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Addressing the Racial Disparity in Birth Outcomes: Implications for Maternal Racial Identity on Birthweight

Wanda M. Burton , *University of Alabama - Tuscaloosa*, wmburton@crimson.ua.edu

Maria Hernandez-Reif , *University of Alabama*

Brad Lian , *Mercer University*

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Abstract

Background: As a widely used marker of health, birthweight has been a persistent racialized disparity with the low birthweight rate of Blacks in Alabama nearly doubling the national average. The purpose of this study was to examine the role of racial identity and acculturation on birthweight in a sample of Black women living in Alabama.

Methods: Black women (n=72) in West Alabama were surveyed about the birthweight of their first born child. Correlation and multiple linear regression analyses were conducted.

Results: Racial identity was the only significant predictor of birthweight. Mothers with a strong racial identity reported having low birthweight babies less often than those who scored lower on racial identity. Further exploration of racial identity revealed self-image as the essential element that predicted birthweight. Birthweight increased 4.2 ounces for each additional degree of self-image. Results also indicated that birthweight decreased as mothers' age increased, within the widely accepted optimal maternal age range 21 to 35.

Conclusions: Results add to the existing body of literature in support of the positive effects racial identity has on health. Findings on age are congruent with the weathering hypothesis which states that the health of Black women may begin to deteriorate in early adulthood possibly due to the strain of racism.

Keywords

birthweight; birth outcomes; racial identity; weathering hypothesis

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Wanda Martin Burton, MS, CHES, University of Alabama
Maria Hernandez-Reif, Ph.D., University of Alabama
Brad Lian, Ph.D., Mercer University

ABSTRACT

As a widely used marker of health, birthweight has been a persistent racialized disparity with the low birthweight rate of Blacks in Alabama nearly doubling the national average. The purpose of this study was to examine the role of racial identity and acculturation on birthweight in a sample of Black women living in Alabama. Black women (n=72) in West Alabama were surveyed about the birthweight of their first born child. Correlation and multiple linear regression analyses were conducted. Racial identity was the only significant predictor of birthweight. Mothers with a strong racial identity reported having low birthweight babies less often than those who scored lower on racial identity. Further exploration of racial identity revealed self-image as the essential element that predicted birthweight. Birthweight increased 4.2 ounces for each additional degree of self-image. Results also indicated that birthweight decreased as mothers' age increased, within the widely accepted optimal maternal age range 21 to 35. Results add to the existing body of literature in support of the positive effect racial identity has on health. Findings on age are congruent with the weathering hypothesis, which states that the health of Black women may begin to deteriorate in early adulthood possibly due to the strain of racism.

Keywords: birthweight; birth outcomes; African American/Black women; racial identity; weathering hypothesis

INTRODUCTION

In the U.S., low birthweight (LBW) (< 5.5 lbs) is the leading cause of infant mortality in non-Hispanic African American infants (Mathews, MacDorman & Thoma, 2015). Non-Hispanic African Americans will be referred to as Blacks in this paper to denote race. Blacks are disproportionately impacted by high infant mortality rates (Martin et al., 2015). Additionally, there are many developmental outcomes of LBW, including respiratory distress, complications in

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cognitive development and heart disease (Boardman, Powers, Padilla, & Hummer, 2002; Conley & Bennet, 2000).

Although national LBW rates for Blacks have remained essentially unchanged over the last few years (Hamilton et al, 2015), in Alabama LBW remains a major cause of concern. While the state average is 10%; for Blacks in Alabama, the LBW rate is 14.6% (Martin, et. al., 2015). Startlingly, the national LBW rate for Blacks in the US (13.15%) is more akin to what UNICEF (2004) reported for underdeveloped countries (13% - 15%) than the overall LBW average for the United States (8.0%) (Hamilton et al., 2015).

Term status is a key factor in birthweight, with babies born preterm (before 37 weeks of gestation) at an increased risk of LBW and infant mortality (CDC, 2015). Yet there are several other factors impacting LBW including maternal delivery age, birth order, socio-economic status (Ghaemmaghami et al., 2013; Martin et al., 2015; Mirowsky, 2005), and depression and anxiety (Diego et al., 2006; Diego et al., 2009). The risk of LBW increases with maternal delivery age; between 22 and 35 is suggested as the optimal maternal delivery age (Mirowsky, 2005). Although the relationship between income and birthweight is complicated (Hamad & Rehkopf, 2015), low socioeconomic status (SES) appears correlated to delivering low birthweight babies (Reichman, 2005). A meta-analysis of the impact of maternal depression on LBW concluded that while the relationships is significant, it is complicated by other factors including SES (Grote et al., 2010). Marital status seems to also affect LBW rates with unmarried mothers reporting higher LBW rates (Martin et al., 2011; Ellen, 2000).

Being Black is also a significant predictor of LBW (Goldenberg et al., 1996; Hosseini et al., 2009). LBW rates of Blacks exceed the rate of any other reported racial or ethnic group, even when maternal age, educational level and socioeconomic status are taken into account (David & Collins, 1997). The optimal age range for childbearing is more complicated for Blacks. The weathering hypothesis states that the health of Black women may begin to deteriorate in early adulthood as a physical consequence of cumulative disadvantage and this has been suggested as a causal factor in the racial disparity in LBW and infant mortality (Geronimus, 1992; Geronimus, Hicken, Keene, & Bound, 2006).

While the cause of LBW may be uncertain, this persistent disparity in birthweight for Blacks versus other 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 (NIH, 2013). While studies have found that children exposed to WIC tend to have higher birthweight, WIC does not expunge the racial disparity in LBW (Case & Paxson, 2006).

Acculturation

 LBW rates of Blacks exceed the rate of any other reported racial or ethnic group, even when maternal age, educational level and socioeconomic status were taken into account. Black mothers from the African continent have low birthweight rates closer to U.S. born White mothers than to U.S. born Black mothers (Baker & Hellerstedt, 2006; David & Collins, 1997). The rate of discrepancy between U.S and African born Blacks solicits an explanation beyond heredity. A primary difference that may account for this health disparity is culture.

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,

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& Herskovits, 1936). It is typically used to describe the notion of minority individuals adapting to the dominant mainstream culture. African American acculturation can be understood as a continuum of being immersed into African American culture versus dominant culture (Landrine & Klonoff, 1996). Studies report that African-American acculturation may play a more significant role on some health factors than education and income combined (Kimbrough, Molock, & Walton, 1996; Landrine & Klonoff, 1996; Landrine & Klonoff, 1999).

Race as a Social Determinant of LBW

Another aspect of culture can be understood by examining race as a social determinant of LBW. As opposed to a biological factor, race implicates racial hierarchy or racism (Bravemen, Egerter, & Williams, 2011; Gee & Ford, 2011). Research reports a significant relationship between perceived racism and birthweight in Blacks (Dominguez, Dunkel-Schetter, Glynn, Hobel, & Sandman, 2008; Mustillo et al., 2004). In one study, Black women reported more exposure to general, pregnancy, and racism stressors and higher levels of chronic stress and anxiety than non-Hispanic White women. Controlling for medical and sociodemographic risk factors, these psychosocial differences help explain observed racial differences in birth outcomes (Dominguez et. al, 2008).

Racial Identity

The current study explored factors that could buffer the negative impact of race on LBW. Racial identity is a well-researched buffer for the negative impact of racism (Rivas-Drake, et al., 2014; Smith & Silva, 2011) and is defined as the significance and meaning that Blacks attribute to their membership within the Black racial group (Sellers, Rowley, Chavous, Shelton, & Smith, 1997). The individual's ascriptions and perceptions about their racial groups likely serve as personal guides for making individual decisions, depending upon the importance and meaning of racial identity (Harvey & Afful, 2011). A number of studies support that the more Blacks identify with their racial groups, the more vigilant and sensitive they are to perceiving discrimination (Crocker & Major, 1989; Sanchez & Awad, 2016; Sellers & Shelton, 2003). Moreover, racial identity has been shown to buffer the deleterious consequences of racial discrimination (Galliher, Jones, & Dahl, 2011; Rivas-Drake, Hughes, & Way, 2008; Sellers, Copeland-Linder, Martin, & Lewis, 2006). Racial identity may buffer through increased self-esteem (Mandara, Gaylord-Harden, Richards, & Ragsdale, 2009) or act as a moderator between racial discrimination and psychological distress (Sellers & Shelton, 2003).

Less developed racial identity has been associated with low well-being and low self-esteem for Black women (Jones, Cross & DeFour, 2007) and Blacks in general (Pierre & Mahalik, 2005; Pillay, 2005). Additionally research supports a positive association between in-group connectedness with higher self-esteem for Black youth (Vandiver, Cross, Worrell & Fhagen-Smith, 2002; Worrel, et. al., 2004). Thus, African-American acculturation seems to be related to racial identity (Cole & Arriola, 2007; Pope-Davis, Liu, Ledesma-Jones, & Nevitt, 2000; Walker, Wingate, Obasi & Joiner, 2008). As of yet, research investigating the interaction of maternal racial identity and acculturation on birthweight has not been examined.

Due to the persistent racial disparity of LBW rates, the purpose of the current study was to examine the role of racial identity and acculturation on birthweight and term status in a sample of Black women living in Alabama. Black women who reported having a strong racial identity

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were expected to reveal high acculturation to the African American race and report having lower rates of LBW and preterm births.

METHODS

A cross-sectional design was used with a convenience sample to determine the impact of racial identity and maternal delivery age on birth outcomes. Birthweight was the primary outcome variable and term status was secondary. Birthweight was maternally reported in pounds and ounces. Maternally reported birth weights have been suggested as sufficiently accurate for research purposes (Adegboye & Heitmann, 2008). Term status refers to weeks of gestation with preterm (or premature) births defined as less than 37 weeks and full term as after 37 weeks (CDC, 2015).

Procedure

Several child care centers serving high concentrations of Black families were initially contacted to recruit participants; 4 indicated interest. Snowball sampling occurred with directors of the child care centers suggesting additional sites for recruitment including places of worship and community organizations. The researcher was granted permission at each site to recruit and fliers advertising the study were provided. The fliers included contact information for the researcher as well as the date and time the researcher would be on-site conducting the study. Black mothers living in Alabama were recruited from childcare centers (n=4), places of worship (n = 2) and community organizations (n=2). Participants had children that attended the child care centers, were members of places of worship or were receiving services through the community organizations. The researcher met with the participants in group settings, and distributed a packet of surveys. Participants received a $5.00 gift card for their time. All study procedures were approved by the University of Alabama's Institutional Review Board.

Participants

In order to target the impact of race on LBW, data analyses were restricted by age (Mirowsky, 2005) and SES (Reichman, 2005). Participants with a maternal delivery age beyond the optimal age range of 21 - 35, those within the lowest SES category, and those with incomplete data were excluded from analyses (n = 35). One hundred and seven Black mothers were initially surveyed, of which 72 were included in the final analysis.

Instruments

Background Demographic Sheet: Mothers self-reported their children's birthweight, length and term status (full or preterm), and household socioeconomic status (SES). Birthweight was operationalized as a first single live-birth to account for multiple fetuses and previous LBW deliveries which are contributing LBW factors. SES was computed using the Hollingshead Four Factor Index, a survey designed to quantify class based on educational attainment, occupation, marital status, and employment status (Hollingshead, 1975). Class status ranged 5 categories from lower to upper. However, the lowest SES category included participants who did not complete high school, and were therefore not included in the analysis to account for the negative impact of education on birthweight.

Mood Scales: Mood was examined using the *Center for Epidemiologic Studies Depression* (CES-D) scale (Radloff, 1977) and the *State-Trait Anxiety Inventory* (STAI) (Spielberger, 1983).

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Culture Scales: Culture was examined by measures of racial identity and acculturation. Racial identity was measured by the Centrality subscale of the *Multidimensional Inventory of Identity* (MIBI; Sellers, Smith, Shelton, Rowley & Chavous, 1998). Using factor analysis, researchers found strong evidence in support of the Centrality scale (Sellers, et al, 1998). The 8-item Centrality scale yielded acceptable alpha coefficients (ranging from .70 to .79) for the examination of both predictive and construct validation. 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."

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. A sample subscale and items are: Health Beliefs and Practices: Some older Black women know a lot about pregnancy and childbirth. 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.

Analysis

Birthweight data were converted from a continuous to a categorical variable using 5.5 lbs to distinguish between normal and LBW. Normal birthweight includes those who weigh at and above 5.5 lbs and LBW are those below 5.5 lbs. A one way ANOVA was conducted to examine if the mothers of the two groups of infants (normal weight vs LBW) differed on background, mood (i.e., CESD scores, STAI scores) and/or culture (MIBI scores, AAAS-R scores). Two multiple regression models were conducted with the first testing all variables. Correlational analysis examined the relationship between the variables. Due to the novel significant relationship between racial identity and birthweight, a second correlational analysis was conducted to test each of the 8 items' relationship with birthweight. The significant items were included in the second regression model.

RESULTS

Background and Demographics

All of the 72 participants identified as Black or African American and first gave birth between the optimal age range of 21 – 35, with the mean maternal delivery age of 24.86. Seventeen per cent (n = 12) reported giving birth to low birthweight babies. For the sample as a whole, most were married and fell within the middle SES class. Occupations varied greatly but many were teachers, factory workers and supervisors. Sociodemographic data are included in Table 1.

Table 1 Sociodemographic variables (N = 72)

Variable	N (%)
Education	
Professional (MA, MS, PhD, MD)	4 (5.6%)
4-Year College Graduate	16 (22.2%)
1-3 Years of College	24 (33.3%)

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High School Graduate	28 (38.9%)	
Current Age		
21-25	6 (8.3%)	
26-30	24 (33.3%)	
31-35	22 (30.6%)	
36-40	14 (19.4%)	
41-45	4 (5.6%)	
46-50	1 (1.4%)	
51-55	1 (1.4%)	
Socioeconomic Status		
Upper	4 (5.6%)	
Upper Middle	18 (25%)	
Middle	31 (43%)	
Lower Middle	19 (26.4%)	
Marital Status		
Married	42 (58.3%)	
Single	21 (29.2%)	
Cohabitating	6 (8.3%)	
Separated or Widowed	3 (4.2%)	

The ANOVA found a significant difference in racial identity between the two groups based on term status, $F(1, 70) = 3.96$, $p = .05$. Mothers who reported having full term babies identified more with having stronger racial identity than mothers who reported having preterm babies. There were no other significant differences on background, mood or culture between the two groups. In addition, the ANOVA indicated a trend, though not significant, for mothers of normal weight babies to be of higher SES groups than mothers of low LBW babies, $F(1, 92) = 2.612$, $p = .109$. The comparison between mothers of normal and low birthweight babies on mood, background and culture did not reach significance.

Correlations & Predictors of Birthweight

A slight but significant correlation was revealed between racial identity and birthweight, $r(68) = .27$, $p = .02$. Acculturation, depression nor anxiety were related to birthweight. Table 2 contains the correlations.

Table 2 Correlations between Birthweight, Background, Mood & Culture

Measures	1	2	3	4	5	6	7
1 Birthweight	-	-.190	-.005	-.015	.273**	.094	-.089
2 Total SES		-	-.172	.045	-.175	-.015	-.292**

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3 Acculturation	-	.277**	.252**	.232*	.035
4 Depression		-	.143	.818***	.060
5 Racial Identity			-	.155	.155
6 Anxiety				-	.099
7 Maternal delivery age					-

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

   Due to the strong correlation between anxiety and depression, r (70) = .818, *p*< .001, anxiety was excluded from the regression analysis to eliminate the effects of multicollinearity. A multiple linear regression was conducted to determine which independent variables were predictors of birthweight. Regression results indicated an overall model of two predictors (maternal delivery age and racial identity) that contributed to 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 First Model accounted for approximately 11% of the variance in predicting the birthweight. A summary of the coefficients is presented in Table 3.

Table 3 First Model Summary Coefficients of Birthweight

Independent Variables	B	Stand Error	T	p-value
Intercept	140.500	37.276	3.769	.000*
SES	-5.227	3.561	-1.468	.147
Maternal Delivery Age	-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

Exploring Racial Identity
   Further analyses were conducted to understand the relationship between racial identity and birthweight. The eight-item racial identity scale was examined to test which of the 8 items significantly correlated with birthweight. There were positive correlations between birthweight and three of the racial identity items. These were items 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.

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A second multiple linear regression was conducted; it included racial identity items 2, 5 and 6, and maternal delivery age, the significant predictor from the first model. SES was also included because of its significant correlation with maternal delivery age. 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. Birthweight was equal to $149.633 + 4.288$ (racial identity item #2), where responses on item 2 range from strongly disagree to strongly agree on a 7-point Likert scale. Birthweight increased 4.288 ounces for each additional degree the participant agreed with, "In general, being Black, is an important part of my self-image." This singular item of the racial identity scale accounted for nearly 14% of the variance in birthweight. See table 4 for a summary of the other coefficients.

Table 4 Second Model Summary Coefficients of Birthweight

Independent Variables	B	Stand Error	T	p-value
Intercept	149.633	35.132	4.259	.000*
Acculturation	-.105	.082	-1.283	.205
Maternal delivery age	-1.781	.919	-1.937	.057
SES	-5.491	3.473	-1.581	.119
Racial Identity #2	4.288	2.033	2.110	.039*
Racial Identity#5	2.323	2.986	.778	.440
Racial Identity#6	.917	3.282	.279	.781

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

DISCUSSION

In the current study, racial identity and mom's age at delivery were found to be predictors of infant birthweight. Specifically, for Black mothers, giving birth between the ages of 21 and 35 was associated with birthweight decreases of nearly two ounces with each additional year older. For this same group, birthweight was found to increase approximately 4.2 ounces for each degree stronger that mothers identified as being Black. Further, there was a significant difference in racial identity based on term status. Mothers who reported having full term babies identified more with having stronger racial identity than those who reported having preterm babies.

Findings on maternal age at delivery support the "weathering hypothesis" suggesting that Blacks experience early health deterioration as a consequence of the cumulative exposures to racialized and socioeconomic stressors (Geronimus, 1992; Geronimus et al., 2006). This striking finding suggests that while for most women giving birth in their 20s and early 30s constitute prime child bearing ages, this time span may not be optimal for Blacks. Our findings are congruent with other studies. For example, Geronimus (1992; 2003) reported that Black infants with teen mothers experience a survival advantage relative to White infants whose mothers are older. Another study found early childbearing to be associated with higher mortality among Whites, while later childbearing was associated with higher mortality among Blacks (Spence & Eberstein, 2009). Still another found that racial disparities in birth outcomes increase with increasing maternal age, and Black teenagers often experience better birth outcomes than older Black women (Buescher& Mittal, 2006).

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Other studies have found an interaction between SES and age that complicate the weathering hypothesis. Research suggest that Black women who were born in economically disadvantaged neighborhoods and remained there as mothers showed significant weathering with regard to low birthweight. However, Black 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. (Love, David, Rankin & Collins, 2010; Messer & Kaufman, 2010). In our study, we found only marginal differences for birthweight differences by maternal SES. These mixed findings in the literature related to income or SES may require a more nuanced understanding since SES inequality and race seem inseparable.

Our racial identity findings suggest that women who report having a strong sense of racial identity are less likely to deliver LBW babies. This finding adds to the diverse literature in support of racial identity. Recent reviews of the literature suggest that for Blacks, racial identity has been positively associated with mental wellness, positive psychosocial factors, academic achievement and better health outcomes (Rivas-Drake et al., 2014; Smith & Silva, 2011). Research on racial identity and birth outcomes is very limited. Thus, our findings make a contribution to the literature on this complex issue. Replication studies are needed as well as more in depth studies to reveal a greater understanding of the benefits of racial identity on birthweight. One study of birthweight examined the impact of residential segregation and found a relationship between residential clustering and positive 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 Blacks live in contiguous neighborhoods, was associated with more optimal birth outcomes (Bell et al., 2006). Thus perhaps there is a relation between residential clustering and racial identity. Or, both of these factors may independently buffer the negative effects of exposure to racism. The buffering may be associated with both physical support, as with residential clustering, and with psychological support as with racial identity.

Limitations

Limitations to this study include the cross-sectional design with a non-random convenience sample. A future study might include a longitudinal design. Most of the participants were from a localized part of the state which may have impacted their responses on the cultural measures. Thus, one limitation is the generalizability of our findings to the population of Black women across the United States. Additionally, a larger more diverse sample may have found a link between acculturation and birthweight.

Although depression and anxiety have been consistently linked to birth outcomes in numerous other studies, this finding was not replicated. This may have been due to the way in which data were collected. Given that current age was not a restriction, mothers were asked to report on their mood and culture which may not have been representative of how they felt during their pregnancy. In some cases, 18.5 years had passed since participants had first given birth, though on average participants were within 5 years of their first delivery. Recall bias may have been an additional limitation, however, maternally reported birth weight is well accepted for research (Adegboye & Heitmann, 2008; Gayle et al., 1988). Additionally, unmeasured confounding variables, such as prenatal care, smoking, and nutrition, may have influenced the

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results. Although several of the most significant factors of LBW such as multiple fetuses, previous low birth weight deliveries, maternal education and age were included. That is, we only looked at first time mothers and excluded those who were carrying multiple fetuses.

CONCLUSION

In the context of reducing low birthweight rates among Black women promoting racial identity among Black women of all ages may have significant health benefits, but may be fundamentally important for those considering delaying childbirth. Future studies should seek to replicate these findings with a random sample of currently pregnant Black mothers to determine the strength of this novel association between racial identity and LBW that was uncovered in the current study. If reliably replicated, application of this information can work toward reducing the racial disparity in low birthweight rates.

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