CULTURE, RACIAL IDENTITY AND MOOD EFFECTS ON BIRTH OUTCOMES OF AFRICAN-AMERICAN MOTHERS IN ALABAMA

by

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ABSTRACT

The purpose of this study was to determine if racial identity, acculturation, depression and or anxiety would predict birthweight in African Americans. Multiple linear regression was conducted and results indicated that racial identity predicted birthweight. African American mothers who identified with having a stronger racial identity reported having low birthweight babies less often than those who scored lower on racial identity. These findings are consistent with those that support other positive effects of racial identity, such as higher self-esteem and less risk-taking behaviors among youth. Further exploration of racial identity revealed self image as the essential element of predicting birthweight. Results also indicated that for African American mothers between the ages of 21 and 35, birthweight decreases as mothers' age increase. This finding is congruent with the weathering hypothesis which states that the health of African-American women may begin to deteriorate in early adulthood; thereby suggesting that the optimal age for childbirth for African Americans may be earlier than most research suggest. More research is needed to explore the effects of racial identity and self image on birthweight among a more diverse group of mothers. Additional research should also compare women from different parts of the country and migration time in the U. S. to re-examine the possible effects of acculturation.

LIST OF ABBREVIATIONS AND SYMBOLS

β	Population values of regression coefficients
F	*F* distribution, Fishers's *F* ratio
p	Probability of error that is involved in accepting the observed result as valid
r	Pearson product-moment correlation
R^2	Multiple correlation squared; measure of strength of association
R^2_{adj}	Adjusted R^2: Modification of R-square that adjusts for the number of terms in a model
SD	Standard deviation
$\bar{x}$	Mean: the sum of a set of measurements divided by the number of measurements in the set
<	Less than
>	Greater than
=	Equal to
%	Percent
BPD	Bronchopulmonary dysplasia
LBW	Low birthweight
ROP	Retinopathy of prematurity

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CHAPTER 1

Introduction

Low Birthweight in the United States

Birthweight is often categorized as very low (less than 1,500 grams, or 3.3 pounds), low (less than 2,500 grams or 5.5 pounds) or normal (2,500 grams or more). Preterm birth (before 37 weeks of gestation) is the most common reason for low birthweight. Low birthweight (LBW) is a widely used marker of infant health and a major public health challenge. Babies born in the United States are more likely to be LBW in comparison to those born in most other developed countries (UNICEF, 2003). Since 1990, the U. S. low birthweight rate has increased by 19 % to 8.2% and the preterm birth rate has risen by 21% (Annie E. Casey Foundation, 2009). In 2000, approximately 7.6% of babies born in the US were LBW (Martin et al., 2002). From 2005 to 2006 the percentage of LBW births increased from 8.2% to 8.3%; the rate of preterm births increased from 12.7% to 12.8% (Hamilton, Martin & Ventura, 2007). Most recently, in 2008, 1 in 12 babies (8.2% of live births) was low birthweight in the United States (March of Dimes, MOD, 2011). These rates have remained consistent over four decades (Case & Paxson, 2006). The recent increase has prompted concern among researchers and policy makers (Mathews & MacDorman, 2008).

In the United States, reason for concern is justified. LBW is the second leading cause of infant mortality in the overall population after congenital anomalies, and the leading causes of death for non-Hispanic African American infants (Mathews, Menacker & MacDorman, 2004). Non-Hispanic African Americans will be referred to as African Americans for this study.

African American infants have two times the rate of LBW and three times the rate of very low birthweight when compared to Caucasian infants born in the United States (Martin et al., 2009).

Birth Outcomes in Alabama

Children in the southern states have consistently poorer outcomes for most indicators of children's health and well-being (Annie E. Casey, 2009). One study examined the "Deep South" as a predictor of child health outcomes (Goldhagen et al., 2005). Deep South states include North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas and Tennessee. Using the child health index (CHI) ranking scores generated for each state, 12 of the 16 worst states were from the south defined by the Census Bureau. Children in many southern states have poorer overall physical health outcomes than children in other regions of the country. Living in the Deep South was a powerful predictor of poor health outcomes including percent of LBW infants, infant mortality, child death rate, teen death rate and teen birth rate (Goldhagen et al., 2005).Living in a socioeconomically deprived area has been associated with increased risk of adverse birth outcomes especially for African American women (Janevic et al., 2010).

Alabama is ranked 47th in the 2010 Kids Count Data Book on key child health and well-being indicators (Annie E. Casey, 2009). Since 2000, Alabama increased in five of the eight indicators including LBW, infant mortality rate, teen death rate, children in poverty and children in single-parent families. The rate of LBW had the greatest increase, 7%, from 2000 to 2007 (Annie E. Casey, 2009). In 2006, one in ten babies born in Alabama was LBW (MOD, 2010). Alabama had not met the Healthy People 2010 objective of no more than a 5% LBW rate set by the U. S. Department of Health and Human Services. When examining minority groups in

Alabama, black infants averaged a 15.4% rate of LBW; the highest among all other racial or ethnic groups, Hispanics, 6.6%, Native Americans, 8.9%, whites 8.4%, and Asians 7% (MOD, 2010). These poorer birth outcomes have serious implications not only for infant survival, but also for childhood growth, development and some important health outcomes in adulthood (Case & Paxson, 2006).

Developmental Outcomes

LBW greatly elevates the risk of infant mortality and a host of other chronic medical problems during early infancy and throughout childhood. Cerebral palsy is the most potentially disabling major neurological abnormality of LBW children. Cerebral palsy is a group of disorders characterized by the inability to control movement and often accompanied by cognitive impairments (Reichman, 2005). Very low birthweight infants are up to 30% more likely to develop cerebral palsy than are babies born at term (Reichman, 2005). Other neurosensory outcomes include blindness, deafness, and impaired mental development. These conditions are at a greater risk for the most premature or lightest infants. Only 20% to 25% of surviving infants born at less than 27 weeks of gestation experience a major disability. Therefore it is important to note that the majority of LBW infants are normal on neurological exams (Lorenz, 2001).

Other serious conditions associated with LBW include mental retardation, respiratory distress syndrome (RDS), bronchopulmonary dysplasia (BPD) and retinopathy of prematurity (ROP). RDS and BPD can lead to feeding difficulty, recurrent respiratory infections, asthma and growth delay (UCSF, 2004). Cognitive and behavioral problems associated with LBW may continue and may make it more difficult for children to do well in school (Case, Fertig&Paxson, 2005). Infants born with low birthweight are at an elevated risk for many long-term health

conditions and developmental disabilities that can impair school readiness. Low birthweight children score lower on intelligence tests than children of normal birthweight (Reichman, 2005; Shenkin, Starr &Deary, 2004). One study reported 37% of the LBW children surveyed required additional attention in school and had problems that included difficulties in language abilities, memory, attention, fine motor skills, nonverbal reasoning and problem solving. (Kessel-Feddema, Sondaar, Kleine, Verhaak, &Baar, 2007). One study found that the risk of specific school-identified disabilities increase as birthweight decreases (Avchen, Scott, & Mason, 2001).

Children born at LBW without a major disability may suffer from more subtle medical, behavioral and emotional problems (Shenkin, Starr & Deary, 2004). The most common health conditions of LBW children are asthma, upper and lower respiratory infections, and ear infections. LBW children are re-hospitalized for these conditions and for surgeries of the eyes, ears, nose and throat. Behavioral problems include conduct disorder, hyperactivity, and attention deficits (Reichman, 2005; Shenkin, Starr, & Deary, 2004). These behavioral problems tend to be more common in boys than girls seemingly because their behavior is often more demonstrative than girls (Kessel-Feddema et al., 2007).

Persistent health problems may contribute to excessive days of restricted activity, school absence and poor school performance. Children in poor health are more likely to become adults in poor health (Case & Paxson, 2006). Childhood health problems can affect economic success in adulthood. Poor health in childhood can influence educational attainment which, in turn, can affect employment opportunities and wages. Adults in poor health are less likely to be employed and more likely to command lower wages than healthy adults (Case, Fertig & Paxson, 2005).

With LBW affecting such a vast range of short and long term conditions, researchers turn to its causes.

Influential Factors

Modern Birth Trends

Several factors have contributed to the recent increase in LBW rates. One factor is the increased rate of multiple births (Mathews & MacDorman, 2008), partially due to advances in assisted reproductive technologies. Very low birthweight babies are surviving at an increased rate due to the wider availability of sophisticated medical technologies. The modern trend of delaying childbirth has also impacted LBW rates. Delayed childbirth tends to have more complications resulting in preterm and LBW infants (Tough et al., 2002; Mirowsky, 2005). However, these recent changes do not account for all of the increase in LBW rates.

Maternal Age and Health

Researchers have well-documented several factors that lead to increased risk of delivering low birthweight babies. Women under age 20 and over age 35are at an increased risk of delivering LBW infants (Mirowsky, 2005). Women who have chronic health problems such as obesity, type-2 diabetes, and cardiovascular disease are more likely to have babies born at LBW (Arya et al., 2006). According to a recent study by Cornish et al (2007), inflammatory bowel disease, which typically has an onset during peak reproductive years, doubles women's chances of having LBW babies. Other, more distant infections that can be carried in the bloodstream to the placenta, can also impact birthweight. Tooth decay and gum disease can affect LBW. These common dental problems affect more than 80% of women aged 20 to 39

years (Johnson et al., 2006). Outside of medical health issues, there are several other factors that influence LBW rates.

Maternal Mood and Drug Effects

One study linked depression during the second trimester of pregnancy with slower fetal growth (Hobel&Culhane, 2003). Another study concluded that continuous untreated depression was associated with preterm birth rates for more than 20%. In contrast, preterm birth rates without depression ranged from 4 to 9% (Wisner, et al., 2009). One study examined birth outcomes in relation to exposure to Hurricane Katrina (Xiong, et al., 2008). It suggested that women with high hurricane exposure were at an increased risk of having LBW infants. Exposure to specific severe disaster events and the intensity of the disaster may be better predictors of poor birth outcomes than general exposure to disaster (Xiong, et al., 2008).

More research has been done examining anxiety during pregnancy and on birth outcomes. Anxiety during pregnancy may increase fetal exposure to maternal glucocorticoids, steroid hormones involved in metabolizing carbohydrate, protein, and fat, and have anti-inflammatory properties and lead to lower birthweight (Yehuda, et al., 2005). Trait anxiety at the second and third trimesters predicted lower birthweight and shorter birth length (Hosseini, et al., 2009). Women whose anxiety reached severe levels for at least two trimesters were significantly more likely to deliver LBW babies than those who reported severe anxiety at none or only one of the trimesters. Women who reported chronic, severe trait anxiety are at the highest risk of having shorter gestations and delivering smaller babies (Hosseini, et al, 2009). Perceived patterns of stress and anxiety have been linked to gestational length (Glynn, Schetter,

Hobel, & Sandman, 2008). Mothers who delivered preterm infants exhibited increases in stress and anxiety during delivery (Glynn et al., 2008).

Depression and anxiety may be related to psychological stress which can affect the mother's and baby's health directly or indirectly by influencing harmful behaviors such as drinking or smoking (Hobel & Culhane, 2003). Cigarette smoking during pregnancy is the single most known cause of LBW. Even after controlling for other factors, researchers find that smokers are nearly twice as likely to deliver LBW babies as non-smokers (Child Trends, 2004). In 2005, LBW rates of mothers who smoke were highest in Kentucky at 26.1% (Kids Count Data Center, 2009). Fortunately, research has shown that mothers who smoke are not destined to deliver LBW babies. According to research from the American Cancer Society, women who quit smoking prior to being pregnant or during the first three or four months of pregnancy lower their risk of having a LBW baby to the same level as women who never smoke (American Cancer Society, 2003).

Nutrition

Nutrition plays a vital role on a mother's and child's health. Researchers have found that when a poorly nourished woman becomes pregnant, intensive interventions, such as high protein diets or intensive vitamin and mineral regimen supplements may not be enough to reduce her odds of delivering a LBW baby (Golbert & Culhane, 2007). Health care providers typically recommend that women of normal weight gain between 25 to 35 pounds during pregnancy. Women who gain less than 22 pounds are two to three times more likely to have a LBW baby than women who gain at least that amount (Dickinson, 2004).

Maternal History

Low birthweight tends to go in a cycle, seemingly perpetuated from one generation to the next. Researchers found that an infant whose mother was a LBW baby is four times more likely to have a LBW. The likelihood increases to six times greater when the father was born at a LBW. A recent study, in 2007, that replicated these findings also found that the generational transmission of LBW is stronger for mothers who live in high poverty zip codes (Conley & Bennett, 2000; Currie & Moretti, 2007). Research has shown that women with more years of education give birth to fewer children and engage in fewer behaviors that undermine their own health or place their pregnancies at risk (Martin et al., 2009). Overall, increased education has been associated with less probability of giving birth to LBW babies when compared to women with less education (Reichman, 2005).

Socioeconomic Status

Women of low socioeconomic status (SES) are at an increased risk for delivering low birthweight babies (Reichman, 2005). Marital status seem to also affect LBW rates with unmarried mothers reporting LBW rates of approximately 10% (Martin, et al, 2002) versus the approximate 7% national average. LBW mothers are 27% less likely to be married than mothers of normal weight, full term babies (Ellen, 2000). Teenage mothers' probability of having a LBW baby is 34% higher than for older mothers (Conley & Bennett, 2000). Studies show that positive social support from the baby's father or other family members predict better birth outcomes, particularly higher birthweight (Singer &Ryff, 2001). However, unhealthy relationships are associated with poor birth outcomes (Chambliss, 2008).

Race

One study hypothesized that African American women would report more exposure to general, pregnancy, and racism stressors and higher levels of chronic stress and anxiety than non-Hispanic White women. These psychosocial differences would help to explain any observed racial differences in birth outcomes, controlling for medical and sociodemographic risk factors (Dominguez , Dunkel-Schetter, Glynn, Hobel, & Sandman, 2008). Perceived racism across the lifetime and perceived racism vicariously experienced as a child predicted birthweight in African Americans and helped to account for racial differences in birthweight (Dominguez, 2008). Another study found that being African American predicted to lower birthweight and shortened birth length (Hosseini et al., 2009). Race, or racial disparity, in birthweight will be expanded upon as a main factor of this study.

Paternal Effects

Other studies examined issues outside of maternal issues that may impact LBW. Paternal factors influence birthweight as well. Recent research suggests that a man's pre-conception behaviors and environmental exposures, including smoking and drinking, can affect his seminal fluid, causing genetic mutations or abnormalities; or affect the way his genetic contribution is expressed or passed on (Reichman, 2005). Reichman (2005) also suggests that when fathers' jobs expose them to pesticides, solvents and lead, their newborns are at a greater risk of low birthweight. This new finding may play a role in the disparities among racial and ethnic groups, since typically in the U. S. African American men are twice as likely as Caucasian men to be employed where there is greater likelihood of exposure to toxic substances on the job.

Racial Disparity

Several of the findings previously mentioned do not hold true across race and ethnicities. In 2005, Currie found that dental problems that impact LBW rates tend to affect blacks more than whites. For African American and American Indian/Alaskan Native mothers, more years of education does not appear to reduce the risk of LBW rates as it does for other ethnic groups (Nepomnyaschi, 2009).

Data on hypertension was examined to determine whether the pattern of maternal hypertensive disorders differed among race and whether these differences would vary LBW rates (Miranda et al., 2010). The presentation of hypertension clearly differed by race with black women demonstrating the highest rates, followed by white then Hispanic women. Also, as age increases the likelihood of presenting with hypertension increases more rapidly in black women in comparison to white women. There was a similar pattern found in birth outcomes among hypertensive women. Black women were at the greatest risk for LBW infants, followed by Hispanic women and then white women. Black women were at the greatest risk for early deliveries, preterm births or very preterm births, while Hispanic and white women were not significantly different on any of these three measures (Miranda et al., 2010).

In 2007, the LBW rate for African American infants was nearly twice the rate for Caucasian American infants, 13.8% and 7.2%, respectively (Annie E. Casey, 2009). LBW rates of African Americans exceeded the rate of any other reported racial or ethnic group, even when maternal age, educational level and socioeconomic status were taken into account. The gap between African American and Caucasian newborns is widest at the lowest birthweight range, proposing the greatest health risks and poorest developmental outcomes (Martin et al., 2009).

This persistent two sometimes three to one difference in low birthweight for African Americans versus other ethnic and racial groups has been noted over the past 40 years despite the efforts of two federally sponsored programs that protect the health of pregnant women and infants: Special Supplemental Nutrition Program for Women, Infants and Children (WIC) and Title V (MOD, 2010). While studies have found that children exposed to WIC tend to have higher birthweight, WIC does not expunge the racial disparity of LBW rates (Case & Paxson, 2006). Title V of the Social Security Act authorized the Maternal and Child Health Services Program; it is a major source of state funds for women of childbearing age, infants and children with special health care needs. Title V consists of block grants awarded to state health agencies on the basis of specified formulas, and discretionary grants. In 2008 (fiscal year), there were 134, 842 women and children served by WIC in Alabama. In 2010 (fiscal year), Title V funds to Alabama included $11,723,121 from the federal government and $85,400,238 in matching state funds (MOD, 2010). What is apparent is that African-American infants in Alabama die at more than two times the rate of the national average, 13.8% versus 6.7%, respectively (MOD, 2010) and have nearly doubled the occurrence of LBW rate of the national average (15.4% versus 8.2%) despite obvious external factors such as nutrition, healthcare, education and stress (Annie E. Casey, 2009; MOD, 2010).

Racial/ethnic differences in LBW were highlighted by a 2003 National Institute of Health request for research proposals in reducing LBW rates in minority families (PA-04-027). Hispanic infants have LBW rates less than that of Caucasians and the national average despite poor socioeconomic conditions (Annie E. Casey, 2009).Foreign-born women are less likely to have LBW infants than their US-born counterparts. Although results may vary across some ethnicities, consistently, foreign-born African Americans have lower LBW rates than US-born

African-American mothers (Acevedo-Garcia, Soobader, & Berkman, 2005). African-born black mothers have low birthweight rates closer to those of U.S. born white mothers than to U.S. born black mothers of predominantly African decent (David & Collins, 1997).

Health disparities among minority groups have not been limited to LBW rates in the U. S. Specifically African Americans, Hispanics and Native Americans, face a particularly high risk of obesity and attendant health problems, even when SES is controlled (Ogden et al., 2006). Cultural attitudes and practices have also been associated with obesity trends. Changes in culture are believed to explain the substantial weight gain seen in many immigrant groups with length of residence in the U. S. and across generations of residence in the U. S. (Kaplan, Huguet, Newsom, & McFarland., 2004). As of yet, these disparities have not been fully explained by any single or multiple factors that would lead to such a significant discrepancy. This discrepancy solicits an explanation that would account for differences among African born black mothers and U. S. born black mothers. One primary difference that appears to account for the health disparities is culture.

Acculturation

Acculturation is viewed as a process that happens when two autonomous groups are in direct contact with one another and results in changes of the original culture (Redfield, Lenton, & Herskovits, 1936). It is typically used to describe the notion of minority individuals adapting to the dominant mainstream culture. Most of the literature examining acculturation evaluates a Latino population with regards to behaviors and environmental factors.

Effects on Latino

One study examined the effects of acculturation on the use of tobacco in people of Mexican descent (Wilkinson et al., 2005). In that study, women's smoking behaviors were found to be affected more than men's by acculturation. A higher percentage of US-born women were more acculturated and more of these women reported being current smokers than Mexican-born women, 15.2% versus 7.2%, respectively. Interestingly, age of migration greatly affected the level of acculturation. The longer one resides in the United States, the greater one's exposure to American culture and the stronger the influence of the new culture (i.e., the American culture in this case) on one's behavior (Wilkinson, et al, 2005).

Studies show that Mexican immigrant women are more likely than Mexican-American women to engage in healthy prenatal behaviors, including abstinence from alcohol, drug, and cigarette use. Mexican immigrant women also tend to have more psychosocial assets such as support from the baby's father, availability of social networks and fewer stressful life events all of which are associated with favorable birth outcomes (McGlade, Saha, & Dahlstrom, 2004). Research suggests that as immigrant women acculturate to the United States, their risk of substance use during pregnancy increases (Finch, Boardman, Vega, & Kolody, 2001).

Overall, despite less prenatal care and lower socioeconomic levels, Hispanic women in the United States have better birth outcomes than African Americans. In fact, birth outcomes of Latina are comparable to outcomes of White women in the United States. This paradoxical phenomenon has been termed the "healthy migrant effect" (McGlade, Saha & Dahlstrom, 2004). It refers to the trend of healthy birth outcomes despite relatively challenging circumstances for immigrants; this trend typically only lasts for one generation (Leslie, Diehl, & Galvin, 2006).

Favorable birth outcomes held true despite less prenatal care during the first trimester among Latina women versus non-Latina women. Fifty-seven percent of Mexican-born women who lived in Oregon received first-trimester prenatal care compared with 78% of non-Latina women (Yusem, 2003). Foreign and native born Mexican women thrive better in communities that have a high concentration of Mexicans (McGlade, Saha & Dahlstrom, 2004). This is untrue for African Americans.

Effects on African Americans

One study of Minnesota residents replicated findings that LBW rates and preterm births were higher among infants of native-born compared to foreign-born black women (Baker & Hellerstedt, 2006). They found that black residential concentration was not strongly associated with risk for LBW or preterm births for infants of either foreign or native-born women. Native born black women in Minnesota were more likely to be adolescent, to report having used alcohol or tobacco prenatally, and to be unmarried when they gave birth. Native born women were more likely than foreign born women to live in high-black-concentration census tracts (Baker & Hellerstedt, 2006). In contrast, Latina women tend to have better birth and health outcomes when immersed into Latino residential concentration (McGlade, Saha & Dahlstrom, 2004).

This inconsistency is not surprising for native-born black women given the different histories of black and Hispanic populations in the U.S. Hispanic, primarily Mexican, women share important cultural roots. In contrast, native-born black populations historically come from many African countries; even those that migrated from Central and South America have some historical roots of slavery. During slavery, African cultural heritage was suppressed; hence black women in high concentration neighborhoods may not share cultural ties. Therefore, these women

may not benefit from shared cultural practices within a residential area (Baker &Hellerstedt, 2006). The health-defeating effects of acculturation seem to outweigh the healthy migrant effect after a single generation; therefore, persistent health disparities remain for minority groups in the U. S.

Increasing acculturation, defined by duration of residence in the U. S., is also assumed to indicate a loss of the protective health behaviors associated with many immigrants' native cultures (Kaplan, Huguet, Newsom & McFarland 2004). A loss of supportive networks in the society of origin involving loss of healthy behaviors and its replacement with less healthy behaviors is thought to be detrimental to the health of immigrants (Kaplan et al., 2004). Kaplan and researchers suggested that immigrants are generally healthier than the U. S. –born population, and that this distinction tends to diminish over time as immigrants adapt to a different sociocultural environment (2004). One study found an association between acculturation and body mass index. Immigrants who had lived in the U. S. for the shortest duration of time had lower body mass index scores when compared to immigrants who lived in the U. S. longer (Park, Neckerman, Quinn, Weiss, & Rundle, 2008).

Protective Factors

Despite having lower SES, foreign-born women tend to have better birth outcomes than US-born women (Acevedo-Garcia, Soobader, & Berkman, 2005). Acevedo-Garcia and other researchers believe that there are protective factors associated with foreign-born status especially among individuals with low SES. They found that LBW rate varies considerably across race with rates of 4.5% for white women and 10.8% for black women. The protective effect of immigrant status seems to be particularly strong among black and Hispanic women. Research shows that for

Latinos, residing in predominantly Latino neighborhoods, seem to bolster immigrant identity. Residence in a predominantly immigrant neighborhood is positively associated with a number of positive health outcomes (Eschbach, Ostir, Patel, Markides, & Goodwin, 2004). Among black women, the LBW rate among the foreign-born is approximately 30% lower than among the US-born (Acevedo-Garcia, Soobader, & Berkman, 2005).

The protective effect of immigrant status seems stronger among women with low education compared to women with higher education. Immigrant status reduces the risk of LBW across all education groups, but the effect is strongest among Black women, with a 43% reduction rate (Acevedo-Garcia, Soobader, & Berkman, 2005). After controlling for demographics, SES, prenatal care, health behaviors during pregnancy, and clinical risk factors, women of racial/ethnic minority groups had significantly higher odds of having a LBW infant than non-Hispanic white women (2.36 for black women, 1.59 for Asian women, and 1.17 for Hispanic women). Although foreign-born status is not associated with LBW among white women and it increases the risk among Asian women by 24%, it reduces the risk by ~19% among Hispanic women and ~25% among black women (Acevedo-Garcia, Soobader, &Berkman, 2005).

Recently, a systematic review of the literature was conducted to clarify the relation between migration and LBW and preterm births between migrants and non-migrants. Among foreign-born migrants, all minority groups were more likely to have adverse birth outcomes than white women, with the exception of LBW among Hispanic migrants. Black women were the group at the highest odds for the two outcomes among foreign-born and U. S.born women. The black-white gap was wider among the U.S.-born than among international migrants. Black

women presented the strongest protective effect of being foreign born, followed by Hispanic women (Urquia et al., 2010). While the association between foreign-born status and birth outcomes is not uniform across different ethnicities, infants born to first-generation black and Hispanic migrant women were at a lower risk of LBW and preterm births than their U. S. counterparts. These protective factors were not found among Asian and white migrant women (Urquia et al., 2010).

Findings from this systematic review of the literature from 1995 to 2007 by Urquia and others contradict some theories that have been used to explain racial disparity among birth outcomes. These findings are at odds with the classic assimilation theory that predicts a convergence of the outcomes of migrant groups towards the level observed in the mainstream white society. Findings also contradict the genetic hypothesis which would predict that U. S.-born black women be an intermediate risk group between foreign-born black and U. S.-born white women because of the intermarriage and genetic mixing over previous generations. The social historical hypothesis points to continuous exposure to socioeconomic and structural discrimination from past historical periods to the urban underclass. The segmented assimilation theory suggests that migrants are selectively incorporated into the system of stratification of the American society based on their ethnic affiliation. The latter two theories are more consistent with Urquia's findings (2010).

Purpose of Current Study

Due to the racial disparity and insufficient causal factors of LBW rates among some minority groups in the US, the purpose of the current research study is to examine the role of acculturation and racial identity on birthweight in a sample of African American women in West

Alabama. Acculturation is a process through which individuals' values and behaviors change as a result of interactions with people in their social environment. Due to the increased risky behaviors associated with acculturation and protective buffering factors associated with a strong racial identity, the primary hypotheses is that acculturation into mainstream society will increase the chances of low birthweight babies born to African-American mothers; also, strong racial identity will decrease the chance of low birthweight babies born to African-American mothers. Research questions include:

1. Does acculturation predict birthweight of babies?
2. Does racial identity predict birthweight of babies?
3. Does depression predict birthweight of babies?
4. Does anxiety predict birthweight of babies?
5. Is racial identity and/or acculturation related to anxiety?
6. Is racial identity and/or acculturation related to depression?

It is hypothesized that both acculturation and racial identity will help predict the birthweight of babies. That is, participants who are more acculturated into African American culture will have a higher racial identity and will have healthier babies, which might be comparable to the immigrant phenomenon observed that protects the first generation of foreign-born women who migrate to the United States. Also, depression and anxiety will predict birthweight. The higher one scores on the depression and anxiety measures, the greater the chance of delivering a low birthweight baby as has been reported in the literature. Finally, acculturation and racial identity

will be related to anxiety and depression. Participants who are more acculturated into African American culture and have a stronger sense of racial identity will have lower scores on both the anxiety and depression measures.

Methods

Participants

African American mothers had given birth were targeted for this study. One hundred and seven African American mothers were surveyed. Data analyses were restricted to those who gave birth between the ages of 21 – 35 to reduce the amount of stress associated with motherhood outside of this limit. Mothers who give birth during the 21 – 35 age range are suggested as the lowest risk for adverse birth outcomes (Mirowsky, 2005). Data for twenty-five participants were excluded due to not meeting the age range (21 – 35) criterion for the first born child. SES was also a factor for exclusion. Specifically, data analyses were restricted to individuals who fell within the lower middle to upper SES classes, as defined by Hollingshead, 1975. Data from five individuals, who fell within Class V (considered the lowest SES class), were excluded from the study due to an increased risk of stress and prenatal concerns as stated earlier (Reichman, 2005).Data from an additional five participants were excluded due to incomplete or missing data. Therefore, the final sample was comprised of 72 African American mothers. Current ages of mothers ranged from 23 to 77 (m = 43.44, SD = 11.88). The average age of mother at delivery of first child was approximately 25 years of age. The average age of the father, as reported by the mother, at delivery of first child was about 27 years of age. While the birthweights of the first born children were of primary interest, demographics for all, or up to four, children were recorded and analyzed. Further statistics on demographics are included in Table 1.

Currently pregnant women that wished to take part in the study were not to be excluded. Rather the researcher planned to administer the surveys and contact participants after delivery for

birth outcomes after their delivery. If participants were pregnant while taking the surveys, specifically the measures of depression and anxiety, their responses would be controlled by the statistical analysis to minimize the risk of confounding variables. No participants reported being currently pregnant.

Measures

Background Demographic Sheet

The background demographic interview sheet gathered information regarding birthweight outcomes including weight, length and term status. It included a checklist of highest educational attainment and occupation. It also included questions regarding current zip code, and parents' place of birth.

Socioeconomic

Socioeconomic status (SES) was computed using the Hollingshead Two Factor Index.(Hollingshead, 1975). SES was assessed for the entire household. Education and occupation were computed to distinguish five levels of class: upper, upper middle, middle, lower middle and lower. A score equal to or greater than 61 is within the lowest stratum, and therefore was excluded (Hollingshead, 1975).

Mood Scales

Mood was examined by measures of anxiety and depression. The *Center for Epidemiologic Studies Depression* (CES-D) is a widely accepted measure of depression that contains 20 items. This four-point Likert scale contains a range of responses from 'rarely' to

'most of the time'. Examples of items include: "I felt lonely." "I did not feel like eating. I was not hungry." The CES-D is not designed for clinical diagnosis; however it is based on symptoms of depression as seen in clinical cases. It was found to have very high internal consistency and adequate test-retest repeatability (Radloff, 1977). A score of 16 or higher suggests a clinically significant level of symptoms of depression and therefore served as a cutoff point.

The *State-Triat Anxiety Inventory* (STAI) is a validated 20-item self report assessment device which includes separate measures of state and trait anxiety. Respondents noted how they generally feel from 'almost never' to 'almost always'. Items on the STAI include: "I feel secure." "I worry too much over something that really doesn't matter." Scores may range from 20 to 80 with 20 – 36 as low, 37 – 45 as moderate and 46 – 80 as high anxiety (Spielberger,1983). Various reliability and validity tests have been conducted on the STAI and have provided sufficient evidence that the STAI is an appropriate and adequate measure for studying anxiety in research and clinical settings (Sesti, 2000).

Acculturation Scale

Acculturation was measured with the *African American Acculturation Scale- Revised* (AAAS-R) (Klonoff & Landrine, 2000). The 47-item, revised from the 74-item version, consists of eight subscales that delve into African American culture. The subscales and examples of items are listed: 1) Religious Beliefs and Practices: Prayer can cure disease. I believe in the Holy Ghost. 2) Preference for things African American: I listen to Black radio stations. Most of my friends are Black. 3) Interracial Attitudes: I don't trust most White people. Deep in their hearts, most White people are racists. 4) Family Practices: When I was young, I shared a bed at night with my sister, brother or some other relative. When I was young, I took a bath with my

sister, brother or some other relative. 5) Health Beliefs and Practices: Some people in my family use Epsom salts. Some older Black women know a lot about pregnancy and childbirth. 6) Cultural Superstitions: When the palm of your hand itches, you'll receive some money. I eat black-eyed peas on New Year's Eve. 7) Racial Segregation: I went to a mostly Black elementary school. I currently live in a mostly Black neighborhood. 8) Family Values: Old people are wise. A child should not be allowed to call a grown woman by her first name, "Alice." The child should be taught to call her "Miss Alice."

The AAAS has been used in several studies finding that acculturation plays a more significant role than education and income combined (Landrine & Klonoff, 1996; 1999; (Kimbrough, Molock, & Walton, 1996). The AAAS-R has high reliability and validity and correlates, r = .97 with the original version of the scale (Klonoff & Landrine, 2000). Higher scores indicate that one is more immersed into African American culture.

Racial Identity Scale

African American identity was measured by the Centrality subscale of the *Multidimensional Inventory of Black Identity* (MIBI; Sellers, Smith, Shelton, Rowley & Chavous, 1998). In the MIBI study, a sample of 474 African American college students from two universities (one predominantly White American and one predominantly African American) was used to evaluate the reliability and validity of the MIBI. Using factor analysis, researchers found strong evidence in support of the Centrality scale (Sellers, et al, 1998). The Centrality scale yielded acceptable alpha coefficients (ranging from .70 to .79) for the examination of both predictive and construct validation. Response scale ranges from 1(strongly disagree) to 7 (strongly agree). Higher scores indicate greater identification with the Black race. Sample items

include: "Overall, being Black has very little to do with how I feel about myself.""My destiny is tied to the destiny of other Black people. "

Procedure

After obtaining IRB approval, fliers advertising the study were displayed in child care centers, community agencies, and places of worship. The fliers provided contact information that allowed interested individuals to contact the researcher. During initial phone contact, appointments were made to discuss participation. Group appointments were scheduled for convenience at offices and places of worship.

At the appointment, the researcher discussed the voluntary nature of the study, confidentiality and after answering questions, asked participants to sign the consent form if they were interested in participating in the study. Afterwards, an individual interview was conducted before distributing the survey packet. Interviews consisted of demographic questions along with birth outcomes on their first four, or up to four, children.

Participants were then given a packet of surveys and were allowed to complete them independently, unless they preferred otherwise. Completion of the survey packet required approximately 10-15 minutes on average. Incentives of $5.00 Wal-Mart gift cards were offered for participants' time.

Data Analysis Plan

Descriptive statistics for the study variables were examined first. To answer research questions 1 through 4, single and multiple linear regression analyses were conducted. The regression analysis allows the testing of acculturation and racial identity to predict low birthweight; and whether anxiety or depression predicts low birthweight. A multiple regression analysis determines what amount of variance in birthweight (the dependent variable) is explained by each of the independent variables, which are acculturation, racial identity, anxiety, and depression. Correlations were conducted to examine the relationship between the variables and answer research questions 5 and 6.

Results

Background and Demographics

Of the 72 African American participants, 17% (n = 12) reported giving birth to low birthweight babies. This is slightly higher than the average LBW rate for African Americans in Alabama, which is currently 15.4% and higher than the national LBW rate for African Americans, which is 13.9% (MOD, 2010). Approximately 39% of the participants were of the middle class. Most were either married or lived alone, with 58.3% married, (n = 42), and 29.2% living alone, (n = 21). A small percentage either reported living with a significant other, 5.6%, n = 4, or with a parent(s), 6.9%, n = 5. Thirty-one percent of women met criterion for depression with a score of 16 or greater on the CES-D, n = 24. Thirty-one percent of women met criterion for moderate anxiety with a score of 37 or greater on the STAI, n = 26.

An analysis of variance (ANOVA) was conducted to compare the background, mood and culture measures of mothers who reported having full term babies to mothers of preterm babies. A significant difference was found on racial identity between the two groups, F (1, 70) = 3.96, p = .05. Mothers who reported having full term babies identified more with having stronger racial identity than those who reported having more preterm babies. There were no other significant differences on background, mood or culture between the two groups. An ANOVA was also conducted to test a difference between mothers who reported having low birthweight babies to those who reported having normal birthweight babies. The ANOVA indicated a trend that showed mothers of normal weight babies tended to be of higher SES groups than mothers of low birthweightbabies, F(1, 92) = 2.612, p = .109. Table 1 contains the means and standard deviations of parents' ages at deliveries. Table 2 contains the frequency and percentages of the

SES classes. Table 3 contains the means and standard deviations of the birth outcomes. Table 4 contains the comparison between mothers of normal and low birthweight babies on mood, background and culture and Table 5 contains the same comparison between mothers of full and preterm babies. Table 6 contains the means and standard deviations of the acculturation, racial identity, depression, and anxiety measures.

Correlations and Predictors of Birthweight

A modest positive correlation was revealed between racial identity and first born birthweight, r (68) = .27, p =.02. However, acculturation was not related to first born birthweight, r (69) = -.01, p = .97. No other significant correlations could be calculated with the birthweight of the second, third or fourth born due to small cell counts. Neither depression, r (68) = -.015, p = .9, nor anxiety, r (68) = .094, p = .441, significantly correlated with birthweight. Table 7 contains the correlations by infant birth order and birthweight, maternal information, mood, acculturation, and racial identity.

Due to the significant correlations found among the variables (which will be discussed in the *Culture and Mood Effects* section), a multiple linear regression was conducted to determine which independent variables (mom's age at delivery; SES; depression; racial identity; and acculturation) were predictors of first born birthweight. Due to the strong correlation between anxiety and depression, r (70) = .818, p< .001, multicollinearity was examined.

Multicollinearity exists among predictor variables that are at least moderately intercorrelated, used in regression analysis. It severely limits the size of the R because the predictor variables, anxiety and depression, may be pursuing much of the same variability.

Individual effects are confounded due to the overlapping information between the two variables. It also tends to increase the variances of the coefficients which results in a more unstable prediction equation. Therefore, anxiety was excluded from this model to eliminate the effects of multicollinearity. Currently, less research has been conducted on depression and birth outcomes; therefore, it is the goal of this study to reexamine depression within this context.

Regression results indicated an overall model of two predictors (mom's age at delivery and racial identity) that significantly predict first born birthweight. For the purpose of this paper, this model will be referred to as the First Model. A significant regression equation was found($F(5, 60) = 2.579$, $p < .05$) with an R^2 of .177, and an $R^2_{adj} = .108$.

The regression equation revealed that participants' predicted first born birthweightfor the First Model was equal to 140.500 – 1.913 (mom's age at delivery) + 1.242 (racial identity), with age at delivery ranging from 21 – 35 years. Birthweight increased 1.242 ounces for each point higher that the mother scored on the racial identity scale and decreased 1.913 ounces for each additional maternal year older at delivery. The First Model accounted for approximately 11% of the variance in predicting the first born'sbirthweight. A summary of the coefficieints is presented in Table 8.

Exploring Racial Identity

A simple linear regression analysis was conducted to test if racial identity, as the single independent variable, would better predict birthweight. Regression results suggested that racial identity significantly predicted 6% of the variance in first born birthweight, $R^2 = .074$, $R^2_{adj} = .061$, $F(1, 68) = 5.457$, $p < .05$. Participants' predicted first born birthweight is equal to 72.401 +

1.010 (racial identity) when weight is measured in ounces. Participants' weight increased 1.010 ounces for each additional point that the mother scored on the racial identity scale.

Further analyses were conducted to understand the relationship between racial identity and first born birthweight. The eight-item racial identity scale was examined to test which of the 8 items significantly correlated with first born birthweight. There was a modest positive correlation between first born birthweight and three of the eight racial identity items. These were items numbered 2 (In general, being Black, is an important part of my self-image.), 5 (I have a strong sense of belonging to Black people.), and 6(I have a strong attachment to other Black people.); r(68) = .25, p = .038, r(68) = .28, p = .02, and r(68) = .25, p = .041 respectively.

Multiple linear regression was conducted to determine which independent variables (racial identity item 2, 5 or 6) were predictors of first born birthweight. The regression equation was not significant, $F(3, 66) = 2.550$, $p > .05$, with an R^2 of .104 and an R^2_{adj} of .063. Neither items 2, 5 or 6 by themselves significantly predicted first born birthweight.

SES was modestly correlated with mom's age at delivery, $r(65) = -.292$, p = .017, and acculturation positively correlated with racial identity, $r(69) = .252$, p = .034. Since mom's age at delivery along with racial identity significantly predicted first born birthweight in the First Model, additional variables were added for a Second Model. A multiple linear regression was calculated to predict first born birthweight based on racial identity items 2, 5, 6, mom's age at delivery, SES and acculturation. A significant regression equation was found, $F(6, 59) = 2.756$, $p < .05$, with an R^2 of .219 and an adjusted R^2 of .139. First born birthweight was equal to 149.633 + 4.288 (race identity #2), where responses of item 2 on self-image range from strongly disagree to strongly agree on a 7-point Likert scale. First born birthweight increased 4.288

ounces for each additional degree on the 7-point scale for maternal self-image. Item two (In general, being Black, is an important part of my self-image) of the racial identity scale was the only significant predictor of first born birthweight, accounting for approximately 14% of the variance. See table 9 for a summary of the other coefficients.

To further examine the racial identity measure, a factor analysis was conducted using principal component analysis with Varimax rotation. Several solutions (i.e., 2-, 3-, and 4-factor solutions) were assessed. Item 3, My destiny is tied to the destiny of other Black people, was problematic in that it was consistently identified as a distinct and separate factor, which was not particularly surprising because it correlated relatively lowly with the other items in the racial identity scale. Excluding it from the factor analysis models increased communality scores of all of the other items, and so it was dropped and treated independently. So the factor models tested were based on the 7 other items comprising the racial identity measure. The "best" solution, in that the solution made sense intuitively and the eigen values for each of the factors were greater than 1, was based on two factors that accounted for approximately 60% of the total variance for the set of variables. Factor 1 was labeled racial attachment due to the high loadings by the following items: I have a strong sense of belonging to Black people; I have a strong attachment to other Black people; Being Black is an important reflection of who I am; In general, being Black is an important part of my self-image. This first factor explained nearly 40% of the variance. The second factor was labeled racial importance and driven primarily by the following items: Being Black is not a major factor in my social relationships; Being Black is unimportant to my sense of what kind of person I am; Overall, being Black has very little to do with how I feel about myself. This factor explained an additional 20% of the variance. The communalities of the variables, excluding item 3, were fairly high, (at least 64%). Therefore, the final factor

solution was based on seven items, identifying two distinctive factors of racial identity, racial attachment and racial importance. Based on these findings, additive scales for racial attachment and racial importance were created. The racial attachment scale consisted of 4 items and had a range from 4-28; it had high internal consistency, Cronbach alpha = .818. The racial importance measure was based on 3 items, had a range from 3-21, and an alpha of .585.

Strong to modest correlations were found between individual racial identity items and acculturation and depression. See Table 10 for the correlations. See Table 11 for the Factor Analysis.

Culture and Mood Effects

Moderate significant correlations were found among the culture and mood measures. A Pearson correlation was calculated examining the relationship between acculturation, racial identity, depression and anxiety. Acculturation positively correlated with depression and racial identity, $r(69) = .28$, $p = .019$ and $r(69) = .25$, $p = .034$, respectively. The correlation between acculturation and anxiety approached significance, $r(69) = .232$, $p = .052$. As expected, anxiety and depression were strongly correlated, $r(70) = .82$, $p < .01$. However, there was no significant correlation between racial identity and anxiety, $r(70) = .155$, $p = .193$, or racial identity and depression, $r(70) = .143$, $p = .23$.

Multiple linear regression was conducted to determine which independent variables (SES, mom's age at delivery, acculturation, and racial identity) were predictors of depression. Regression results indicated that with this model, acculturation significantly predicted depression, $R^2 = .172$, $R^2_{adj} = .118$, $F(4, 62) = 3.213$, $p = .018$. Depression is equal to -27.927 +

.088 (acculturation), where acculturation is scored on a seven point Likert scale ranging from *totally disagree* to *strongly agree.* Participants' depression scores decreased .09 for each point higher scored by the mother on the African American acculturation scale. This model accounted for 12% of the variance in depression. A summary of coefficients is presented in Table 11.

Multiple linear regression was conducted to determine which independent variables (SES, mom's age at delivery, acculturation, and racial identity) were predictors of anxiety. Regression results indicated that only acculturation was positively related in a statistically significant way ($p = .035$) to anxiety, as can be seen in Table 12. The overall fit of the model was fairly low though ($R^2 = .112$, $R^2_{adj} = .055$, $F(4, 62) = 1.962$, $p = .111$). A summary of coefficients is presented in Table 12.

Modest positive correlations were found between acculturation and 4 of the 8 items on the racial identity measure. These items, labeled racial attachment, included: 2, 5, 6 (previously stated) and 7("Being Black is an important reflection of who I am."), $r (69) = .283$, $p = .017$, $r (69) = .391$, $p = .001$, $r (69) = .371$, $p = .001$, and $r (69) = .275$, $p = .020$, respectively. Multiple linear regression was conducted to determine which of the 4 items of racial identity would predict acculturation. Significance was found, $F(4, 66) = 3.501$, $p = .012$, with an R^2 of .175 and an $R^2_{adj}$of .125. However, regression results suggested that while the overall model was significant, neither racial identity items predicted acculturation.

Discussion

Predicting Birthweight

This study adds to the growing evidence of research consistent with contextual influences on birth outcomes (Bell, Zimmerman, Almgren,. Mayer, Huebner, &2006). Several variables, including mom's age at delivery, depression, racial identity and acculturation, were tested to predict first born birthweight. Multiple linear regression found racial identity and mom's age at delivery as significant predictors of birthweight. Specifically, results indicated that for African American mothers, giving birth between the ages of 21 and 35, birthweight decreases nearly two ounces with each additional year older. For this same group, birthweight increases approximately 1.2 ounces for each degree stronger that mothers identified as being Black.

These findings support the hypothesis that African American mothers who have a strong racial identity tend to have healthier babies. It also adds to the diverse literature in support of the positive effects of having a strong racial identity. For African American young adults, racial centrality was a protective factor in buffering the negative impact of discrimination on psychological distress (Sellers, Caldwell, Schmeelk-Cone, & Zimmerman, 2003).One study found that racial identity was strongly correlated with self-esteem for African American male youth (Mandara, Gaylord-Harden, Richards, & Ragsdale, 2009). That study also found an increase in racial identity over seventh and eighth grade students (age 12 – 14 years of age) was associated with a decrease in the prevalence of depressive symptoms, for that age group, even with self-esteem controlled.

Although additional research is needed on racial identity and birthweight, the current findings should generate a novel approach to examining the racial disparity in birthweight rates

between Blacks and Whites. Future research on birth outcomes with African Americans should include common influential factors such as nutrition, SES, mood and drug effects, maternal age, health and history, and a measure of racial identity and racial attachment. Perhaps the integrated effect of several diverse factors can explain the persistent racial disparity in birthweight. While replication of these findings is necessary, possible application of this research could include promoting racial identity strengthening programs for African American women who receive government assistance (ie., WIC and Title V programs). This element could be included along with more common practices such as prenatal and nutritional classes.

Findings on mom's age at delivery and birthweight support the "weathering hypothesis" that the health of African-American women may begin to deteriorate in early adulthood as a physical consequence of cumulative socioeconomic disadvantage (Geronimus, 1992, 2003). It further suggests that while for most, a woman's 20s and early 30s constitutes prime child bearing ages, it may not hold true for African Americans. Geronimus(1992, 2003) found that African-American infants with teen mothers experience a survival advantage relative to White infants whose mothers are older.

Other research support the "weathering hypothesis" as well. For example, Spence and Eberstein (2009) found early childbearing to be associated with higher mortality among whites, while later childbearing was associated with higher mortality among blacks. In 2006, Buescher and Mittal found that racial disparities in birth outcomes increase with increasing maternal age. African American teens often experience better birth outcomes than older African American women (Buescher& Mittal, 2006).

Since research on the biological, emotional and psychological distress of having a teen mother (Chen et al., 2007) far outweigh the potential benefits of younger child bearing age for

African Americans, these new findings should not encourage teen-age pregnancy. The findings need to be extensively replicated before the benefits of earlier child-bearing ages for African Americans can be determined. This is especially important in light of the modern trend to delay child birth until late 30s. After necessary replication, research that supports the weathering hypothesis, could be publicized so that African American women are able to make a more informed decision on family planning. Doctors could include this information along with birth control options so that African American women are notified of their increased risk of adverse birth outcomes when delaying child birth until their late 20s and early 30s, which has been consistently publicized as the optimal age for child bearing.

Another study found effects of the weathering hypothesis interacting with SES (Love, David, Rankin & Collins, 2010). Love and colleagues reported that African American women who were born in poorer neighborhoods and were still poor as mothers showed significant weathering with regard to low birthweight. However, African American women in upper income areas at both time points had a steady fall in low birthweight rates. Their LBW rates were much more similar to those of their White counterparts than to other African American women in poorer neighborhoods. These findings were further explored in another study (Messer & Kaufman, 2010) that reviewed the literature on the weathering hypothesis interaction with SES.

Love's findings are not surprising due to the additional resources that come along with higher SES status. Women within the higher SES classes are more likely to have greater education in areas such as nutrition, healthy prenatal behaviors and are more likely to have careers that offer health care. Presumably, they may be under less stress or have better coping skills than their counterparts in lower SES classes. These women may also have support systems

that provide more positive influence than women of lower SES. Support systems have been examined in the context of residential clustering.

Research suggests that residential clustering positively influences birth outcomes (Bell et al., 2006). Residential isolation was associated with lower birthweight, higher rates of prematurity, and higher rates of fetal growth restriction. Meanwhile, clustering, defined as the extent to which African Americans live in contiguous neighborhoods, was associated with more optimal birth outcomes (Bell, et al, 2006). Research on racial identity and birth outcomes is still very limited. Future studies might examine, specifically, what it is about living in Black neighborhoods that might reduce women's risk for low birthweight. Might it be that residential clustering adds to the support system in a way that residential isolation cannot? The support system might add to a stronger sense of attachment to other Black people with shared African American experiences, beliefs and practices.

Interestingly in the current study, racial identity alone predicted less of the variance in birthweight than racial identity and maternal age together. When the components of the racial identity scale were more closely examined the idea that race is an important part of self-image emerged as the most significant predicting variable of birthweight. However, this item loaded with other items in the factor analysis on attachment to other Black people. Therefore, attachment to other Black people is the significant predicting factor of birthweight, instead of self-image (item 2) alone. Birthweight increased $1/4^{th}$of a pound (4.3 ounces) for each degree stronger participants' rated their attachment to other Black people. This seems to be the first study to report on the link between racial attachment and birthweight.

Examining the Relationship between Mood and Culture

Acculturation was significantly related to depression, racial identity and anxiety, while racial identity was only related to acculturation. Significant results indicated that with each degree stronger on the African American acculturation measure, depression scores decreased nearly a whole point. This model accounted for 12% of the variance in depression. This same model was tested to predict anxiety, and while acculturation emerged as statistically related to anxiety, the overall model was not significant.

Lastly, racial identity and acculturation were found to be modestly related. Further exploration of racial identity revealed strong correlations between specific racial identity items and acculturation, specifically factor one, labeled attachment to other Black people. While none of them emerged as significant predictors of acculturation alone, the overall model was significant, accounting for approximately 13% of the variance in acculturation.

Limitations

Results are subject to limitations mostly associated with a small, homogeneous sample. A majority of the participants were from a localized part of the state and were associated with a place of worship, which may have impacted their responses on the cultural measures. A larger more diverse sample may have found a link between acculturation and birthweight. However acculturation was hard to analyze since a majority of the participants shared the same culture. Although depression and anxiety have been consistently linked to birth outcomes in numerous other studies, this finding was not replicated. Presumably, this was due to the way in which data were collected. Since age was not a restriction, mothers were asked to report on their current general depression and anxiety symptoms which may not have been representative of how they felt during their pregnancy; especially if they gave birth several years prior to the study being

conducted. On average, 18.5 years had passed since participants had given birth to their first born. Therefore neither depression nor anxiety was related to birthweight. This study may have been improved if data were collected on currently pregnant women rather than retrospectively.

Future Research

Primarily, studies should seek to replicate the link between maternal age at delivery, racial identity, racial attachment and birthweight. Does a strong racial identity relate to a sense of attachment to other African Americans? If so, how does this promote healthy behaviors that might affect birth outcomes? Perhaps a strong sense of attachment allows African American women the contentment of support and self-confidence. This, in turn, may lessen the stress of obtaining and maintaining a higher SES, or some other unattainable goal that might be intrinsically motivated. It could be that without a strong racial identity and sense of attachment, African American women feel pressured to reach an unattainable goal causing more cumulative stress over time. Therefore, other variables such as self-worth, satisfaction and goals for the future might be examined as well.

Future research should include a prospective longitudinal design with pregnant African American women of different ages. This will allow a more accurate testing of depression and anxiety symptoms, and retest the weathering hypothesis by analyzing the data by age groups. The follow up, after the baby is born, could include birth outcomes that would allow a comparison view of the weathering hypothesis. Additional follow ups could examine the long term effects of maternal age at delivery, racial identity and attachment over time. This is imperative before African American women are advised about lowering their childbearing ages.

Conclusions

In the context of reducing low birthweight rates among African Americans, this study adds to the growing literature in support of the weathering hypothesis and brings new information that links racial identity, more specifically as it relates to an attachment to other African Americans, as a significant influential factor. Promoting racial identity among African American women of all ages may have significant health benefits on birth outcomes, but may be fundamentally important for older African American women who choose to delay childbirth. While the connection between racial identity and racial attachment to birthweight seems revolutionary, more research is needed in this area. Studies should seek to replicate these findings to determine the strength of this novel association. If reliably replicated, application of this information can work toward reducing the racial disparity in low birthweight rates.

Table 1
Demographics

Parents' Age at Deliveries

	Parent's Age	$\bar{x}$	SD
Mom	1st Born (n = 72)	24.86	3.48
	2nd Born (n = 46)	28.26	5.04
	3rd Born (n = 19)	30.79	4.57
	4th Born (n = 6)	33.17	5.71
Dad	1st Born (n = 72)	27.35	4.80
	2nd Born (n = 46)	34.33	29.75
	3rd Born (n = 19)	33.21	4.77
	4th Born (n = 6)	33.67	5.61

Table 2

Demographics

SES Class
Percentages

SES	N	Percentage
(1) Upper	4	6%
(2) Upper Middle	18	26.9%
(3) Middle	26	38.8%
(4) Lower Middle	19	28.3%
Total	67	100%

Table 3

Means and Standard Deviations of Birth Outcomes

Infants	N	$\bar{x}$	SD	Preterm %	LBW %
1st born	70	3085.219g	708.353g	16.7%, n = 12	17.1%, n = 12
2nd born	45	3277.581g	565.423g	19.6%, n = 9	4.4%, n = 2
3rd born	18	3234.207g	829.268g	21.1%, n = 4	16.7%, n = 3
4th born	6	3227.119g	899.250g	16.7%, n = 1	16.7%, n = 1

Table 4

Means and Standard Deviations in Background, Mood and Culture on Birthweight

Infants		Normal	LBW	F	p value
Mom's age at delivery	N =	83	17	.104	.748
	$\bar{x}$ =	23.07	22.71		
	SD =	4.219	4.497		
Total SES	N =	78	16	2.612	.109
$\bar{x}$ =		3.00	3.38		
SD =		.883	.619		
Acculturation	N =	82	17	.416	.520
$\bar{x}$ =		231.26	237.65		
	SD =	38.964	26.306		
Racial Identity	N =	83	17	1.98	.163
	$\bar{x}$ =	36.18	33.76		
	SD =	6.222	7.513		
Depression	N =	82	17	.011	.917
	$\bar{x}$ =	15.41	15.12		
	SD =	10.454	11.805		
Anxiety	N =	83	17	1.142	.288
$\bar{x}$ =		37.17	34.35		
	SD =	9.856	10.112		

Table 5

Means and Standard Deviations in Background, Mood and Culture on Full and Preterm Births

Infants		Full term	Preterm	F	p value
Mom's age at delivery	N =	60	12	.024	.878
	$\bar{x}$ =	24.83	25.00		
	SD =	3.484	3.133		
Total SES	N =	55	12	2.367	.129
$\bar{x}$ =		2.82	3.25		
	SD =	.905	.754		
Acculturation	N =	59	12	.277	.600
$\bar{x}$ =		230.42	237.08		
	SD =	41.795	28.257		
Racial Identity	N =	60	12	3.964	.050
	$\bar{x}$ =	36.58	32.42		
	SD =	6.263	8.262		
Depression	N =	60	12	.374	.543
	$\bar{x}$ =	14.18	12.25		
	SD =	9.245	13.329		
Anxiety	N =	60	12	1.153	.287
$\bar{x}$ =		35.50	32.25		
	SD =	8.514	13.929		

Table 6

Means and Standard Deviations of Acculturation, Racial Identity, Depression and Anxiety

Measure	N	$\bar{x}$	SD
Acculturation	71	231.55 (Range: 100 – 297)	39.738
Racial Identity	72	35.89 (Range: 11 – 50)	6.754
Depression	72	13.86 (Range: 0 – 48)	9.954
Anxiety	72	34.96 (Range: 14 – 71)	9.581

Table 7

Correlations by infant birth order and Birthweight, Maternal Information, Mood, Acculturation and Racial Identity

Measures	1	2	3	4	5	6	7	8	9	10
(1) 1st born weight	-	.213	.262	.612	-.190	-.005	-.015	.273**	.094	-.089
(2) 2nd born weight		-	.377	-.174	.044	-.077	-.205	.139	-.132	.051
(3) 3rd born weight			-	.395	-.129	.003	.009	.100	.206	.228
(4) 4th born weight				-	.177	-.104	.154	.122	-.165	.633
(5) Total SES					-	-.172	.045	-.175	-.015	-.292**
(6) Acculturation						-	.277**	.252**	.232*	.035
(7) Depression							-	.143	.818***	.060
(8) Racial Identity								-	.155	.155
(9) Anxiety									-	.099
(10) Mom's age at delivery										-

Note. Acculturation = African American Acculturation Scale – Revised; Depression = Center for Epidemiologic Studies Depression; Racial Identity = Multidimensional Inventory of Black Identity Centrality subscale; Anxiety = State-Trait Anxiety Inventory.
*p = .05. ** p< .05. *** p< .001

Table 8

First Model Summary Coefficients of Birthweight

Independent Variables	B	Stand Error	t	Sig
Intercept	140.500	37.276	3.769	.000*
SES	-5.227	3.561	-1.468	.147
Mom's Age at delivery	-1.913	.930	-2.036	.046*
Acculturation	-.058	.084	-.689	.494
Racial Identity	1.242	.453	2.744	.008*
Depression	-.146	.331	-.441	.661

Note. Dependent variable = 1st born birthweight.
Adjusted R^2 = .108

Table 9

Second Model Summary Coefficients of Birthweight

Independent Variables	B	Stand Error	t	Sig
Intercept	149.633	35.132	4.259	.000*
Acculturation	-.105	.082	-1.283	.205
Mom's Age at delivery	-1.781	.919	-1.937	.057
SES	-5.491	3.473	-1.581	.119
Racial Identity – self image	4.288	2.033	2.110	.039*
Racial Identity – belonging	2.323	2.986	.778	.440
Racial Identity – attachment	.917	3.282	.279	.781

Note. Dependent variable = 1st born birthweight.
Adjusted R^2 = .139

Input Table 10

Correlations between Birthweight, Maternal Information, Mood, Acculturation and Racial Identity

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(1) 1st born weight	-	-.190	-.089	-.005	-.015	.094	-.037	.249*	.071	-.030	.277*	.245*	.189	.152
(2) SES		-	-.292*	-.172	.045	-.015	-.144	-.051	-.133	.098	-.199	-.149	-.077	-.016
(3) Mom's age at delivery			-	.035	.060	.099	.092	.060	.048	.067	.049	.105	.131	.011
(4) Acculturation				-	.277**	.232*	-.193	.283**	.189	-.088	.391***	.371***	.275**	-.192
(5) Depression					-	.818***	-.029	.047	.254*	-.206	.180	.141	.132	.057
(6) Anxiety						-	-.080	.075	.247*	-.179	.248*	.184	.056	.074
(7) race1							-	-.171	-.247*	.154	-.047	-.163	-.109	.377***
(8) race2								-	.232*	.097	.413***	.362**	.313**	-.022
(9) race3									-	-.252*	.352**	.316**	.358**	-.233*
(10) race4										-	-.144	-.202	-.307**	.496***
(11) race5											-	.853***	.656***	-.227
(12) race6												-	.616***	-.265*
(13) race7													-	-.354**
(14) race8														-

*Note.*Acculturation = African American Acculturation Scale – Revised; Depression = Center for Epidemiologic Studies Depression; Anxiety = State-Trait Anxiety Inventory; Race 1 - 8 = individual items on the Multidimensional Inventory of Black Identity Centrality subscale. * $p \leq .05$. ** $p \leq .02$. *** $p \leq .001$.

Table 11
Factor Analysis Table for the Multidimensional Inventory of Black Identity Centrality subscale

	Factor 1	Factor 2	Communality
5. I have a strong sense of belonging to Black people.	**.857**	-.181	.797
6. I have a strong attachment to other Black people.	**.829**	-.243	.766
7. Being Black is an important reflection of who I am.	**.775**	-.245	.691
2. In general, being Black, is an important part of my self-image.	**.702**	.108	.685
8. Being Black is not a major factor in my social relationships.	-.131	**.793**	.649
4. Being Black is unimportant to my sense of what kind of person I am.	.031	**.763**	.756
1. Overall, being Black has very little to do with how I feel about myself.	-.110	**.605**	.855
3. My destiny is tied to the destiny of other Black people.	.339	-.523	.389

Table 12

Model Summary Coefficients of Depression

Independent Variables	B	Stand Error	Sig
SES	1.781	1.346	.191
Mom's Age at delivery	.288	.345	.406
Acculturation	.088	.031	.005*
Racial Identity	.238	.171	.168

Note. Dependent variable = Depression.
Adjusted R^2 = .118.

Table 13

Model Summary Coefficients of Anxiety

Independent Variables	B	Standard Error	Sig
SES	.967	1.408	.495
Mom's Age at delivery	.313	.360	.388
Acculturation	.069	.032	.035*
Racial Identity	.208	.179	..250

Note. Dependent variable = Anxiety.
Adjusted R^2 = .055.

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Appendix

Background Questionnaire

Participant # :_____ Date: _____/_____/_____

Mother Age: _____ Occupation: _____

Education:

___ Under 7 Years of School ___ 7—9 Years of School ___ 10—11 Years of School

___ High School Graduate ___ 1—3 Years of College (includes technical degree)

___ Four Year College Graduate ___ Professional (M.A., M.S., Ph.D., M.D.)

Your ethnicity: _____ Your Place of Birth: _____
(List County if in AL, list city & state if outside of AL)

Your zip code: _____ How long at this residence: _____

Your mother's place of birth: _____ Your father's place of birth: _____

Your Current Living Arrangements: ___Husband ___Significant Other ___Parent(s) ___Friend(s) ___Alone (no other adults)

___Other: _____

Hollingshead Score: _____ Are you currently pregnant? Yes or No

If you live with your husband or significant other, please answer the questions below regarding that person.

Is this person the father of one of your children? ___ yes ___no

If so, which child is he the father of? ___ # 1 ___ #2 ___# 3 ___ # 4 ___ all

What is his: Age: _____ Occupation: _____

Education:

___ Under 7 Years of School ___ 7—9 Years of School ___ 10—11 Years of School

___ High School Graduate ___ 1—3 Years of College (includes technical degree)

___ Four Year College Graduate ___ Professional (M.A., M.S., Ph.D., M.D.)

Father's ethnicity: _____ His Place of Birth: _____
(List County if in AL, list city & state if outside of AL)

His mother's place of birth: _____ His father's place of birth: _____

Hollingshead Score: _____

Total Hollingshead Score: _____

Birth Outcomes

1st born: weight: _____lbs _____oz length: _____”

Full term ____ Premature ____ # of wks_____

Mother’s age at time of delivery: ____ Child’s current age: ____
Father’s age at time of delivery: ____

2nd born: weight: _____lbs _____oz length: _____”

Full term ____ Premature ____ # of wks_____

Mother’s age at time of delivery: ____ Child’s current age: ____
Father’s age at time of delivery: ____

3rd born: weight: _____lbs _____oz length: _____”

Full term ____ Premature ____ # of wks_____

Mother’s age at time of delivery: ____ Child’s current age: ____
Father’s age at time of delivery: ____

4th born: weight: _____lbs _____oz length: _____”

Full term ____ Premature ____ # of wks_____

Mother’s age at time of delivery: ____ Child’s current age: ____
Father’s age at time of delivery: ____

Participant: # _____

Below are some beliefs and attitudes about religion, families, racism, Black people, White people, and health. Please tell us how much you personally agree or disagree with these beliefs and attitudes by circling a number. There are no right or wrong answers, we simply want to know your views and your beliefs.

	I Totally Disagree Not true at All			*Sort of Agree Sort of True*			*I Strongly Agree Absolutely True*
1. I believe in the Holy Ghost.	1	2	3	4	5	6	7
2. I like gospel music.	1	2	3	4	5	6	7
3. I believe in heaven and hell.	1	2	3	4	5	6	7
4. The church is the heart of the Black community.	1	2	3	4	5	6	7
5. I have seen people "get the spirit" or speak in tongues.	1	2	3	4	5	6	7
6. I am currently a member of a Black church.	1	2	3	4	5	6	7
7. When I was young, I was a member of a Black church.	1	2	3	4	5	6	7
8. Prayer can cure disease.	1	2	3	4	5	6	7
9. What goes around, comes around.	1	2	3	4	5	6	7
10. I used to sing in the church choir.	1	2	3	4	5	6	7
11. Most of the music I listen to is by Black artists.	1	2	3	4	5	6	7
12. I like Black music more than White music.	1	2	3	4	5	6	7
13. I listen to Black radio stations.	1	2	3	4	5	6	7
14. I try to watch all the Black shows on TV.	1	2	3	4	5	6	7
15. The person I admire most is Black.	1	2	3	4	5	6	7
16. I feel more comfortable around Blacks than around Whites.	1	2	3	4	5	6	7
17. When I pass a Black person (a stranger) on the street, I always say hello or nod at them.	1	2	3	4	5	6	7
18. Most of my friends are Black.	1	2	3	4	5	6	7
19. I read (or used to read) Essence or Ebony magazine.	1	2	3	4	5	6	7
20. I don't trust most White people.	1	2	3	4	5	6	7
21. IQ tests were set up purposefully to discriminate against Black people.	1	2	3	4	5	6	7
22. Most Whites are afraid of Blacks.	1	2	3	4	5	6	7
23. Deep in their hearts, most White people are racists.	1	2	3	4	5	6	7
24. Whites don't understand Blacks.	1	2	3	4	5	6	7
25. Most tests (like the SATs and tests to get a job) are set up to make sure that Blacks don't get high scores on them.	1	2	3	4	5	6	7
26. Some members of my family hate or distrust White people.	1	2	3	4	5	6	7
27. When I was young, I shared a bed at night with my sister, brother							

or some other relative.	1	2	3	4	5	6	7
28. When I was young, my parent(s) sent me to stay with a relative (aunt, uncle, grandmother) for a few days or weeks, and then I went back home again.	1	2	3	4	5	6	7
29. When I was young, my cousin, aunt, grandmother, or other relative lived with me and my family for awhile.	1	2	3	4	5	6	7
30. When I was young, I took a bath with my sister, brother, or some other relative.	1	2	3	4	5	6	7
31. Some people in my family use Epsom salts.	1	2	3	4	5	6	7
32. Illnesses can be classified as natural types and unnatural types.	1	2	3	4	5	6	7
33. Some old Black women/ladies know how to cure diseases.	1	2	3	4	5	6	7
34. Some older Black women know a lot about pregnancy and childbirth.	1	2	3	4	5	6	7
35. I was taught that you shouldn't take a bath and then go outside.	1	2	3	4	5	6	7
36. I avoid splitting a pole.	1	2	3	4	5	6	7
37. When the palm of your hand itches, you'll receive some money.	1	2	3	4	5	6	7
38. There's some truth to many old superstitions.	1	2	3	4	5	6	7
39. I eat black-eyed peas on New Year's Eve.	1	2	3	4	5	6	7
40. I grew up in a mostly Black neighborhood.	1	2	3	4	5	6	7
41. I went to (or go to) a mostly Black high school.	1	2	3	4	5	6	7
42. I went to a mostly Black elementary school.	1	2	3	4	5	6	7
43. I currently live in a mostly Black neighborhood.	1	2	3	4	5	6	7
44. It's better to try to move your whole family ahead in this world than it is to be out for only yourself.	1	2	3	4	5	6	7
45. Old people are wise.	1	2	3	4	5	6	7
46. I often lend money or give other types of support to members of my family.	1	2	3	4	5	6	7
47. A child should not be allowed to call a grown woman by her first Name, "Alice." The child should be taught to call her "Miss Alice."	1	2	3	4	5	6	7
48. Overall, being Black has very little to do with how I feel about myself.	1	2	3	4	5	6	7
49. In general, being Black, is an important part of my self-image.	1	2	3	4	5	6	7
50. My destiny is tied to the destiny of other Black people.	1	2	3	4	5	6	7
51. Being Black is unimportant to my sense of what kind of person I am.	1	2	3	4	5	6	7
52. I have a strong sense of belonging to Black people.	1	2	3	4	5	6	7
53. I have a strong attachment to other Black people.	1	2	3	4	5	6	7
54. Being Black is an important reflection of who I am.	1	2	3	4	5	6	7
55. Being Black is not a major factor in my social relationships.	1	2	3	4	5	6	7

Please circle the number that best corresponds to how you have felt this past month.

	Rarely	Some of the time	Occasionally	Most of the time
56. I was bothered by things that usually don't bother me.	0	1	2	3
57. I did not feel like eating. I was not hungry.	0	1	2	3
58. I felt I could not shake the blues even with help from my family and friends.	0	1	2	3
59. I felt that I was just as good as other people.	0	1	2	3
60. I had trouble keeping my mind on what I was doing.	0	1	2	3
61. I felt depressed.	0	1	2	3
62. I felt that everything I did was an effort.	0	1	2	3
63. I felt hopeful about the future.	0	1	2	3
64. I thought my life had been a failure.	0	1	2	3
65. I felt fearful.	0	1	2	3
66. My sleep was restless.	0	1	2	3
67. I was happy.	0	1	2	3
68. I talked less than usual.	0	1	2	3
69. I felt lonely.	0	1	2	3
70. People were unfriendly.	0	1	2	3
71. I enjoyed life.	0	1	2	3
72. I had crying spells	0	1	2	3
73. I felt sad.	0	1	2	3
74. I felt like people disliked me.	0	1	2	3
75. I could not get going.	0	1	2	3

A number of statements which people have used to describe themselves are given below. Read each statement and circle the appropriate response to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

	Almost Never	Some times	Often	Almost Always
76. I feel pleasant.	1	2	3	4
77. I tire quickly.	1	2	3	4
78. I feel like crying.	1	2	3	4
79. I wish I could be as happy as others seem to be.	1	2	3	4
80. I am losing out on things because I can't make up my mind soon enough.	1	2	3	4
81. I feel rested.	1	2	3	4
82. I am "calm, cool, and collected".	1	2	3	4
83. I feel that difficulties are piling up so that I cannot overcome them.	1	2	3	4
84. I worry too much over something that really doesn't matter.	1	2	3	4
85. I am happy.	1	2	3	4
86. I am inclined to take things hard.	1	2	3	4
87. I lack self-confidence.	1	2	3	4
88. I feel secure.	1	2	3	4
89. I try to avoid facing a crisis or difficulty.	1	2	3	4
90. I feel blue.	1	2	3	4
91. I am content.	1	2	3	4
92. Some unimportant thought runs through my mind and bothers me.	1	2	3	4
93. I take disappointments so keenly that I can't put them out of my mind.	1	2	3	4
94. I am a steady person.	1	2	3	4
95. I become tense and upset when I think about my present concerns.	1	2	3	4