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Chaeyeon Lim   April 9th, 2025

Black American Mothers' Preterm Births and Children's Attention Outcomes: Understanding the

Moderating effects of Parenting and Environmental enhancers

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Abstract

Black American Mothers' Preterm Births and Children's Attention Outcomes: Understanding the

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By Chaeyeon Lim

Previous research has found that Black American children born prematurely had a higher chance

of adverse neurodevelopmental outcomes than children born within normal gestational ages.

Additionally, Black American mothers with lower socioeconomic status (SES) have been found

to be at twice the risk of preterm birth and low birth weight than white mothers. Given these risk

patterns, it is essential to represent minority communities in the scientific literature linking

preterm birth and child neurodevelopment. This study focuses on the relationship between

preterm birth and children's attention problems in a sample of 288 Black American families.

Participants were recruited from prenatal clinics and followed throughout their pregnancies, with

their children then followed through the preschool period of development. Children's attention

was measured via the preschool Child Behavior Checklist (CBCL). Neighborhood environments

were geocoded and evaluated based on the child opportunity index (COI). Positive parenting

characteristics were coded offline from videos of mothers playing with their children. We

hypothesized that preterm birth would be associated with more attention problems in children,

and that the relationship between preterm birth and attention problems would be weaker if there

were higher levels of positive parenting or a stronger neighborhood environment (more

opportunities for children). The study results did not support our hypotheses. These results

suggest that Black American mothers' preterm births do not directly predict later attention

problems in children. Instead we found a significant correlation between a mother's prenatal

stress and children's attention problems, suggesting that other perinatal risks might be more

important to focus on than prematurity in Black American populations to improve cognitive

outcomes in children.

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Introduction

There are growing concerns from parents and psychologists about the significant increase in children with delayed developmental milestones, especially regarding cognitive abilities that influence academic performance and social interactions (Cheng et al., 2014). In the recent decade, there was a significant increase of 9.5% in developmental disabilities in the U.S. (Zablotsky et al., 2020), which may be correlated with increasing rates of preterm birth (Talge et al., 2010). Indeed, recent research calls for further attention to the relationship between children's cognitive delays and the prevalence of preterm births (Breeman et al., 2015). Studies have shown that preterm children have significantly lower intelligence quotient (IQ) scores compared to full term peers (Johnson, 2007) and that cognitive differences persist through adulthood (Chan et al., 2016). However, these recent studies have predominantly focused on Caucasian mothers and children, leaving the relationship between developmental risks and preterm birth in Black American samples unclear.

It is alarming that there is little focus on Black American mothers in this field of research, especially given the significant prevalence of preterm births and other environmental risk factors within this population. Limited research suggests that preterm Black American children have a significantly higher chance of severe neurodevelopmental disabilities than children born within normal gestational ages (Andrews et al., 2007). Additionally, studies showed that Black American mothers with lower socioeconomic status (SES) were at twice the risk of preterm births and low birth weight than of Caucasian mothers. They also suggested the interaction within multiple environmental factors, such as SES and mother's parenting styles, to be essential in shaping children's outcomes (Foster et al., 2000). It is problematic to generalize and overlook different prevalences of the types of risk factors and health outcomes in different communities. Addressing this concern in this study would be beneficial for teachers and clinicians in fields of

education and healthcare that focus on the well-being of children. The current study is based on the premise that is essential to represent racial minority communities that have been neglected in the previous literature to better specify culturally sensitive interventions that promote children's cognitive development.

Preterm Birth and Cognitive Outcomes in Children

Amongst multiple factors that impact child development, the study focuses on the influence of preterm births on children's cognitive outcomes, particularly attention abilities. Cognitive deficits are one of the most common impairments in preterm infants, and one of the most essential factors underlying overall developmental dysfunction in preterm children (Weijer-Bergsma et al., 2007). This is because attention plays a major role in children processing all novel and complex stimulation in their environment; the process of selective attention and response to events or process of memory encoding is heavily intertwined with their cognitive abilities (Ruff & Rothbart, 1996). A study by Sucksdorff et al. (2015) found that the lower the gestation age at birth in weeks, the higher the risk of getting diagnosed with ADHD. Franz et al. (2018) also found that ADHD prevalence in preterm children is two to four times higher than in the general population. These initial differences are associated with higher chances of ADHD diagnoses later in development, especially during adolescence (Camerota et al., 2024), suggesting the importance of identifying and treating children at risk early in their development. The current study focuses on attention problems that are observed during the preschool phase of development, aiming to identify potential strategies for early intervention.

Impact of Environment on Child Cognitive Outcomes

A child's cognitive development is heavily dependent on the quality of the environment in which they are raised. In particular, lower childhood socioeconomic status (SES) is associated

with multiple cognitive impairments, including academic achievements, language abilities, memory, attention, and executive function abilities (Finn et al., 2016). A study by Rosen et al. (2019) compartmentalized aspects of early environments into three areas: violence exposure, cognitive stimulation, and quality of physical environment that reflect varying SES circumstances. Cognitive stimulation examines the complexity of stimuli presented to babies and the presence of learning materials, whereas physical environment examines children's SES, safety or neighborhood crime rates, cleanliness, and general perceptual environment. Overall, it was suggested that two of the areas of focus, quality of physical environment and violence exposure levels, were correlated with cultivating positive attention outcomes from early childhood. This study highlighted the important role of children's immediate surroundings, and we aim to further understand if these quality environments might also moderate the relationship between children's prematurity and attention outcomes in the Black American population.

A study by Sealy-Jefferson et al. (2019) suggests that Black American women are at a higher risk for preterm births compared to other racial communities, particularly non-Hispanic white women (Giurgescu et al., 2013). Because Black American women are consistently exposed to high-stress environments (Louis et al. 2015), including racial discrimination, fewer education opportunities, and less social support, these prenatal experiences may increase the likelihood of preterm births. Furthermore, Black children in general, both born preterm and term, exhibit higher rates of executive functioning deficits than white children of similar SES backgrounds (Foster et al., 2000). This could suggest that there are distinctive elements in the environment – stress factors - that Black American children are exposed to, in addition to the challenges that preterm birth poses in long-term development. Our study will attempt to isolate the impacts of

preterm birth on child attention problems by controlling for other potential risks, including prenatal stress, low social support, and low income in our statistical analyses.

Environmental Enhancers as a Moderator

Knowing that early childhood environment acts as an essential factor of children's cognitive outcomes and that racial or ethnic minorities are particularly impacted, this study aims to investigate the influence of environmental enhancers on the attentional abilities of Black American preterm children. More specifically, it will focus on how neighborhood conditions conducive to positive development moderate the strength and direction of the relationship between Black American preterm birth and children's attention problems. A study by Rakesh et al. (2021) suggested that measures of home and school environment – including perceived safety - moderated the relationships between neighborhood deprivation and brain development throughout adolescence. Rosen et al. (2019) also suggested that the quality of the physical environment – such as safety, cleanliness, etc – acted as predictors of the relationship between SES (particularly income-to-need ratio) and children's attention outcomes. Based on these foundations and prior literature, the current study aims to test whether the positive qualities of a child's neighborhood environment can moderate the relationship between preterm birth and child attention problems.

Impact of Parenting on Child Cognitive Outcomes

Parenting is also a significant contributor to a child's cognitive developmental outcomes (Treyvaud et al., 2016). A meta-analysis of 27 published articles by Neel, Stark, and Maitre (2018) revealed that parenting style significantly associated with cognitive and behavioral outcomes in preterm infants. It also suggested that parental responsivity in particular was associated with improved long-term child outcomes. The current study evaluated a related

parenting concept, parental sensitivity, as well as parental positive regard and cognitive stimulation as potentially important predictors of childhood attention in the context of preterm birth.

Parenting as a Moderator

While it is rare to find literature that has studied the moderating effects of parenting on the relationship between preterm birth and children's attention outcomes, particularly studies that focus on Black American families, several studies have demonstrated the significance of parenting as a buffer that alleviates children's cognitive delays and the effects of other adverse childhood experiences. For example, Chen et al. (2011) found that maternal nurturing and care buffered the impacts of childhood adversity on physical and mental health outcomes. Schecther et al. (2017) found that positive parenting strategies buffered the impact of prenatal distress on child cognitive outcomes in preschool. A study by Liu and Lachman (2019) also found that parenting styles buffered the relationship between childhood SES and long-term cognitive outcomes. Given these patterns of results, the current study tests the hypothesis that positive parenting might also buffer associations between preterm birth and attention problems early in childhood.

Importantly, a study by Watkins-Lewis (2012) suggested that parenting styles may differ in Black American communities, where a priority of safety might increase aspects of parental control, in contrast to sensitivity. It is important to test the role of positive parenting in buffering the relationship between preterm birth and children's attention problems in Black American families in particular, which is a goal of the current study as well.

The Present Study

The present study investigates the relationship between Black American mothers' preterm birth and their children's attention problems, in addition to analyzing how the mother's parenting styles and the child's neighborhood environment moderate that relationship. We hypothesized that if Black American children are born prematurely, they will have worse attention problems (H_1). We also hypothesized that a positive parenting style will act as a moderator of the preterm birth and child attention relationship, such that it will alleviate the negative cognitive outcomes typically associated with preterm birth (H_2). Additionally, we hypothesized that a high childhood opportunity index score would similarly moderate the preterm birth and child attention problem relationship (H_3). We believe that testing these associations in a Black American sample would potentially inform culturally sensitive interventions for women and their children.

Methods

Participants

The current study collected demographics, addresses, and cognitive developmental tests from 288 pairs of Black American mothers and children. Data on gestational age at birth were collected from hospital birth records. Prenatal enrollment and data collection took place at Grady Memorial and Emory University Midtown Hospital in Atlanta, GA. Children ranged from two through six years old during laboratory study follow-ups undertaken as part of the ECHO consortium study. This secondary analysis used participant data for families who had all surveys and assessments completed by February 2020.

Materials and Measures

Demographics and Birth Data

Family demographic information (age, sex, address, and date of birth) was directly derived from their existing medical records in the hospital patient database. All recorded gestational ages at birth were between 23 and 41 weeks ($M = 38.5$, $SD = 2.12$). Our measure of prematurity was continuous gestational age without categorizing participants into specific intervals such as very preterm, moderately preterm, or late preterm.

Child Behavior Checklist (CBCL)

To investigate the attention outcome in children, we used the Child Behavior Checklist for ages 1.5-5 (CBCL), which is a part of the Achenbach System of Empirically Based Assessment (ASEBA). This version is tailored for children of preschool age. This is a 100-tiem self-report questionnaire that was completed by the mothers. The checklist assesses children's

problems or symptoms of anxiety or depression, somatic complaints, sleep problems, aggression, anxiety, affection, and attention/hyperactivity (Kristensen et al., 2010). For each behavioral item mothers are asked to complete a 3-point Likert scale, ranging from 0 through 2, where 0 indicates "absence" and 2 indicates "occurs often now or within the past two months." We used the raw score of attention problems scale in this study, with a higher score indicating a more severe presence of the categorized symptoms. The attention problems scale included five items such as "can't concentrate" and "can't keep still." Inter-item reliability was good in this sample (Chronbach's Alpha=.70).

Mother – Child Interaction

Five-minute videos of mothers playing with their children at ages two and three years of age were coded offline to assess the quality of the mother child interaction. Based on the Three-Bag Assessment proposed by Brady-Smith et al. (1999), we focused on the mothers' sensitivity, positive regard, and cognitive stimulation levels. The coding scheme was on a scale of 1 through 4, with 1 being not at all characteristic and 4 being highly characteristic of each of the parenting factors. The coders – who were undergraduate and graduate students – ensured an inter-rater reliability of 80% or greater across all videos.

Child Opportunity Index (COI)

To measure environmental enhancers, we calculated Child Opportunity Index (COI) scores based on the geocodes of family's registered addresses. The COI is an estimate of education quality, safe housing, access to healthy food, air pollution, and economic opportunities of participants' neighborhoods. The latest version of the COI (3.0) was based on data from 2012 through 2021. These scores were derived from the pre-existing COI values accessed from the

database website 'diversitydatakids.org' and based on the participant's geocodes. We chose to use raw score values for COI relative to national averages.

Maternal Stress in Pregnancy

Maternal stress was included as a covariate in models predicting to children's attention outcomes in the sample. This was measured using the Perceived Stress Scale (PSS), a 14-item self-report questionnaire developed by Cohen et al. (1983) that assesses stressful events in their second trimester of pregnancy. Participants rated these items on a 5-point Likert scale. Half of the items (items 1, 2, 3, 8, 11, 12, and 14) were phrased with negative indicators, where a higher score would indicate high stress. The other items measured coping. In this study we summed the stress items to get a total prenatal stress score. Interrater reliability was high for this measure (Cronbach's Alpha=.85).

Insurance Status

Another covariate we used in our models was the mother's insurance status, which we used to estimate the mother's socioeconomic status (SES) and household income. Because not all families wanted to share household income data, we relied on income verification tests, which provided families with insurance at three different levels: Medicaid, low-income, Medicaid, right-from-start, and Private insurance. Medicaid insurance indicates the lower end of income, which is less than 133% of the federal poverty standards. Medicaid right from the start reflected verified income less than 200% of poverty standards, and the private insurance indicated income 200% of or above the poverty standards.

Procedure

Pregnant Black American women ages 18 through 40 were recruited from the Emory and Grady prenatal clinics. Basic demographic information, including addresses, marital or cohabitation status, education, and insurance status, was collected at their first prenatal visit (see Table 1). Gestational age at birth and other information on the newborn infant, such as their sex, was collected from their hospital records. Parenting observations and maternal reports of child's attention were collected at follow up visits when the children were between two and six years of age.

Data Analysis

In total, the study collected data from 288 dyads (mother-child). Covariates included in this study were type of pregnancy insurance, marital or cohabitation status, maternal education, maternal prenatal stress, and sex of child. We ran a Pearson Correlation test to measure the linear relationship between all variables to understand if there were any notable correlations amongst our predictor variable, moderators, and covariates. We used a linear regression model to assess our three hypotheses: main predictor (H1) and moderating effects (H2, H3) – with our predictor variable being preterm gestational age in weeks, our outcome variable being CBCL attention scores, and parenting style scores and COI scores tested as moderators to understand whether environmental enhancers or parenting styles had a moderating effect of the main relationship between gestational age at birth and child attention problems. Predictor, moderator and outcome variables were all measured as continuous, numerical values, and these analyses were done via IBM SPSS 29.0 and SPSS PROCESS.

Results

Table 1 shows the basic demographics and descriptive information of all variables that the study measured for the 288 recruited participants. There was an approximately even split between the male and female proportion of infants (49.7% and 50.3% respectively), with 31.9% of the mothers on the lower end of the SES categories. 42.4% of the mothers also pursued education beyond high school. The mean age of mothers when they gave birth was 25 years old, and the mean gestational age at the birth of the child was 38.5 weeks.

Table 1

Participant Demographics and Descriptives

	N=288
Sex of infant, N (%)	
Male	143 (49.7)
Female	145 (50.3)
Type of pregnancy insurance, N (%)	
Low	92 (31.9)
Moderate	142 (49.3)
High	64 (18.8)
Marital Status, N (%)	
Married or Cohabiting	138 (47.9)
Not married or cohabiting	150 (52.1)
Education, N (%)	
Middle School or Less	1 (.3)
Some High school	43 (14.9)
High School Diploma or GED	122 (42.4)
Some College	78 (27.1)
Graduated College	32 (11.1)
Postgraduate education	12 (4.2)

Gestational age in weeks, *M (S.D.)*	38.5 (2.12)
Maternal age at birth, *M (S.D.)*	25.0 (4.79)
Age of infant in months, *M (S.D.)*	44.9 (13.77)
CBCL Raw Attention Score, *M (S.D.)*	2.18 (2.080)
Maternal Parenting, *M (S.D.)*	
Sensitivity	2.90 (.815)
Cognitive Stimulation	2.48 (.817)
Positive Regard	2.48 (.859)
COI Raw Score, *M (S.D.)*	22.5 (22.87)
PSS Raw Score, *M (S.D.)*	11.1 (5.70)

We also measured the associations between all variables (Table 2) – covariates, predictor, and moderating variables to understand the direction and strength of linear correlations found, if any. We found significant associations between gestational age and maternal sensitivity; children's attention outcomes and the sex of infant; children's attention outcome and maternal stress; sex of infant and cognitively stimulating parenting; marital status and children's attention outcomes; marital status and type of pregnancy insurance; marital status and COI; type of pregnancy insurance and COI; parenting sensitivity and pregnancy insurance, and COI.

Table 2

Bivariate Correlations for Study Variables

	1	2	3	4	5	6	7	8	9	10	11
1. Gestational age in weeks	1	-0.36	.039	.082	-.047	.123*	.034	-.017	-.065	.017	-0.78
2. CBCL Attention	-	1	-.109	-.146*	.119	-.001	-.084	-.110	-.095	-.101	.200**
3. Age of infant	-	-	1	-.075	.012	-.002	.002	-0.13	-.074	.089	-.072
4. Sex of infant	-	-	-	1	-.035	.081	.042	-.003	.165*	.074	.023
5. Marital Status or Cohabitation	-	-	-	-	1	-.161**	-.106	-.024	-.039	-.127*	.046
6. Type of pregnancy Insurance	-	-	-	-	-	1	.252**	.153*	.100	.274**	.110
7. Sensitivity	-	-	-	-	-	-	1	.716**	.396**	.222**	.109
8. Positive Regard	-	-	-	-	-	-	-	1	.356**	.156*	.012
9. Cognitive Stimulation	-	-	-	-	-	-	-	-	1	.161*	.045
10. COI	-	-	-	-	-	-	-	-	-	1	.105
11. Maternal Stress Score	-	-	-	-	-	-	-	-	-	-	1

*p < .05
**p < .01

We then used linear regression analysis to test our hypothesis that prematurity would predict children's attention problems, with the inclusion of covariates (see Table 3). Our main effect hypothesis was not supported. We also tested H2 and H3, whether parenting styles and environmental enhancers would moderate the association between preterm birth and child attention problems. However, we did not find a significance on the moderating effect of environmental enhancers and all three elements of positive parenting (see Table 4).

Table 3

Linear regression model of preterm birth (gestational age) as predictor of children's attention outcomes

	Standardized β	t	Sig.
Main effects			
Preterm Birth	-.006	-.104	.917
Covariates			
Sex of infant	-.148	-2.516	.012
Type of pregnancy Insurance	-.008	-.136	.892
Age of infant	-.113	-1.924	.055
Marital Status or Cohabitation	.111	1.877	.062
Maternal stress score	.191	3.227	.001

Table 4

Linear regression model examining the interaction of parenting style and environmental

enhancers as a moderator of the relationship between preterm births and attention outcomes

	t	p	Change in R^2	F	df1	df2
Interaction (X*W)						
Preterm Birth × Sensitivity	-.2155	.8296	.0002	.0465	1.0000	196.0000
Preterm Birth × Positive Regard	1.1340	.2582	.0057	1.2860	1.0000	196.0000
Preterm Birth × Cognitive Stimulation	-.7209	.4718	.0023	.5197	1.0000	196.0000
Preterm Birth × Environmental Enhancer	-.5162	.6061	.009	.2665	1.0000	267.000

Discussion

Our study aimed to investigate the association between Black American pre and early-term births and their children's attention outcomes. We hypothesized that prematurity would predict and lead to worse attention outcomes. To test this hypothesis, we used existing data from an ongoing longitudinal prenatal study that assessed gestational age at birth as well as the children's CBCL 1.5-5 scores for attention. We also hypothesized that more positive parenting styles would moderate the association between prematurity and child attention in an alleviating manner. Here, we coded mother-child interaction videos to evaluate positive regard, sensitivity, and cognitive stimulation as markers of positive parenting from the mother. Finally, we hypothesized that environmental enhancers would also moderate the prematurity-child attention relationship in the same manner. We used COI data-based geocodes of participants' residential addresses to assess the qualities of the child's environments. Our hypotheses are based on the existing empirical literature, which noted a higher risk of attention problems, including diagnosis of ADHD and behavioral issues, for children born before full gestational age (40 weeks). Previous studies also suggested that environmental factors, such as mother's SES, neighborhood crime rates, exposure to nature, and educational accessibility, play a significant role in a child's development, especially in children with cognitive development delays. However, there were limited studies conducted on Black American samples, despite the fact that Black American mothers are at a higher risk of preterm births in the United States. Racial and ethnic profiles of literature studies were also commonly unreported in the past (Collier et al., 2020). We attempted to bridge this gap in the literature and address the underrepresentation of diverse populations by focusing on a sample of Black American children and mothers.

Contrary to our hypotheses, we did not find statistical significance in the relationship between prematurity and children's attention outcomes. We also did not find evidence for a moderating role of parenting style or environmental enhancers. However, the study still showed (significant and nonsignificant) trends that were consistent with past literature. Importantly, maternal prenatal stress was a significant predictor of child attention problems, even when other covariates were controlled. In addition, our results showed a negative trend between children's attention and gestational age at birth, yielding a Pearson Correlation value of .039 (see Table 2). In other words, the lower the gestational age, the more severe the attention problems of the child (higher CBCL score). Additionally, we also observed a negative trend between mother's sensitivity, positive regard, and cognitive stimulation (characterizes ideal parenting style) and children's CBCL scores. Pearson Correlation coefficients were -.084, -.110, -.095. This shows that stronger positive parenting was related to lower CBCL scores – a better attention outcome in children. Although of these relationships were not statistically significant, exceeding the threshold p-value of .05, we did observe that the direction of the relationship remains consistent with the literature and our hypotheses.

Limitations

We suspect several reasons for the failure to find the hypothesized statistical significance in our study. One reason could be that the association between prematurity and attention is weaker in Black American children, but this conclusion contradicts previous literature that there could be a stronger association in the Black American population (Osterman et al., 2023). However, there are a few studies that indicate that there are weak associations between preterm births and the presence of behavioral, conduct, attention, or depressive problems in children, even across different races and ethnicities (ElHassan et al., 2022). Given the mixed findings

across the literature, it would be important to conduct more cross-cultural and racial studies to assess the relationship between prematurity and children's attention outcomes to understand the importance of gaining new knowledge and adopting specific strategies that are effective for improving the well-being of Black American families.

Another possible explanation for our findings may be sampling bias. Women were enrolled in the study in the prenatal clinics at an early stage of pregnancy, which may have resulted in a sample that was particularly attentive to their children's health and development. In addition, the follow-up data was collected through numerous hospital and lab check-ups over the years. This suggests that the mothers in this sample may have been particularly sensitive to their children's well-being and consistently attentive to their children's development. Furthermore, the average gestational age of mothers was 38.5 weeks, which is closer to what is considered full-term. Therefore, our study may not have been able to capture the full range of the mothers' and children's biological and environmental factors, including variability in gestational age and maternal parenting.

A third explanation might be that the children in this study had not yet aged into elementary school where attention problems are often first identified. Parents may often fail to catch early signs of attention problems in children before their school age because they are very subtle and do not have access to a third opinion, particularly from expert perspectives, such as a teacher (Glascoe & Marks, 2011). Furthermore, adopting screening tests to track children's developmental problems is not a popular option amongst primary care institutions. The average age of attention problem identification in children, including diagnoses of ADHD and Attention Deficit Disorder (ADD), is approximately 7 years old, which is when they start attending school. This is a typical time point when parents notice their children's behavioral and attention

problems unless symptoms are overtly severe (Coghill et al., 2019). A later follow-up of this sample may find a stronger, statistically significant finding of prematurity predicting children's attention problems that aligns with the hypothesis.

Another limitation of our study was the assumptions we made concerning "ideal" maternal parenting styles, particularly in samples of Black American families. Conventionally, highly positive, sensitive, and cognitively stimulating parenting is considered the ideal and effective parenting style to facilitate children's attention outcomes and other developmental milestones. However, the study did not assess how the impact of different parenting styles might depend on unique environmental factors such as pregnancy insurance type, maternal education, marital status, sex of infant, COI, or even cultural factors of the family. Previous studies have shown that the effectiveness of different parenting styles depends on the environment and culture in which the child is raised, such as across countries and continents (Cheung and Lim, 2022). They indicated that some parental behaviors that are not conventionally considered ideal, such as authoritarian or permissive parenting, are not always predictive of adverse child outcomes across all cultural boundaries (Steinberg, 2001). Although the positive effects of authoritative parenting (highly positive and sensitive) transcended through multiple cultures, authoritarian and permissive parenting were also positively correlated with several desirable development outcomes, including academic excellence and emotional regulation abilities, in multiple Asian countries (Leung et al., 1998; Chong & Chan, 2015). Understanding that standardization of the effectiveness of parenting styles is inconsistent and variable among cultures might help to explain why our conventional positive parenting measures did not serve as protective in this sample of Black American families.

Implications

Our results suggest that one's environment (quality of surrounding resources) and maternal parenting style do not impact the effect of mothers' preterm delivery on children's attention outcomes. This may mean there are other variables, which were not factored in our study nor as commonly explored in literature, that can account for and predict children's attention problems. These could include, but are not limited to, the child's socialization or friendship with peers, modern technology usage, relationship with teachers and secondary caregivers, and mental or physical comorbidities. Because developing children also spend a significant amount of time in social settings once they are enrolled in daycare or kindergarten, socialization of children apart from their mothers is another factor to consider when keeping track of child development. Furthermore, there has been a significant increase in technology usage in children and a consistent decrease in the age at which children first start using devices – which now begins as early as the age of 3 years (Genc, 2014). Studies indicate that the use of technology from an early age significantly impacts children's attention outcomes and may be an influence on the recent increase in ADHD or ADD diagnoses (Vedechkina & Borgonovi, 2021).

While the study does not suggest that we should have no health and developmental concerns about preterm Black American children, it may suggest that society should decrease the stigmatization of mothers who give birth prematurely. They are not only subject to excessive blame based on stereotypes, but they are also susceptible to invasive criticism and accusations regarding their private backgrounds, including their marital or education status, as causes of their pregnancy complications and outcomes. It is critical to understand that such social criticism significantly contributes to maternal postnatal stress, which in turn yields another risk factor that influences mothers' relationship with their children and their holistic well-being. A study by Jarašiūnaitė-Fedosejeva et al. (2024) found that mothers of premature infants are particularly

vulnerable to experiencing postpartum mental health challenges. They also found that mothers who give birth pre or early-term are more prone to feel guilt and shame, internalizing their pregnancy complications and child's developmental problems. These ideas can be applied to preventative treatment for mothers' well-being, emphasizing the fact that long-term care for mothers after birth is critical. Improving mothers' health and improving accessibility to medical care and resources, apart from the quality of the child environment that the study focused on, have significant potential to further facilitate children's developmental outcomes and relationships with their mothers in the Black American population. Also knowing that our results also indicated a correlation between mothers' stress and children's attention outcomes, we emphasize the importance of encouraging maternal well-being in modern mother-child support programs.

Future Directions

Although the study did not find significant associations between preterm birth and child attention outcomes, nor moderating effects of neighborhood environment and parenting styles, there are many avenues for future research on this topic.

Past literature suggests that a mother's postpartum stress is a significant contributing factor in their interaction with children. Because the current study measured children's long-term attention development via multiple lab visits over the years, it is critical to measure mothers' continuous progress in their well-being and interaction with their child. In other words, it is important to understand that an individual's health, a child's developmental trajectory, familial relationships, and physical environments are dynamic. At one point in time, they could seem to be achieving all the ideal standards that facilitate the well-being of everyone, whereas in another point of time, these could completely change. The current study did not examine trajectories of

change over time, which may have better identified points of risk or potential intervention. We also did not examine children at older ages, we might better highlight the child's academic or school performance, interpersonal relationships, other cognitive developments, communication abilities, and physical growth in terms of how they contribute to or impact the influence of preterm birth on attention outcomes. Aiming to track and measure the dyad's dynamic, long-term changes is a potential avenue for future research.

Conclusion

This study explored the relationships between Black American preterm birth (as a predictor) and children's attention outcomes, as well as how environmental enhancers and maternal parenting style might moderate that main relationship. In particular, we aimed to bring attention to Black Americans due to the lack of literature focusing on this population. We did not find support for our hypotheses but instead found that prenatal stress was a significant predictor of children's attention than preterm birth. However, the study brought to combat underrepresentation issues of Black American populations and negative connotations that mothers struggle through. Most importantly, our project contributes to the mixed and limited literature on this issue and suggests multiple ways future research can utilize to promote mothers' and children's well-being. New studies should include longer-term follow-ups to assess attention outcomes as the children enter elementary school and also consider culture-specific parenting practices that might associate more strongly with Black American children's developmental outcomes.

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