthy, they won't do well, they won't be prepared to learn.
-Mother of 2, White

Parents expressed concerns about how early children must be at school and how late they go to bed, and how that may affect their ability to learn. One of the groups discussed foods that were served at their child's center and how they felt the children were hungry when they came home, affecting their ability to learn. Parents agreed that structure and routine is beneficial to children.

You got to get up at the same time. You go to bed every night. I think a routine helps young children especially. So, nothing is a surprise.
-Grandfather of 1, White

Definition of Neighborhood

When asked for their definition of neighborhood parents across all four groups responded in one of three ways: 1) geographical area, 2) crime, and 3) people who lived in the neighborhood. In the one group that did not take place in Orleans Parish, most respondents stated that they thought of their neighborhood as the street or geographical area where they lived. In the three groups that took place in Orleans Parish, many immediately responded with the word "crime" describing how unsafe they felt in the neighborhoods where they lived.

> *When I think about my neighborhood, I'm kind of like with ******. I think about the crime rate. Um, I stay around the corner from a park. I don't bring my kids to it cause it's a wide open park. There's a grocery store on the opposite side where*

they're like people always hanging out. Somebody's getting shot. They're having fights. I don't have the time to take off running with me and my kid.
-Mother of 2, African American

Within this perception of neighborhood as the crime rate, neighborhood safety was

discussed in all four groups in great detail. Parents discussed how they feel unsafe in

their neighborhoods and how that effects whether they let their children go outside,

where they let them play, and what they are able to do with them in their

neighborhoods.

Because we be locked up in the house. I'm too scared to be peaking outside my door and a bullet cross my head or something. Me personally, I don't let my baby go outside because they got too much crime going on and I don't want nothing to happen to them. So, if he go outside, we just right there at the house. We're not walking to the park, no not like that. I don't trust it.
-Mother of 6, African American

Others, when asked to describe their neighborhood, began to talk about people in their

neighborhoods and to describe their relationships with them or how they felt these

individuals had an influence on their children. Some described keeping to themselves,

and others spoke of positive and negative influences.

My neighbors don't come outside, like we only see them going or coming.
-Mother of 6, African American

Like I said earlier with you know the different neighbors you know, a positive impact, asking them, you know, how they day was or what they learned, so that's something that's refreshing they memory. [saying the neighbors are asking their kids how their day was]
-Mother of 2, African American

Older participants also talked about how things used to be and how they had changed

regarding both crime and the ability to trust people in the neighborhood.

Nowadays it's so hard to trust people with your children
-Grandmother of 5, African American

A minor theme that emerged within perception of neighborhood and its influence on children was coded as neighborhood disorder. Participants discussed how residents had a "disrespect" for their neighborhoods because of litter, broken glass, etc. and commented on how that affected their children in terms of both safety and physical activity. Both structural disorder (litter, blighted buildings and lots) and social disorder (people littering, selling drugs, loitering) were discussed.

> *Because if you come outside and you got to be looking trifling or anything or they just throwing anything on the ground or they just doing everything in the neighborhood. Its the people that live in it. Those people neighborhood they making it look worser than what it is.*
> *-Mother of 3, African American*

> *Well, it limits their ability to go outside and play, I mean, you can't let them out of your sight, you can't hardly go outside and not step on broken glass, cans, trash, and I mean, people take no respect to their neighborhoods. I've seen a garbage can right there and somebody just take their McDonald's stuff and threw it on the ground.*
> *-Grandfather of 1, White*

Neighborhood and School Readiness

When asked if they thought that the characteristics of neighborhoods (e.g. crime, people who lived in the neighborhood) that were described had an impact on how ready their children were for school, many participants discussed that they thought it was the people living in the neighborhoods, rather than the physical characteristics of the environments that influenced their children.

> *It's not where your kids grow up at, it's what they parents teach them and what's going on. Cause everybody, everybody said like, oh places they stay at is bad. It's not the area that's bad. It's the people that reside in those areas that make those areas look worser than what they are.*
> *-Mother of 3, African American*

Parents voiced that no matter where or what neighborhood that their child was from,

that there was still the potential for them to be school ready and frequently heard in all

four groups was the phrase "it starts at home." Parents referred to activities that they did

with their children such as flash cards, worksheets, and tablet games and consistently

mentioned skills they referenced regarding school readiness (ABC's, 123's, colors,

shapes). Participants talked about how they chose to raise their child and how that was

the most important thing in terms of child-wellbeing and school readiness. Parents

expressed hope, that regardless of the neighborhood that the child is from/was raised in

that neighborhood can be overcome by the influence of the parent-child

relationship/activities with the child.

It's more about how you raise your child.
-Mother of 3, African American

It all goes back to starting at home, everything with your child, whether it's now or
whether they 50 years old in life. But at the end of the day, every step they take,
everything they learning and producing and developing is coming out of your household.
-Mother of 2, African American

Parents seemed to have interpreted the idea of connection to mean a barrier, for

example "is the neighborhood a barrier to school readiness for your child" and therefore

it was described as inherently connected, but that the connection could be altered or

made less important by work at home with the child.

A common theme that was consistent in all four groups in terms of neighborhood

impact on children was child safety.

> *I think going back to how it might affect children in school, I think it creates*
> *distractions, worries for them that they shouldn't really have to have at that age.*
> *You shouldn't have a child of three, four five, any age really, worried about who's*
> *got a gun. They shouldn't have to worry about dangerous trash on the street. So*
> *it's a distraction. They get to school and their mind is not there in school.*

Parent Stress

Child safety was generally talked about in terms of its relationship to parent

stress. Parents spoke of concerns about their child's safety in relationship to their

neighborhood and of their personal responsibility to keep their children safe.

> *Because she can't go out and play, I don't allow my child to go outside, you know and enjoy being a child because of what's going on in the neighborhood. And I'm afraid, you know, even if we are in the house, bullets don't have a name on it or it flies anywhere. It's just if she's right there.*
> -Mother of 1, African American

> *No, I don't like them to be over there, for them to be outside around there, no because they got a boy that got killed in broad daylight. Right there on the corner where his daddy hang at and that was one of his daddy friends. And I told him, if my kids come over here, keep them inside. I said you don't have no reason to be outside when all that stuff going on.*
> -Mother of 3, African American

When asked if they felt like they served as a buffer between their neighborhoods and

their children, parents responded differently, either stating they were not a buffer or

describing the stress that they take on to protect their children from situations and

people in their neighborhoods.

> *I don't serve as a buffer; I manipulate the environment to fit ****'s needs for what I want him to see. We never use the ****** bus stop. Not one day not ever not never. It is so rare. Because they are all selling drugs, and drinking, and partying and smoking right there at the bus stop. They gone pull out a big bag of weed and I was like alright let's go!*
> -Mother of 1, Mixed Race

> *I'm superwoman. I am super mama. I don't play. And my children know, with all this foolishness. That's why I'm asking, what are you seeing, what are you watching, you have to be like the military person now. You don't want to just be mama no more. You have to be police mama.*
> -Mother of 6, African American

Parents described feelings of loneliness when it came to raising their child and spoke of

needing "a village" to raise their child, but not feeling like they could trust people to help.

*We need the village base. It takes a village to raise a child. But you have to filter
through five hundred bad to get one good, but that's how the world is.*
-Mother of 2, African American

*It's so hard to trust other people with your kids, you know to not know that. If it's a group
of us, like us four, and we could stay in like one little residential neighborhood where we
all neighbors. So Monday I have the kids, Tuesday **** has them, Wednesday you have
them. Like it's a good idea because the community does need to come together, you
know, to kind of help each other out along the way to provide support.*
-Mother of 2, African American

Parents in all four groups discussed these themes of child safety and parent stress in

terms of neighborhood, but as mentioned above, few described how these things are

connected with school readiness.

3.7 DISCUSSION

This mixed-methods study examined the relationship between caregiver

perceived neighborhood support and child development outcomes including health and

school readiness.

3.7.1 Quantitative Discussion

Quantitative results indicated that there is an association between perceived

neighborhood support and child health and school readiness, particularly social

emotional development, and that these results may differ by child race and sex.

We found that children whose parents reported low perceived neighborhood support

had slightly poorer reported health and poorer scores in behavioral domains of school

readiness. Specifically, Black children and children of other races whose parents

reported low perceived neighborhood support had lower social emotional protective

factor scores and higher behavioral concerns scores compared to their counterparts whose parents reported high perceived neighborhood support. These differences were not observed in non-Hispanic White or Hispanic children. We also found that for child health, non-white Hispanic children whose parents reported low perceived neighborhood support also reported poorer health status compared to their non-white Hispanic counterparts whose parents reported high perceived neighborhood support. These differences were not observed for White, Black, or children of other races. Differences were seen by child sex as well, with girls whose parents reported low perceived neighborhood support demonstrating higher social emotional protective scores than their counterparts whose parents reported high perceived neighborhood support. This association was not seen in boys.

The association between parent perception of neighborhood support and child health, found in this paper, has been documented in the literature, however it was either not a racially diverse low income sample, [262] or the research was mechanistic in nature and focused on neighborhood social support as a mediator between neighborhood poverty and child health.[263] Research among older children found associations between neighborhood social support and childhood obesity,[264] which further draws attention to the need to better understand how neighborhood social support is impacting child health, particularly in young children.

Unlike one previous study that did not find a relationship between behavioral outcomes and neighborhood-level factors after controlling for family and child level variables, [145] this study did show a significant association between neighborhood support and social emotional outcomes. However, as found in previous research, [139]

associations with cognitive skills were not associated with neighborhood support. Differences in the association between neighborhood support and social-emotional development by race, specifically within a low-income population, are unique findings to this study. These differences in race and perception of neighborhood may help to further explain factors contributing to racial disparities in social-emotional development found in other studies. [95, 103] Existing research focused on racial disparities and school readiness, focuses largely on poverty or socioeconomic status, and while it mentions parent level factors and neighborhood characteristics, how the two interact is not often taken into consideration. [95] Furthermore, experts also recommend that increased enrollment for non-White children in preschool has the potential to lessen school readiness gaps. [103] However findings from this study, conducted among a sample of children enrolled in high quality early learning environments, suggests that neighborhood and parent level factors remain important to consider when designing programs and policies to close the racial school readiness gap.[,]

The inverse effect was seen for girls whose parents reported low perceived neighborhood support. This could be because, in general and specifically for children living in poverty, girls have more protective social emotional factors than boys. [265,266] Additionally, research has shown that in older girls, neighborhood effects on behavior are not demonstrated until later in childhood and that girls often display behavior within their family, opposed to with peers or outside of the family.[267]

3.7.2 Qualitative Discussion

For the qualitative portion of this study, parents and caregivers discussed common themes of perception of neighborhood, neighborhood safety, and stress in

relationship to their impact on their children. The qualitative findings from this study contribute to the small body of literature focused on parent perspective of their neighborhood and how it impacts their children, [157,168,169] specifically parents of young children.

Similar to Galster and Santiago, parents discussed crime and influence of neighbors on their children; however, in our study crime and neighborhood safety were most commonly mentioned (compared to collective efficacy) as the main neighborhood level factors influencing their child. Parents in focus groups for this study often discussed their perception of their neighborhood (crime or the people in the neighborhood) in terms of its connection to parent stress or their child's safety, but the majority did not verbalize the pathway of the narrative they were describing (perception→parent stress → child safety → child well-being) or seem to make the connection themselves to child well-being or school readiness. Furthermore, the parents in this sample were all low-income and dissimilar to Galster and Santiago's population.

When asked about the connection between neighborhood and school readiness, the majority of parents discussed how neighborhood was a barrier to their child's readiness. Parents did not view the physical aspects of the environment, but rather the people in the neighborhood as the mechanism through which neighborhood could influence their child. However, for the most part, parents were hopeful and viewed neighborhood as something that could be overcome by parental factors such as their own relationship with their child or activities they did with them at home. It appeared that it was not that they did not perceive that the two (neighborhood and school readiness)

were not connected, but rather that they were inherently connected and could be overcome by these individual/household level interactions.

Many parents described school readiness as rote memory skills, as opposed to social-emotional skills, which could explain why participants rarely articulated specifically how neighborhood could have an impact on school readiness. It may be more difficult to see a connection between neighborhood and rote memory than between neighborhood and social-emotional development, which were significantly associated in the quantitative results. The commonly heard phrase "it starts at home" in this study population was more aligned with rote memory skills as a measure of readiness because it was described as something tangible they worked on with their child on with their child (games, flashcards, etc.). This also contributes to the disconnect between how neighborhood would influence school readiness because the social-emotional environment of the home was commonly not referenced or discussed.

Parents, whether they viewed themselves as buffers or not, seem to be absorbing the impact and stress of neighborhood factors and did not directly see how it may be influencing their children. Child safety was discussed as if it was not guaranteed, and that it was their responsibility to keep their child safe, as opposed to a collective efficacy perspective found in previous qualitative work or larger forces at work to make neighborhoods safer. The tensions between agency, parental responsibility for child safety, and structure, lack of perceived support from neighbors, resources, or safety were apparent as parents discussed their neighborhoods and their children. This was compounded by discussion of systems issues, and how parents must be ever more vigilant, not only because of the structural challenges, but systemic issues such as lack

of police intervention, or activities for children in their neighborhoods. How perception

of neighborhood, and neighborhood structure impacts parenting has been documented

in the literature, however the juxtaposition of agency and structure, specifically for

parents of young children, has not been examined in great detail.[268] Additionally, in this

study, while constructs of stress and safety were discussed, parents did not explicitly

acknowledge that those were impacting either their relationship with their child or school

readiness.

3.7.3 Study Limitations

This paper has the same limitations mentioned in *2.5.1 Study Limitations*

for Paper 1 related to limitations of the data set in regards to longitudinal analyses and

selection bias. Secondly, this paper included parent report as child health as one of the

child outcomes, and while parent report of child health is generally considered as an

appropriate proxy measure for the child's actual health status,[92,269-271] it is a subjective

measure. Information bias remained an issue for this paper, with both exposure

(parental perceived neighborhood support) and outcome variables (parent report of

physical health) coming from parent report. Additionally, the exposure variable, parental

perceived neighborhood support, is not a comprehensive measure of neighborhood

support or social capital and has the potential to lead to potential measurement validity

issues or misclassification of the effects because there is not in depth information on

each of the constructs represented in the variable (collective efficacy, social cohesion,

and social control). Furthermore, it is not possible to include neighborhood structural

factors, such as poverty, crime rates, etc. in these analyses because residential address

is not available for each child. The omission of this information also has the potential to

lead to confounding, based on the hypothesized theories of how neighborhood impacts child development which include both structural and social neighborhood factors.

Although one of the strengths of this paper is that it includes mixed methods, the qualitative portion was only conducted with a sample of parents in New Orleans, Louisiana and does not include perspectives from all races/ethnicities represented in the larger Educare sample, and thus, it is not possible to fully understand the impact of neighborhood on health and school readiness from different cultural perspectives. Additional limitations for the qualitative portion of the study were that the lead author and facilitator of the focus groups did not have similar demographics to focus group participants and this may have influenced response bias during the groups. Limited time and funds also restricted the number of groups and additional data collection would allow for a deeper exploration of themes. Lastly, the term "school readiness" itself is a very abstract concept and asking parents to describe connections between school readiness and how a neighborhoods can impact children is challenging and may have resulted in less than clear responses from participants.

3.7.4 Conclusions

Despite these limitations, this study contributes to the limited body of literature that has focused on neighborhood social contexts and their impact on child social and cognitive development. [139] [145] [139,166] This study included multiple measures at the family level, unlike previous research, [139,145,164] included both cognitive and strengths based social emotional development assessments, which previous studies did not have collectively.[139,145] Furthermore, using a perceived measure of neighborhood support

can be viewed as a strength, due to the fact that perceived measures of neighborhood may have a greater effect on health outcomes than objective. [183-186]

The qualitative work in this study was unique as it focused specifically on neighborhood and school readiness, rather than general social risk or child outcomes as previous qualitative studies have done,[164,178,179] and did so specifically in a low-income population of parents of young children. The juxtaposition of the findings—quantitatively that social-emotional development was the only school readiness outcome significantly associated with neighborhood support and qualitatively that there may not be a direct association between neighborhood and school readiness and that rote memory, or cognitive skills such as ABC's, 123's are the most important component of school readiness—suggests that future research should parent level factors more in depth to better understand the mechanisms effecting the quantitative associations.

Chapter 4. How Do Perceived Neighborhood Social Contextual Factors Influence School Readiness?

4.1 PRIOR LITERATURE

Very few studies have examined the effects of neighborhood factors on child development, specifically school readiness, in early childhood. Among these, only 2 nationally representative datasets have been used. [145,148,272] While cognitive, behavioral and physical health outcomes have been studied, the association between neighborhood factors and behavioral problems are less consistent, especially when taking into consideration family context,[148] and physical health has been rarely studied as a specific component of school readiness, although there is evidence it should be included as a key construct. [29,30,48,54,110,111,113,127] The existing studies using nationally

representative datasets also have limitations, because many were not originally designed to study neighborhood factors, and do not consistently include neighborhood social context.[148]

Additionally, the majority of studies have not included multiple measures at the family level, including parenting measures, such as parent-child relationship quality, parent stress, or a parent's activities with their child, which may provide more insight into the association between neighborhood characteristics and child development.[157] For young children, especially, family-level factors including in-home cognitive stimulation or home literacy, positive parent-child relationships, and maternal mental health and social support, have been shown to play a role in the influence of neighborhood on child social and cognitive development.[148,165,272,273] For example, one study found that parental perceived neighborhood support was associated with maternal depression and lower quality parenting practices which in turn were associated with lower receptive vocabulary ability and higher behavioral problems for their children.[165] Family social capital, defined broadly as positive parenting practices, and more specifically as "close social bonds among parents and children", is a key construct of Sampson's, a highly recognized sociologist who studies neighborhood effects on children, hypothesized mechanism of how neighborhood influences child development.[161]

The connection between family-level factors and child development has been established through research, with key components of positive-parenting practices such as responsivity and sensitivity to a child's needs, in-home stimulation, and the utilization of non-violent, consistent discipline practices resulting in positive child outcomes such

as cognitive components of school readiness and positive social emotional development.[239-243]

Only one study directly tested a family-level mechanism (level of stimulation in the home environment), [274,275] through which neighborhood influences child cognitive development. However findings were not clear as to whether the home environment was acting as a confounder or a mediator, and the study was conducted in a high income neighborhood.[276] Among low-income neighborhoods, studies have suggested that parenting may act as moderator in the association between neighborhood structure and disadvantage and behavioral outcomes in children, but these studies have typically included parents of older elementary age or adolescent children.[169-173] Furthermore, while research exists that suggests possible pathways between neighborhood and child health, such as characteristics of parents that may influence their parenting behavior (i.e., stress, mental health), [155,174-176] physical health has not been examined traditionally as a construct of school readiness.[148] Among this existing body of evidence, limitations remain, specifically mechanistic research related to the impact of neighborhood social support and how it may operate within families to impact child behavioral and cognitive development.[139]

Perceived parental neighborhood support and safety have been linked to parenting practices.[167,168] Parent's concerns about safety, in addition to negative peer influences, have the potential to direct their parenting styles, as well as where they allow their child to go and who they allow them to interact with.[167,168] Parents living in low-income neighborhoods or neighborhoods with high levels of social disorganization may be more susceptible to the impact of neighborhood perceptions on their parenting. [277,278]

Families living in neighborhoods with low social cohesion or social control are more likely to feel the impact of their neighborhood on their home life.[169] Parents may feel the need to serve as a buffer for their child using protective strategies,[279] or on the contrary may adapt to the parenting practices of their neighborhood with low social cohesion or control which may result in an increase in less involved parenting practices. [279-281] Neighborhood social contexts may influence parents living in low income neighborhoods more than affluent neighborhoods, because of social pressure to adapt to a more "hands off" parenting style, or conversely to restrict their child's autonomy due to concerns about safety.[282]

While there is limited research that includes both neighborhood social context and comprehensive family level measures, researchers who have examined these constructs hypothesize that parenting may be one of the mechanisms on the causal pathway through which perceived neighborhood support influences child health and development,[139,147,157,164] but more data is needed to confirm these associations.[139,145,147,177] Additionally, studies have not used consistent nor a wide-range of parenting measures, with some including only the parents level of involvement in the child's education or cognitive stimulation at home,[145,147] and others including measures of the parent-child relationship such expressing affection and activities together. [139] As mentioned previously, hypotheses exist that parent stress and mental health may be a key pathway through which neighborhood factors influence children, through their impact on parenting behavior. [148,155,174-176] However, empirical evidence remains limited and the majority of work has focused on parents of older children and adolescents. [167,168,281] While strong theories and frameworks exist related to

neighborhood social context and child outcomes, studies that include a wider range of parenting measures and that are focused on a broad definition of child development and school readiness—including cognitive, behavioral, language, and physical health--are needed to better understand how neighborhood social context influences school readiness. [139,145]

4.2 RESEARCH QUESTIONS AND RESEARCH HYPOTHESES
Aim 3.

Studies examining the association between neighborhood characteristics and child outcomes related to school readiness are often lacking in multiple measures at the family level, [157] particularly parenting which has been hypothesized as a potential mediator of the relationship between perceived neighborhood support and child outcomes. [139,147,157,164] Additionally while some evidence and theoretical frameworks exist, [139,145,147,177] the proposed mechanisms are not clear. To address gaps in existing literature, _Aim 3 is to test a mechanism through which neighborhood context as measured by parents' perceived level of neighborhood support--influence physical health and behavioral and cognitive domains of school readiness, through parental stress and parent-child relationship quality._ Mediation analyses were conducted to examine mediation by parent stress and parent-child relationship quality in the association between neighborhood support and child health and school readiness outcomes. The **third hypothesis, _Hypothesis 3b: Neighborhood support influences physical health and behavioral and cognitive domains of school readiness indirectly through parental stress and parent-child relationship quality (mediators)._**

4.3 RESEARCH METHODS

4.3.1 Study Sample

The proposed study utilized data from the Educare Learning Network (ELN) Implementation Study, described in detail above in *2.3.1 Study Sample*. Data was collected in three main domains 1) Child Progress Measures 2) Family Progress Measures and 3) Classroom/Teacher Progress Measures. Child Progress Measures are collected by members of the LEP team for each site, as well as, by the child's classroom teachers. These child progress measures are outlined in detail in *2.4.2 Variable Specification*. Family Progress measures are collected during a Parent Interview that is administered annually to the child's primary caregiver by a Family Support Staff or LEP research team member at each Educare site. The Parent Interview includes a variety of demographic information about the child and family, parental beliefs and attitudes, and their perceptions of the Educare program.

The primary quantitative dataset for this study was provided by FPG and includes all data collected for the ELN Implementation Study from 2007-2015 (N=26,810). Due to changes in versions of several child progress measures, only data from 2012- 2015 was used in this study, and children with identified disability plans or any identified serious chronic diseases such as diabetes, sickle cell, and high lead levels are excluded from this study due to potential confounding. Additionally, this study includes only children in their transition year at Educare (would be leaving at the end of the year to go to kindergarten) whose parents provided information on neighborhood support (N=3237). The study sample includes children from 3 to almost 6 years of age, also excludes any child with a reported Individual Education Plan (IEP) or Individual Family Support Plan (IFSP) which is included in the FPG data set. Details about this sample can be found

above in *3.4.1 Descriptive Statistics,* **Table 1.** The sample size/power calculations

described above in *3.3.1 Study Sample* are the same for this study. The matched

sample for Paper 2 was used for this study (N=2263), however for the mediation

analyses the final sample was smaller (different for each outcome ranging from 173 for

Spanish PLS scores to 872 for Bracken scores) due to the fact that it only included

children who had more than one time point for school readiness outcome measures,

and who had data on all parent and family level variables included in the analyses.

4.3.2 Study Design

The study design described above in *3.3.2a Quantitative Design* is the same for

this study.

4.3.3 Variable Specification

The *independent, exposure, variables* in this study that comprise perceived

neighborhood support, which includes perceived collective efficacy (social cohesion and

social control) and perceived safety, were operationalized using a scale of six questions

from the ELN Parent Interview that were adapted from the National Survey of Children's

Health 2003. [192,255,256] The Neighborhood Support categorical score (each question is

worth 4 points, range 6-24, 4 categories: Least Supportive, Moderately Low Support,

Moderately High Support, and Most Supportive) was used for these analyses. The

response set of questions is outlined in Chapter 3 (*3.3.3 Variable Specification*) **Table 3.**

Neighborhood Questions.

The *dependent, outcome, variables* in this study, are child development

outcomes—child physical health, and the behavioral and cognitive domains of school

readiness. **Physical health** was operationalized using two questions on the ELN Parent

Interview—parent overall rating of child health, and any specific health needs (conditions) that the child has been diagnosed with. In the ELN Parent Interview **parent overall rating of child health** was measured by the question "Overall, would you say your child's health is…?" with answers categorized into "Excellent, Very Good, Good, Fair, or Poor." **Specific health conditions** were measured by asking parents "Does your child have special health needs?", and if they answered "Yes" they were asked to tell the interview all that applied including—allergies, diabetes, sickle cell disease, high lead levels, anemia, eczema, hearing difficulties, asthma, obesity, vision programs, or other. For the purposes of this study, only children with asthma were included when analyzing outcomes for children with specific health conditions. Children with diabetes, sickle cell, high lead levels, anemia, hearing difficulties, and vision problems were excluded due to low sample sizes and potential confounding.

Behavioral and cognitive domains of school readiness were measured using scores from four validated assessment tools in three categories—Language and Communication which includes the Preschool Language Scale (PLS), 5th Edition (English α=0.79, Spanish α=0.0.79) [229] and the Peabody Picture Vocabulary Test (PPVT), 4th Edition (α=0.94); [230] Social Emotional which is measured by the Devereaux Early Childhood Assessment (DECA) (Protective Factors α=0.82, Behavioral Concerns α=0.80); [231] and Numeracy/Cognitive which is measured by the Bracken Basic Concept Scale-Revised (α=0.83). [232] School readiness was defined based on standard scores within or above the average or typical range for the PLS, PPVT and Bracken; for the DECA it was based on a typical or above T-scores. These variables are described in detail above in Chapter 2 (*2.3.3 Variable Specification).*

Mediators in this study, **parental stress** and **parental child relationship quality** were operationalized using questions on the ELN Parent Interview.

Parental Stress

Parent stress was operationalized from questions adapted and reproduced from the Parenting Stress Index (PSI) Short Form. [283] Responses to eleven questions are calculated into a sum score, mean score, and percentile. The mean score averaged across the number of Parent Interviews available for each child was used (α=0.79). Scores range from 1-5 with a higher score indicating higher levels of stress. For these analyses parent stress was reverse coded. The response set of questions is presented in Table 5 and these items are referred to as the Parental Distress subscale of the PSI.

Table 5. Parent Stress

Being a parent is not always easy. How much do you agree or disagree with each statement: 1=strongly disagree, 2=disagree, 3=not sure, 4=agree, 5=strongly agree.

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1. I often have the feeling that I cannot handle things very well.	1	2	3	4	5
2. I find myself giving up more of my life to meet my children's needs than I ever expected.	1	2	3	4	5
3. I feel trapped by my responsibilities as a parent.	1	2	3	4	5
4. Since having this child, I have been unable to do new and different things.	1	2	3	4	5
5. Since having a child, I feel that I am almost never able to do things that I like to do.	1	2	3	4	5
6. There are quite a few things that bother me about my life.	1	2	3	4	5
7. Having a child has caused more problems than I expected in my relationship with my spouse/partner.	1	2	3	4	5
8. I feel alone and without friends.	1	2	3	4	5
9. When I go to a party, I usually expect not to enjoy myself.	1	2	3	4	5
10. I am not as interested in people as I used to be.	1	2	3	4	5

11. I don't enjoy things as I used to.   1   2   3   4   5

Parent Behaviors

Parent child relationship quality was operationalized from questions adapted

from the Pianta Child-Parent Relationship Scale.[284] Responses to fifteen questions are

calculated into a Parent-Child Closeness and parent-Child Conflict Mean in addition to a

Parent-Child Total Mean. The Parent-Child Total Mean, averaged over the number of

Parent Interviews available for a child was utilized and demonstrated high internal

consistency reliability in our sample ($\alpha=0.79$). Scores range from 1-5 with a higher score

indicating a higher level of Parent-child relationship quality (higher closeness, lower

conflict). The response set of questions is shown in Table 6:

Table 6. Parent Child Interactions

We would like to know about your relationship with your child. Please reflect on the degree to which each of the following statements currently applies to your relationship with your child. Using the scale below, circle the appropriate number for each item: 1=Definitely does not apply, 2=Not really, 3=Neutral, not sure, 4=Applies somewhat, 5=Definitely applies.

	Definitely does not apply	Not really	Neutral, not Sure	Applies somewhat	Definitely applies
1. You share an affectionate, warm relationship with your child.	1	2	3	4	5
2. You and your child always seem to be struggling with each other.	1	2	3	4	5
3. If upset, your child will seek comfort from you.	1	2	3	4	5
	Definitely does not apply	Not really	Neutral, not Sure	Applies somewhat	Definitely applies
4. Your child is uncomfortable with physical affection or touch from you.	1	2	3	4	5
5. Your child values his/her relationship with you.	1	2	3	4	5
6. When you praise your child, he/she beams with pride.	1	2	3	4	5
7. Your child spontaneously shares information about himself/herself.	1	2	3	4	5
8. Your child easily becomes angry with you.	1	2	3	4	5

	1	2	3	4	5
9. It is easy to be in tune with what your child is feeling.	1	2	3	4	5
10. Your child remains angry or is resistant after being disciplined.	1	2	3	4	5
11. Dealing with your child drains your energy.	1	2	3	4	5
12. When your child is in a bad mood, you know you're in for a long and difficult day.	1	2	3	4	5
13. Your child's feelings toward you can be unpredictable or can change suddenly.	1	2	3	4	5
14. Your child is sneaky or manipulative with you.	1	2	3	4	5
15. Your child openly shares his/her feelings and experiences with you.	1	2	3	4	5

Potential confounders in this study include individual sociodemographic characteristics such as child age, sex, race/ethnicity, parent level of education, family structure, parent employment status, and language. *Potential moderators* include attendance and time in Educare. Race, ethnicity, and child sex were also be tested as moderators. Analyses were clustered or nested within Educare school site to account for within school correlation such as cultural and other differences. and confounding that may occur from teachers filling out the DECA. These variables were available in the ELN national dataset.

4.3.4 Statistical Analysis

Building on the analyses described above in *3.3.4 Statistical Analysis* Paper 3 included mediation analyses to examine whether parenting functions as the hypothesized mediator in the relationship between parental perceived neighborhood support and child outcomes (school readiness and physical health). Hayes' methods for mediation with both basic and multiple mediation models were used to determine total, direct, and indirect effects. Bootstrapping was used to test indirect effects.[285] Hayes

Process SAS macro was for these analyses.[286] Mediation assumptions for these analyses included no unmeasured confounding of: 1) the parental perceived neighborhood support-behavioral and cognitive domains of school readiness relationship, 2) the parent-behavior/parent-stress- behavioral and cognitive domains of school readiness relationship, and 3) the parental perceived neighborhood support- behavioral and cognitive domains of school readiness relationship. An additional assumption was that the mediator (parent behaviors and parent stress) precedes temporally the behavioral and cognitive domains of school readiness. Exposure-mediator interactions were present in these analyses. [287]

4.4 RESULTS

Descriptive statistics and crude associations for this sample are the same as Table 1 and Table 2 in *3.4.1 Descriptive Statistics.* Crude effects between neighborhood support and child health and school readiness outcomes are the same as described in *3.4.2 Multivariable/Multilevel Modeling.* Neighborhood support was crudely associated (results not shown) with health (β= 0.03, SD= 0.02, p< .05), protective social emotional factors (β= 0.02, SD= 0.01, p< .05) and social emotional behavioral concerns (β= 0.02, SD= 0.01, p< .01). Neighborhood support was crudely associated with both proposed mediators parent stress (β= 0.06, SD= 0.01, p< .001) and parent-child relationship quality (β= -0.06, SD= 0.02, p< .01). For mediator-outcome associations, parent child relationship quality was only crudely associated with parent report of child health (β= -0.19, SD= 0.06, p< .01). Parent stress was crudely associated with parent report of child health (β= 0.14, SD= 0.03, p< .0001), social-emotional protective factors (β= 0.02, SD= 0.01, p< .05), and behavioral concerns (β= 0.01, SD= 0.01, p< .10).

The following conceptual model is shown in Figure 1 and demonstrates the multiple mediation models that were analyzed.

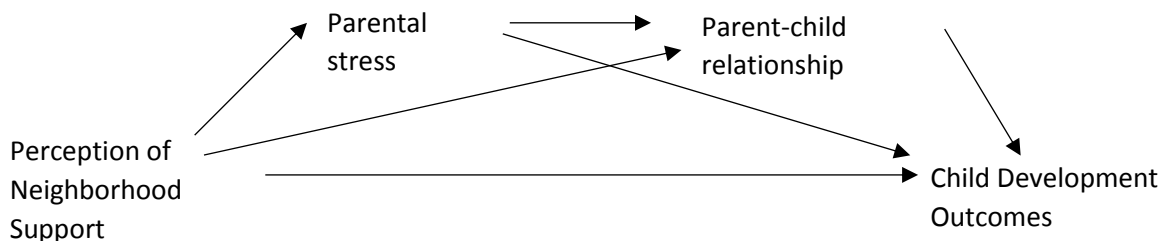**Figure 1**. Conceptual Mediation Model: Neighborhood Support and Child Development Outcomes

Table 1. Child Health Mediation model results (N=686)*

	Beta		95% CI
Direct effect	0.0936	0.0234	0.1638
Indirect effect through parental stress	0.0002	-0.0035	0.0057
Indirect effect through parent-child relationship	0.0098	0.0021	0.0240
Indirect effect through parental stress and parent-child relationship	-0.0012	-0.0048	0.0004

**Models controlled for child sex, race, language, entry age and age at assessment, Parent Education, Parent Employment, family structure, depressive symptoms, activities at home, and community activities

Results from mediation analyses for child health as an outcome indicated that the association between parental perception of neighborhood support and child health may partially act through parent-child relationship quality (β= 0.01, 95% CI= 0.02, 0.16). The direct effect of parental perception of neighborhood support on child health was also statistically significant. (β= 0.09, 95% CI= 0.23, 0.16). The indirect

effects of perception of neighborhood support on child health through

parental stress and multiple serial mediation with parent stress and

parent child relationship quality were not statistically significant.

When stratified by race (results not tabled) the direct effect of

neighborhood support on child health (β= 0.15, 95% CI= 0.04, 0.26) and

the indirect effect of neighborhood support on child health through

parent child relationship quality (β= 0.03, 95% CI= 0.01, 0.06) remained

significant for non-White Hispanic children only.

Table 2. Receptive Vocabulary (PPVT) Mediation model results (N=628)*

	Beta		**95% CI**
Direct effect	-0.4667	-1.7874	0.8540
Indirect effect through parental stress	**0.**0455	**-0.**0139	0.2470
Indirect effect through parent-child relationship	**0.**0978	**-0.**0182	**0.**3014
Indirect effect through parental stress and parent-child relationship	**-0.**0119	**-0.**0616	**0.**0038

*Models controlled for child sex, race, language entry age and age at assessment, First PPVT
score, educational level and employment status, and activities with the child.

Results from the mediation analysis on receptive vocabulary

indicated that the association between parental perception of

neighborhood support and child receptive vocabulary scores did not act

through parental stress and increasing parent-child relationship quality

as shown in Table 2. The direct effect of parental perception of

neighborhood support on child receptive vocabulary score was not

statistically significant. The indirect effects of perception of

neighborhood support on child receptive vocabulary score through

parent stress, parent-child relationship and through the impact of parent stress on parent-child relationship in sequence were not statistically significant.

Table 3. Social Emotional Protective Factors (DECA) Mediation model results (N=647)*

	Beta		95% CI
Direct effect	1.0158	0.0986	1.9331
Indirect effect through parental stress	-0.0119	-0.0999	0.0176
Indirect effect through parent-child relationship	-0.0081	-0.1244	0.0804
Indirect effect through parental stress and parent-child relationship	0.0011	-0.0110	0.0255

*Models controlled for child sex, race, language, entry age and age at assessment, Parent Education, Parent Employment, family structure, depressive symptoms, activities at home, community activities and First DECA protective factors score

Results from mediation analyses on social emotional protective factors indicated that the association between parental perception of neighborhood support and social emotional protective factors did not act through parental stress and quality of the parent-child relationship as shown in Table 3. The direct effect of parental perception of neighborhood support on social-emotional protective factors was statistically significant. (β= 1.02, 95% CI= 0.10, 1.93) The indirect effects of perception of neighborhood support on social emotional protective factors through parental stress, parent-child relationship and multiple mediation were not statistically significant. When stratified by race both direct and indirect effects were insignificant for all racial sub-groups.

Table 4. Social Emotional Behavioral Concerns (DECA) Mediation model results (N=647)*

	Beta		95% CI

Direct effect (p 0.02)	**1.3827**	**0.1987**	**2.5667**
Indirect effect through parental stress	-0.1312	-0.4025	0.0078
Indirect effect through parent-child relationship	0.0198	-0.1984	0.2309
Indirect effect through parental stress and parent-child relationship	0.0088	-0.0840	0.1208

*Models controlled for child sex, race, language, entry age and age at assessment, Parent Education, Parent Employment, family structure, depressive symptoms, activities at home, community activities and First DECA Behavioral Concerns score

Results from the mediation analysis for social emotional behavioral concerns indicated that the association between parental perception of neighborhood support and child social emotional behavioral concerns did not act through increasing parental stress and decreasing parent-child relationship quality as shown in Table 4. The indirect effects of perception of neighborhood support on child social emotional behavioral concerns through parent stress, parent-child relationship and parent stress through parent-child relationship were not statistically significant. The direct effect indicates that even if parents who perceived their neighborhood support as high or low had the same levels of stress and parent-child relationship quality, children whose parents perceived their neighborhood support as low would still have on average 1.38 points higher behavioral concerns scores (p<0.05, 95% CI 0.20, 2.57). When stratified by race both direct and indirect effects were insignificant for all racial sub-groups.

Table 5. English Auditory Comprehension (PLS-5) Mediation model results (N=747)*

	Beta		95% CI
Direct effect	-1.3249	-5.1743	2.5245
Indirect effect through parental stress	-0.0063	-0.9323	0.1601
Indirect effect through parent-child relationship	-0.0129	-1.4077	0.4254
Indirect effect through parental stress and parent-child relationship	-0.0024	-0.3831	0.1196

*Models controlled for child sex, race, entry age, language, educational level of the parent, activities with the child, and First English PLS AC score

Results from mediation analyses on the PLS-5 indicated that the association between parental perception of neighborhood support and English Auditory Comprehension scores did not act through parental stress and quality of the parent-child relationship as shown in Table 5. The direct effect of parental perception of neighborhood support on English Auditory Comprehension scores was not statistically significant. The indirect effects of perception of neighborhood support on English Auditory Comprehension scores through parental stress, parent-child relationship and both in sequence were not statistically significant.

Table 6. Spanish Auditory Comprehension PLS-5) Mediation model results (N=173)*

	Beta		95% CI
Direct effect	-1.2523	-4.9613	2.4567
Indirect effect through parental stress	-0.0072	-0.7725	0.1037
Indirect effect through parent-child relationship	-0.0296	-0.8678	0.2682
Indirect effect through parental stress and parent-child relationship	-0.0052	-0.2928	0.0706

Results from mediation analyses on PLS-5 Spanish Auditory Comprehension indicated that the association between parental perception of neighborhood support and Spanish Auditory Comprehension scores did not act through parental stress and quality of the parent-child relationship as shown in Table 6. The direct effect of parental perception of neighborhood support on Spanish Auditory Comprehension scores was not statistically significant. The indirect effects of perception of neighborhood support on Spanish Auditory Comprehension scores through parental stress, parent-child relationship and both in sequence were not statistically significant.

Table 7. Cognitive Skills (Bracken) Mediation model results (N=872)*

	Beta	95% CI	
Direct effect	0.7235	-1.5340	2.9810
Indirect effect through parental stress	-0.0048	-0.7205	0.1971
Indirect effect through parent-child relationship	-0.0178	-1.4192	0.4076
Indirect effect through parental stress and parent-child relationship	-0.0029	-0.3701	0.1038

*Models controlled for child sex, race, language entry age, age at assessment, educational level and employment status, activities with the child, and First Bracken score.

Results from mediation analyses on school readiness concept knowledge indicated that the association between parental perception of neighborhood support and school readiness concept knowledge (Bracken) scores did not act through parental stress and quality of the parent-child relationship as shown in Table 7. The direct effect of parental perception of neighborhood support on school readiness concept knowledge (Bracken) scores was not statistically significant. The indirect effects of perception of

neighborhood support on school readiness concept knowledge (Bracken) scores through parental stress, parent-child relationship and both in sequence were not statistically significant.

4.5 DISCUSSION

This study examined mechanisms (parent stress and parent child-relationship quality) through which neighborhood social context as measured by parents' perceived level of neighborhood support, could influence physical health and behavioral and cognitive domains of school readiness. Results indicate that parent-child relationship is a mediator of the relationship between perceived neighborhood support and child health, and when stratified by racial groups, this association remained only for non-White Hispanic children. This association between parent child relationship and child health in early childhood has been documented in the literature, and experts agree that parent-child relationship quality is an emergent social determinant of health.[288-290]

In line with existing literature, this study did not identify specific mechanisms in the association between neighborhood social context and child development outcomes. [139,164,165] Quantitative findings of Paper 2 demonstrated an association between perceived neighborhood support and social emotional outcomes (protective factors and perceived behavioral concerns) in children, which were also significant in this sample for behavioral concerns. Qualitative findings of Paper 2 highlighted that while parents did not explicitly describe the connection between neighborhood and their child's school readiness, parent stress was highlighted as a key construct. The findings from this paper continue this debate and discussion of how to capture, categorize, and measure the influence of neighborhoods on school readiness of young children.

It is challenging to deduce which factors are attributable to neighborhood factors versus parent and family level factors. One study asserts that despite the inclusion of family-level factors in analytical models, neighborhood effects are still likely to be misspecified[148], while another indicates that neighborhood effects may also be underspecified, due to the fact that most research on this topic usually only includes either low or high income neighborhoods and not both.[291]

4.5.1 Study Limitations

This paper has the same limitations mentioned in *2.5.1 Study Limitations* for Paper 1 related to limitations of the data set in regards to longitudinal analyses and selection bias. Additionally, the limitations of the parent report of child health and parental perceived neighborhood support measure, and the omission of neighborhood structural factors are the same as those outlined in *3.5.1 Study Limitations* for Paper 2. Neighborhood effects may not have been full captured, as more specific quantifications of neighborhood support could have been used, and the measure was based on parent report/perception vs. an objective measure. Limitations for this paper are also present due to the limited availability of parenting information at the family context level, and these unmeasured characteristics may really account for any observed, or unobserved neighborhood effects.[148] More detailed information on the child's learning environment and information on the level of parental involvement in the child's early learning center are not available for these analyses. Additionally, characterizing or quantifying the responsivity and sensitive of a parent-child relationship is thought to be more valid through observation, rather than a parent reported closeness scale.

4.6.1 Conclusions

This study found that parent-child relationship quality may be a mediator through which parental perceived neighborhood support is influencing child health, and that this mediation may differ by race. As mentioned previously, this research contributes to the growing body of evidence that highlights parenting as a key life course determinant of health. Although findings from this study did not identify specific mechanisms through which perceived neighborhood support effects child development outcomes, this was a large, racially diverse study that included a wide-range of parenting measures, unlike previous studies which may have only include one facet of parenting such as materials in the home, [145,147] or measures of the parent-child relationship, [139] in addition to multiple child development outcomes. It is also unique due to the fact that it was conducted in a sample of young children, whereas the majority of existing literature on the topic is based on neighborhood effects on adolescents. [167,168,281] As with existing studies, the Parent Interview from which the data for this study was generated was not designed to study neighborhood impact on children. This in addition to the mixed findings of this study and the findings of Paper 2 highlight the need not only for more detailed specification of neighborhood and family level variables, but the importance of intersectional and interdisciplinary research designed to study the impact of neighborhood social context on child development and school readiness outcomes. Particularly studies that pay attention to how parent level variables are defined and how parent perspectives are captured. This will be a key construct and tenet moving forward, to accurately capture data to further define and validate existing theories on the impact of neighborhood on child development.

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Specific Aim	Focus Group Topics	Focus Group Question Re-Writes	Analytic Questions
Aim 2. To determine the impact of neighborhood context, specifically parents' perceived level of neighborhood support, on physical health and behavioral and cognitive domains of school readiness. H2c: Parents of young children will identify a common set of neighborhood factors as the most important contributors to physical health as they relate to school readiness.	Parent perceptions of school readiness	**When did you start to think about where your child would go to Kindergarten?** **What are some of the things that you think are important for your child to know/be able to do before they go to Kindergarten?** **What do you think it means for your children to be "ready" for school (Kindergarten)?** *Probe/clarification-How would you explain what it means to be ready for school to another parent?*	*Q1. Do parents understand the importance of early childhood (experiences, exposures, and environment) to school readiness?*
	Child health and school readiness	**How do you think your child's health is connected to how ready they are for school?** **Probe-physical health = physical conditions but also could probe on nutrition (food insecurity) and other health behaviors (physical activity, others?) and environmental factors in the home (smoke exposure, violence exposure, environmental exposures (lead, air quality)*	*Q2. Do parents identify a connection between child health and school readiness?*

| | Neighborhood and child health/school readiness | **What do you think of when I say "your neighborhood?"**

(do they think of their street, a geographic area, or the people?)

What is it like to live in your neighborhood?*

*Probe: Do you feel safe in your neighborhood?

Think about the people in your neighborhood. Tell me how you feel about how they do or do not support your family and your child.*

*Probe: Do you feel like you can count on them? Do you feel like you can trust them? Do you feel like people in the neighborhood might be a bad influence on your child?

Can you tell me about some things in your neighborhood that you think might impact your child's health? *

*Probe: people in the neighborhood, quality of the neighborhood, crime, physical spaces, access to healthy food

Can you tell me about things in your neighborhood that you think impact your child being ready for school?* | *Q3. : What common set of neighborhood contextual factors do parents identify as the most important contributors to physical health and well-being as it relates to school readiness?* |

		Probe: people in the neighborhood, quality of the neighborhood, crime, physical spaces, access to healthy food	
		When you think of your child's childcare/preschool, how do you think that impacts how ready your child is for school?	
		What do you think has more of an impact on school readiness—childcare/preschool or home/neighborhood? Why?	
	Parent stress → health and school readiness	**What are some things in your life that you think make it harder for you to help your child be healthy?**	*Q4. What do parents perceive as the primary buffers/barriers that contribute to school readiness? What role does parent stress play in child health/development/readiness? OR Does the parent child relationship act as a protective factor that fosters health/development/readiness? Are these separate?*
		Probe-stressors at the individual, family, neighborhood, community levels	
		What are some things in your life that you think support (or help) you to help your child be healthy?	
		What are some things in your life that you think make it harder for you to help your child be ready for school?	
		What are some things in your life that you think support (or help) you to help your child be ready for school?	
		Probe-relationship with your child, activities with your child	

| | Program Input (for OPEN curriculum) | **Give examples of types of school readiness:**
• **Physical health**
• **Social and emotional development**
• **Language, reading, knowing words**
• **Cognitive skills (ABCs, numbers, shapes)**

How would you order these things in order of how much you think they have an impact on how ready your child is for school?

What are some ideas that you have for programs, information or resources that would help you to get your child ready for school? | |

School Readiness, Child Health, and Neighborhoods—How are they connected?
FOCUS GROUP INFORMATION SHEET

1. What is your age?

    ☐ a. 18-23 years
    ☐ b. 24-29 years
    ☐ c. 30-34 years
    ☐ d. 34-39 years
    ☐ e. 40-50 years
    ☐ f. 50+ years

2. What is your race? **(Please select one) [OPTIONAL]**

    ☐ a. American Indian/Alaska Native
    ☐ b. Asian
    ☐ c. Black/African American
    ☐ d. Native Hawaiian/Pacific Islander
    ☐ e. White
    ☐ f. Biracial/multi-racial
    ☐ g. Other (**Specify**: _____)

3. What is your highest level of education? **(Please select one)**

    ☐ a. Eighth grade or less
    ☐ b. Some high school but no diploma or no GED
    ☐ c. High School diploma or GED
    ☐ d. Some college but no degree
    ☐ e. High school diploma or GED, plus technical training or certificate
    ☐ f. AA, AS, two-year degree
    ☐ g. Bachelor's degree
    ☐ h. Master's degree
    ☐ i. Doctoral degree (e.g., M.D., J.D., Ph.D.)
    ☐ j. Other (**Specify**: _____)

4. Which **one** option best describes your current employment status?
    ☐ Employed: If yes, check all that apply:
          ☐ Working full-time (35 hours per week or more)
          ☐ Working part-time (less than 35 hours per week)
          ☐ Working only part of the year (less than 12 months)
    ☐ Unemployed (e.g., laid off, between jobs, looking for work)
    ☐ Not in the Labor Force (e.g., retired, at home parent)

5. Are you currently enrolled in school or a training program?
    ☐ Yes, in school: Which school: _____
    ☐ Yes, in training program: Which program: _____
    ☐ No – not in school or training program at this time

6. Which best describes your family structure?
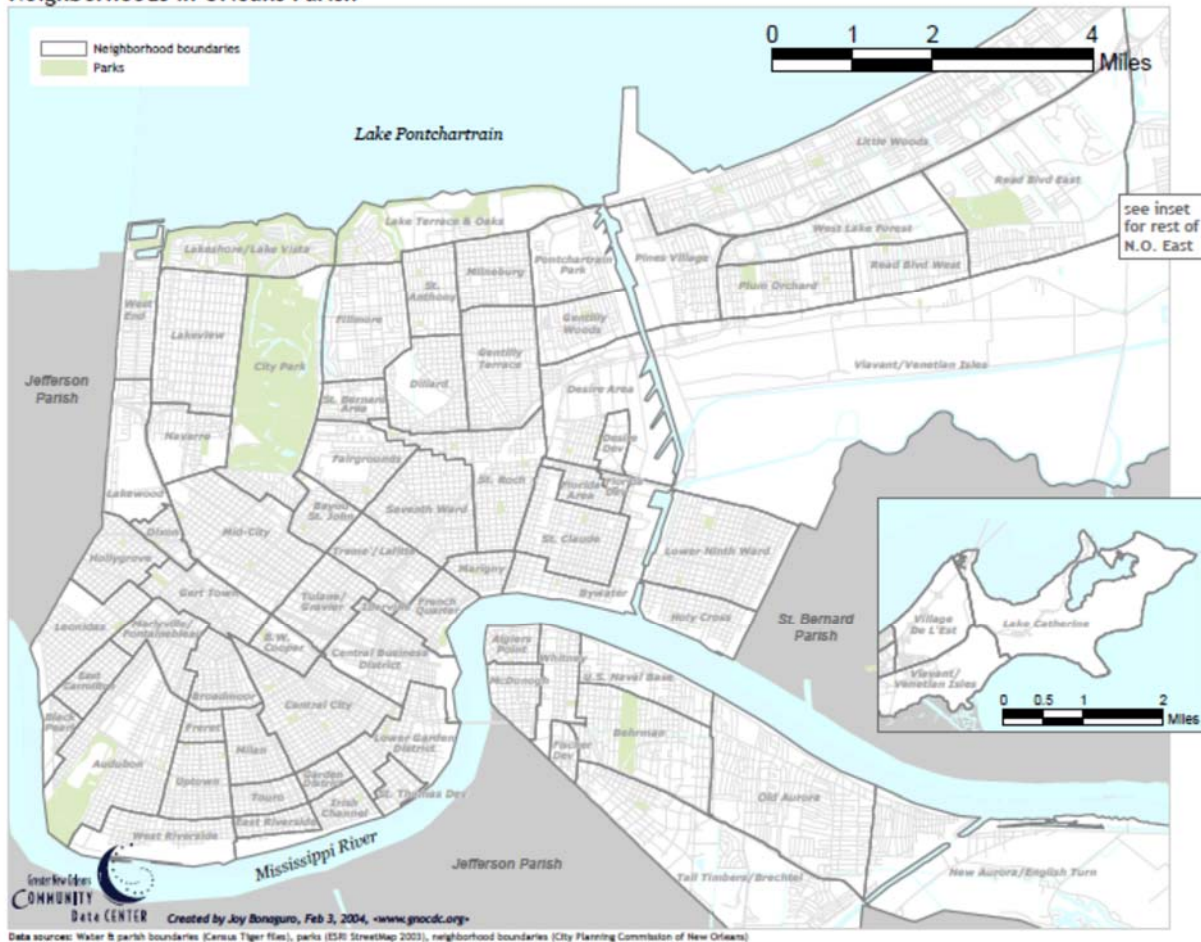   ☐ a. Two-parent   ☐ b. Single-parent   ☐ c. Other (**Specify**: _____)

7. How many children do you have? _____

8. What are the ages of your children? _____

9. Does your child (ages 0-5 years) attend day care, preschool, or a similar type of place?
    ☐ Yes   ☐ No

10. Please circle the neighborhood that you live in on the map below: