Predicting Breastfeeding Intentions: A Test and Extension of the Theory of Normative Social Behavior with African American Social Identity

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ABSTRACT
Breastfeeding is a health promoting social behavior but statistics suggest a persistent disparity of lower rates among African American mothers. The Theory of Normative Social Behavior (TNSB) explains when and how norms influence behaviors, but has produced inconsistent results with respect to proposed moderators of group identity and injunctive norms (IN), limiting its predictive value in diverse cultural groups. Cultural norms are one of many influences on breastfeeding behaviors, yet little is known about their mechanisms of influence. The TNSB has not been tested in the breastfeeding context or within an exclusively African American cultural group. Given this knowledge gap, a survey of 528 African American mothers in the Washington, D.C. area was conducted to test the moderating effects of IN and subjective norms (SN) and social identity on the descriptive norms (DN) to intentions relationship as predicted by the TNSB. Structural equation modeling was used to show that when controlling for education and breastfeeding history, norms significantly predicted 26.4% of the variance in breastfeeding intentions. SN and DN interacted negatively to enhance breastfeeding intentions. Latent profile analysis using ethnic pride, collectivism, and religiosity scales detected four profiles of African American social identity. Social identity profile membership was a significant moderator on the DN to intentions pathway in the structural equation model. Profiles with the highest ethnic pride were significantly influenced by DN to intend to breastfeed. Implications from this study for public health intervention and communication messaging are discussed.

Introduction
Trends in breastfeeding and use of infant formulas have fluctuated throughout time due to advances in science, medicine, and industry, and largely to shifts in culture, gender roles, religion, and policies/politics (Thulier, 2009). Among non-Hispanic Black infants born in 2017, 73.7% were ever breastfed and 21.2% were breastfed exclusively through 6 months (Centers for Disease Control and Prevention, 2020). Much research has been dedicated to understanding breastfeeding disparities and barriers for African American women. Individual psychosocial variables like attitudes, which are influenced by interpersonal social interactions, community discourse, and the media environment, are examples of breastfeeding determinants. A unique and complicated backdrop of historical and contemporary exploitation and systemic racism and resilience, along with political, environmental, and socio-cultural factors undergird today’s infant feeding norms in African American communities (Davis et al., 2021; DeVane-Johnson et al., 2018, 2017; Louis-Jacques et al., 2020). Social norms, and individuals’ perceptions of norms, are among these important influences on breastfeeding, and can vary by geographic and cultural community. Yet, scholars do not fully understand these norms and their role in forming breastfeeding intentions among African American women in the U.S.

Breastfeeding as a social behavior
Breastfeeding is an important health promoting behavior well suited for the study of social norms. Lapinski and Rimal (2005) proposed behavioral ambiguity and the extent to which behaviors are public as potential attributes that make a behavior likely to be susceptible to normative influences. For first time mothers, breastfeeding may be mysterious or ambiguous, leading them to rely on norms to guide their intentions (Kloeblen-Tarver et al., 2002). Breastfeeding in public is often necessary (Hauck et al., 2021), which also may make it more susceptible to normative influences (Rimal et al., 2011). Perceptions of descriptive norms (DN) and injunctive norms (IN) related particularly to breastfeeding in public likely differ based on context including where a woman lives, her culture, and other factors. According to Lapinski and Rimal (2005), norms...
propagate through forms of communication. In breastfeeding, there is limited research on norm propagation, but social support from and conversations about mothering and breastfeeding are common with family, friends and other mothers. Further, there are ample instances of mothers being shamed and stigmatized for breastfeeding in public, which serves to communicate IN (e.g., Thomson et al., 2015).

A body of empirical and qualitative evidence bear out that norms are highly relevant in the breastfeeding context, but limited work teases out the various types of norms. Women in African American communities learn infant feeding practices in social and cultural normative contexts (Lewallen & Street, 2010; Street & Lewallen, 2013). Social influences, like culture and norms, fit within a framework to advance public health research and interventions aimed at reducing human milk feeding disparities in African American communities (DeVane-Johnson et al., 2017). Subjective norms (SN), as defined in the Theory of Planned Behavior, are the most studied and consistently predict breastfeeding intentions (Carlin et al., 2019; Guo et al., 2016), but little work has been done on DN or IN.

**Theory of Normative Social Behavior (TNSB)**

Norms are unwritten rules that guide the actions of groups. Social interactions and communication within a community form and perpetuate social norms (Hogg & Reid, 2006). Health communicators have used norms-based social marketing to promote desirable public health behaviors, beginning formally with Berkowitz and Perkins’ Social Norms Approach in the 1980s. After several decades of scholarship, research continues to illuminate mechanisms for how norms influence behaviors (A. Chung & Rimal, 2016).

Social norms approaches have been successful in health promotion and commercial marketing; however, a better understanding of the norms-to-intentions mechanisms, and influential moderators of that relationship, can promote campaign success and reduce the likelihood of backfiring (Burchell et al., 2013). Moving beyond simple audience segmentation (i.e., targeting by demographics), message targeting on audience psychographics is an effective strategy to increase campaign success because it triggers enhanced processing (Slater, 1996). Mabry and Mackert (2014) suggested the Theory of Normative Social Behavior (TNSB) could serve as a framework for the design of social marketing campaigns. To determine if the TNSB would be appropriate to guide the design of a new social marketing campaign aimed at addressing breastfeeding disparities in African American communities, we test the main TNSB prediction that IN moderate the DN to behavior pathway in the context of breastfeeding intentions among African American women in the mid-Atlantic region of the United States.

To increase the cultural relevance for African American women and address inconsistent findings in TNSB research on the behavioral moderator group identity, we extend the TNSB by defining social identity with psychographic cultural profiles based on ethnic pride, collectivism, and religiosity, and assessing if social identity and SN moderate the DN to intentions pathway. Next, we review literature that informed our research.

Building on the work of Kallgren et al. (2000) and Ajzen and Fishbein (1980), the TNSB aims to explain under what circumstances social norms influence behavior, specifically investigating moderators of the DN to behavior relationship (Lapinski & Rimal, 2005; Rimal & Real, 2005). A. Chung and Rimal (2016) completed a review of social norms research and proposed a revised framework of normative influences, which suggests DN, IN, and SN predict intentions and that there are various attributes of the behavior (e.g., privacy), the individual (e.g., group identity), and the context (e.g., IN) that may moderate that relationship.

DN are individuals’ perceptions of behavioral prevalence (what is commonly done) and directly influence intentions or behavior across a diverse range of behavioral contexts, predominantly alcohol consumption, tobacco use, and nutrition (Shulman et al., 2017). As originally conceptualized in the TNSB, IN are perceptions of social approval – i.e., the acceptability or disapproval of a behavior by a referent group important to the individual (Rimal & Real, 2005). SN, as defined by the Theory of Reasoned Action, are the perceived expectations of important others regarding a behavior (Ajzen & Fishbein, 1970). IN and SN are related but distinct (Park & Smith, 2007). SN, which are more interpersonal than IN, can manifest as social pressure, and are only effective if people are motivated to conform. Researchers often conflate IN and SN, which has led to confusion parsing out their independent effects and comparing across studies (e.g., Niemiec et al., 2020).

SN are a consistent predictor of behavioral intentions (Manning, 2009). IN often have a direct but small effect on intentions, but their role as a moderator on the DN to intentions pathway has been inconsistent in direction or non-significant (Lapinski et al., 2014; Mabry & Turner, 2016). Few studies have assessed an interaction between SN and DN in predicting intentions. In the revised framework proposed by A. Chung and Rimal (2016) SN are included as a direct normative influence, but could also be thought of as a contextual moderating attribute. Indeed, Rimal’s (2008) field experiment on college student’s intentions around alcohol consumption found both IN and SN had a small interaction with DN such that when students perceived drinking to be common and IN or SN to be stronger, they had higher drinking intentions.

The role of norms may vary by cultural context. Thus the first research question (RQ1) asks whether African American mothers’ perceived DN and IN and DN and SN interact in their influences on breastfeeding intentions, and if so, what is the nature of the interactions. Our hypotheses are as follows:

**H1a:** IN will moderate the relationship between DN and breastfeeding intentions, such that when social approval is strong, the relationship between DN and intentions will be stronger; and when social approval is weak the relationship will be weaker.

**H1b:** SN will moderate the relationship between DN and breastfeeding intentions, such that when SN are weak there will be a positive and linear relationship between DN and breastfeeding intentions; when SN are strong, the relationship between DN and intentions will be weaker.

Hypothesis 1a is based on the TNSB. Hypothesis 1b is born out of formative focus group discussions (Villalobos et al., 2021).
and is consistent with what M. Chung and Lapinski (2018) found for IN in a cross-sectional survey on handwashing behavior in a sample of Korean individuals. Their data indicated that the association between DN and behavior was stronger when IN was weak – opposite of what the TNSB predicts. In other words, in the absence of perceived social pressures to conform, the salient cue to guide behavior would be DN.

**Group and social identities in norms research**

The influence of social norms on individual attitudes and behaviors stems from an innate human desire to belong (Baumeister & Leary, 1995). In the TNSB, group identity encompasses perceived similarity with and aspiration to be like a referent group, or desire to emulate the group (Rimal & Real, 2005). Rimal (2008) theorizes that stronger group identity increases the likelihood an individual will intend to engage in a behavior that they perceive the majority of the group engages in. Cross-sectional and experimental evidence supports that with stronger group identity, the DN to behavior association strengthens (Lapinski et al., 2014; Neighbors et al., 2010; Rimal & Real, 2005). However, the moderating effect has been weak or inconsistent (Mabry & Turner, 2016; Rimal, 2008; Rimal et al., 2005). Empirical support for group identity as a moderator between norms and intentions may be mixed in part because a lack of attention to intragroup heterogeneity and cultural variance in group members’ social identities.

Whereas group identity relates to an individual’s thoughts about in-group members, an individual’s social identity relates to how a person’s membership in different groups informs their sense of self. Social Identity Theory suggests individual identification with a group leads to individual motivation to conform with group behavior in order to enhance self-perception (Hogg & Abrams, 1988). Normative behavior is most likely to be adopted when a social identity is relevant and activated and an in-group “prototype” who embodies the group-defining norms is communicating the normative information (Hogg & Reid, 2006). No previous research has evaluated social identity in the TNSB framework for an interaction with DN.

Although social norms are believed to exist in social contexts around the globe, some groups may be more sensitive to the influence of communication about norms than others. In fact, empirical evidence demonstrates that the relationship between perceived norms and intentions/behaviors differs by cultural context (Lee & Green, 1991; Park & Levine, 1999). Individuals who identify with the same ethnic group can hold varying beliefs, attitudes, and values that form part of their social identity, which may affect their susceptibility to norms. Yet, little is known about African American women’s identities. It is unclear if this is a unidimensional construct (i.e., “I identify as a Black woman”) or more likely if this construct is a nuanced, multi-dimensional construct. To test the TNSB with this population, it is critical that social identity be explored.

**African American identity**

In an effort to illuminate how cultural variables might be leveraged to improve breastfeeding through communication in a population experiencing disparities, and to attempt to address issues with the group identity variable described above, we explored how the norms-to-intentions model differs by African American social identity.

There has been conceptual and methodological inconsistency in conceptualization and operationalization of African American identity in research (Cokley, 2005), a complete discussion of which is beyond the scope of this article. Some shared elements across different conceptualizations of African American identity, which could lend themselves to strength-based psychographic targeting in social marketing, include racial/ethnic/cultural pride, spirituality or religiosity, and collectivism (Villalobos et al., 2021). Ethnic pride encompasses positive attitudes toward and feelings of belonging to and connection with a racial or ethnic group (Phinney & Ong, 2007). Religiosity describes broadly a person’s spiritual beliefs and religious actions from attendance and prayer to beliefs about causes of illnesses and treatment approaches (Landrine & Klonoff, 1995). Collectivism refers to a cultural orientation away from the individual self, including belief in interdependence among an “in-group” such as family, tribe/clan, religion, racial/ethnic group, or defined social group (Oyserman et al., 2002). Kreuter and colleagues argued that these dimensions of African American identity are useful for targeting interventions and tailoring communication more effectively for health promotion for several reasons: a) evidence shows they are associated with health attitudes or behaviors, b) they can be measured reliably, c) there is enough variability within the group on the variables to warrant different messages, and d) evidence shows more effective cancer prevention messages were successfully developed based on individual identity with these constructs (Kreuter, Lukwago et al., 2003; Kreuter, Steger-May et al., 2003). This led to our second research question in which social identity is defined by cultural profiles identified through latent profile analysis (LPA) of responses to questions about ethnic pride, collectivism, and religiosity:

**RQ2:** Does African American social identity moderate the relationship between DN and breastfeeding intentions and if so, what is the nature of the moderation?

**Study objectives**

In several studies, the TNSB has explained greater than 50% of the variance in the behavioral or intention outcome (e.g., Mabry & Turner, 2016; Rimal & Real, 2005); however, mixed findings on the roles of IN and group identity point to a need for continued research to understand the structure of the relationships between norms and health behaviors (Shulman et al., 2017). This study aimed to fill gaps in norms research by testing the moderating roles of IN and SN in a new behavioral context and with an understudied cultural group. Another purpose of this study was to assess the utility of ethnic pride, religiosity, and collectivism in segmenting a sample of African American mothers and test their social identity profile as a moderator within the TNSB to determine the potential for psychographically targeting breastfeeding promotion.
Materials and methods

Study sample and procedure

This study was approved by the George Washington University Institutional Review Board (IRB) on June 13, 2019 (NCR #191050). A sample of 528 mothers who identified as non-Hispanic Black or African American, were age 18–49, born in the U.S., and lived in the greater Washington, D.C. metropolitan area were recruited between August and October 2019 through Qualtrics, an online panel aggregator service.

Prior to survey dissemination, five cognitive interviews were conducted with women who met the survey eligibility criteria in order to ensure respondents interpreted questions and response options in the way intended. Following the methods of Peterson et al. (2017) the respondents were first instructed to think-aloud as they responded to each question and subsequently were prompted about specific anticipated areas of confusion.

The survey included 104 questions, not all of which are included in this analysis. Demographic characteristics of the sample are summarized in Table 1.

Measures

Demographic variables measured included zip code, age at first childbirth, annual household income, sexual orientation, and number of total children. Relationship status, education, and religion were measured using inclusive wording (Hughes et al., 2016).

Dependent variable – breastfeeding intentions

The outcome variable was the 5-item Infant Feeding Intentions scale (Nommsen-Rivers & Dewey, 2009). This scale conceptually covers a woman’s intentions related to initiation of breastfeeding, duration, and exclusivity. Scale scores range from zero, indicating no intention to breastfeed to 16, which indicated strong intention to exclusively breastfeed through 6 months. Nommsen-Rivers and Dewey (2009, 2010) developed and validated this scale, finding it had good content and construct validity in two diverse samples.

Latent independent variables

All items were measured on a 21-point visual analog scale of agreement anchored by strongly disagree (−10) and strongly agree (+10).

Descriptive norms. Measured with four items adapted from prior TNSB research, most recently M. Chung and Lapinski (2018). Two items asked about agreement with statements about the prevalence of breastfeeding among people close to the respondent and “moms like me” more generally, retrospectively at the time their youngest child was born. Two additional items, reverse coded, asked about the prevalence of formula feeding among the same referent groups.

Injunctive and subjective norms. IN were measured by 4 items assessing level of agreement about whether society in general, the respondent’s community, and “moms like me” approved of or considered breastfeeding appropriate. The fourth item stated, “It was appropriate for Black moms to breastfeed.” These questions were based on early TNSB work by Rimal and Real (2005) and Rimal (2008). SN were measured with 4 pairs of items. Based on original measures proposed by Ajzen and Fishbein (1980), these questions were adapted from Rimal (2008). Each pair assessed the level of agreement about whether a referent person or group thought the respondent should breastfeed and how important it was for the respondent to comply (e.g., “My family members thought I should breastfeed.” and “It is important for me to do what my family members think I should do.”). The ratings for each pair were multiplied (Ajzen, 1991). Referent groups were chosen based on the literature and refined during formative research: romantic partner, close friends, family members, and healthcare providers. Confirmatory and exploratory factor analyses in this study sample confirmed that IN (social approval) and SN were best treated as separate variables (results not shown).

Social identity. Previously validated scales for ethnic pride (7 items), religiosity (9 items), and collectivism (5 items) were minimally adapted to the breastfeeding context from Lukwago et al. (2001) and Thompson et al. (2015). Latent profile analysis was used to identify cultural profiles, which was then used as the measure of social identity.

Data analysis

The research team conducted analyses in Stata 16.0 unless otherwise specified, first reviewing data to ensure assumptions...
of normality, linearity, and homogeneity of variances were met. Descriptive statistics characterize the sample and bivariate ANOVAs and linear regression analyses assessed relationships between sociodemographic variables and the outcome of interest.

**Structural equation modeling to test H1a and H1b (RQ1)**

Confirmatory factor analysis (CFA) was conducted in Mplus 8.3 prior to structural equation modeling to ensure appropriate measurement model fit. Maximum likelihood estimation with robust standard errors was used because the IN and SN variables were slightly left skewed. Mplus enables testing interactions involving latent variables based on procedures outlined by Klein and Moosbrugger (2000). Variables were mean-centered and then plotted at ±1 and ±2 standard deviations to assess the nature of interactions (Aiken & West, 1991). To assess model fit, absolute, parsimonious, and incremental indices were reviewed with the following cut-points for acceptable fit: SRMR ≤ 0.08, RMSEA ≤ 0.08, TLI ≥ 0.90 (Brown, 2015; Little, 2013) and lower BIC value (Raftery, 1995). Standardized results are reported.

**Latent profile analysis to answer RQ2**

For the second research question, LPA was conducted by iteratively comparing models with one to five profiles to identify profiles based on shared patterns of responses to ethnic pride, religiosity, and collectivism scales (Ferguson et al., 2020). The optimal number of profiles was determined based upon relatively lower AIC, BIC, SABIC, CAIC, AWE, and non-significant loglikelihood ratio test, plus relative improvement in subsequent model fit compared to the improvement in the loglikelihood between the one profile and two profile models, as well considering interpretability (Masyn, 2013; Moore & Little, in press). Profiles should be quantitatively and qualitatively separate (i.e., heterogeneous or distinct) from one another and internally homogeneous compared to the sample overall. Profile separation was assessed for both quantitatively significant differences with 95% CI about the profile indicator means and meaningful differences with Cohen’s d for mean separation of the profile indicators (d > 2); separation by profile assignment was assessed with odds of correct classification (OCC > 5) and if the modal class assignment Proportion (mcaP) fell within the 90% CI for the model estimated class proportion values for each profile (Masyn, 2013; Moore & Little, in press). The profile homogeneity was assessed by comparing the variance of profile indicators within each profile to the sample variance for the indicator with values less than 0.60 supporting within profile homogeneity (Masyn, 2013; Moore & Little, in press). The LPA solution with best fit, interpretability, plus class separation and homogeneity was carried forward for validity analyses.

Next, for profile validity, covariates which may predict profile membership were added to the model one at a time for assessment with the nested chi-square model test (p < .01). The covariates tested were the mother’s age, sexual orientation, income, education, relationship status, religion, and breastfeeding history. Covariates that significantly predicted latent profile membership were kept in the model for the final, hypothesis testing step to control for these differences in profile membership. To clearly illustrate differences in profile membership by covariates, profile membership probabilities were calculated from the multinominal logistic regression coefficients and graphed.

Finally, to address the study’s second research question, DN and breastfeeding intentions were added to the model, and the moderating effect of latent profile membership on the regression between DN and breastfeeding was assessed with the nested model chi-square difference tests. Significant predictors of latent profile membership were kept in the model; plus, education and breastfeeding history were included in this model as covariates of DN and breastfeeding intentions. All the above validity variables were added to the LPA model using the ML three-step or VAM approach (Vermunt, 2010), which used the profile conditional item probabilities to model individuals’ profile membership while maintaining the uncertainty of that assignment relative to the other profiles an individual could be assigned to based upon their responses to the profile indicators (Nylund-Gibson & Choi, 2018). This modeling approach results in a unique regression coefficient being estimated for each of the four profiles. A nested chi-square model test is then done comparing the change in model fit when these four regression coefficients are allowed to be freely estimated and when they are constrained to equality across the profiles. A significant test result means that the model fits significantly worse when the regression coefficients are constrained across profiles, rather than freely estimated; thus, supporting moderation by profile membership.

**Results**

**Cognitive interview findings**

Interviewees stated that it was easy to recall perceptions of norms and their intentions retrospectively, but suggested addition of repetitive language to remind respondents to think back. The interviews led to additional refinement in the survey including changing the order of groups of questions, adding clarifying and qualifying language about the use of terms Black and African American, and rewording some response options.

**Descriptive statistics and bivariate analyses**

Table 2 presents the descriptive statistics and zero-order Pearson’s correlations for scales included in this study. Internal consistencies were deemed acceptable for further analyses.

Table 3 presents the results of bivariate analyses between demographic and independent variables with breastfeeding intentions. Education was a significant predictor of breastfeeding intention; Tukey post-hoc pairwise comparisons indicated that mothers with trade school, some college, or higher were significantly more likely to intend to breastfeed when compared to those with a high school diploma or lower. Income level approached statistical significance, with those making more than 55,000 USD annually being more likely to intend to breastfeed than those making less than that. The older the mother at first childbirth, the higher her intention to
breastfeed. Mothers with a history of breastfeeding were more likely to intend to breastfeed than those without (p < .0001).

Measurement model

The measurement model achieved good fit with the addition of correlated error variances between the partner, family, and close friends indicators of SN, and correlated error variances between the two SN indicators that both mentioned formula use (\(\chi^2(79) = 284.784, p < .001; \text{SRMR} = 0.073; \text{RMSEA} = 0.070 \ [90\% \ CI \ 0.062, 0.079]; \text{CFI} = .913; \text{TLI} = 0.884, \text{BIC} = 45.325.936\)).

Interactions of descriptive norms with injunctive and subjective norms

The initial structural model tested included direct paths from DN, IN, and SN each to the measured outcome variable, breastfeeding intentions score (Figure 1). Because education and breastfeeding history were significantly related to the outcome variable and the main predictor DN, structural models presented control for both. Model fit was identical to the final measurement model and the model as a whole accounted for 26.4% of the variance in intentions. In comparing the standardized path coefficients to each other, the only significant direct effect on intentions was that of SN at 0.439 (p < .001). The effect of DN was 0.07 (p = .331) and of IN was −0.11 (p = .075).

To test the hypotheses that IN and SN moderate the relationship between DN and breastfeeding intentions, the interactions between DN and IN and DN and SN were simultaneously tested within the base model shown in Figure 1. The addition of the interaction terms increased explanatory power of the model to 27.6%. The IN interaction was not statistically significant at 95% confidence (\(\hat{\beta} = 0.08, p = .232\), failing to provide support for hypothesis 1a. The SN interaction however was statistically significant (\(\hat{\beta} = −0.14, p = .036\)).\(^4\) Assessing the slopes in the interaction plot suggests that when SN are at the weakest, the positive, linear relationship between DN and breastfeeding intentions is stronger, supporting hypothesis 1b. When SN are strongest, the relationship between DN and breastfeeding intentions is weaker. Comparison of the intercepts suggests SN have a greater influence on breastfeeding intentions when DN are weakest.

Latent profile analysis to define African American social identity

Table 4 presents the fit statistics for the iterative LPA models. Based upon relative decrease in AIC, BIC, SABIC, CAIC, and the calculated RI, the three-profile and four-profile models had the most improvement relative to the model improvement from

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### Table 2. Descriptive statistics and Pearson’s correlations for model variables.

<table>
<thead>
<tr>
<th>α</th>
<th>Mean (Range)</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 BF Intentions</td>
<td>.86</td>
<td>9.95</td>
<td>4.58</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Descriptive Norms</td>
<td>.69</td>
<td>39.13</td>
<td>17.43</td>
<td>.28*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Injunctive Norms</td>
<td>.80</td>
<td>62.54</td>
<td>15.99</td>
<td>.14*</td>
<td>.245*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Subjective Norms</td>
<td>.84</td>
<td>66.06</td>
<td>40.43</td>
<td>.30*</td>
<td>.26*</td>
<td>.38*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Ethnic Pride</td>
<td>.86</td>
<td>48.04</td>
<td>(−59–70)</td>
<td>21.90</td>
<td>.10*</td>
<td>−.01</td>
<td>.27*</td>
<td>.22*</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Collectivism</td>
<td>.75</td>
<td>34.53</td>
<td>(−90–90)</td>
<td>42.39</td>
<td>.06</td>
<td>.12*</td>
<td>.25*</td>
<td>.39*</td>
<td>.35*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7 Religiosity</td>
<td>.91</td>
<td>13.19</td>
<td>(−50–50)</td>
<td>20.52</td>
<td>−.02</td>
<td>.05</td>
<td>.19*</td>
<td>.28*</td>
<td>.25*</td>
<td>.35*</td>
<td>1</td>
</tr>
<tr>
<td>8 Education</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>.19*</td>
<td>.23*</td>
<td>.05</td>
<td>.03</td>
<td>.10*</td>
<td>.01</td>
<td>.03</td>
<td>1</td>
</tr>
<tr>
<td>9 Breastfeeding History</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>.39*</td>
<td>.25*</td>
<td>.14*</td>
<td>.13*</td>
<td>.14*</td>
<td>−.03</td>
<td>−.02</td>
<td>.20*</td>
</tr>
</tbody>
</table>

### Table 3. Independent variables’ association with breastfeeding intentions score.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Association with Breastfeeding Intentions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geography of residence</td>
<td>F(3,524) = 0.69, 4.59, p = .56</td>
</tr>
<tr>
<td>Income</td>
<td>F(4,523) = 2.03, 4.57, p = .09</td>
</tr>
<tr>
<td>Education</td>
<td>F(2,525) = 10.09, 4.51, p &lt; .0001</td>
</tr>
<tr>
<td>Relationship status</td>
<td>F(4,523) = 1.16, 4.58, p = .33</td>
</tr>
<tr>
<td>Sexual orientation</td>
<td>F(2,525) = 0.53, 4.59, p = .59</td>
</tr>
<tr>
<td>Mom’s age at first childbirth</td>
<td>(\beta = .10, p = .025, R^2 = .01)</td>
</tr>
<tr>
<td>Breastfeeding history</td>
<td>F(1,301) = 54.68, 4.23, p &lt; .0001</td>
</tr>
<tr>
<td>Descriptive norms</td>
<td>(\beta = 0.28, p &lt; .001, R^2 = .08)</td>
</tr>
<tr>
<td>Injunctive norms</td>
<td>(\beta = -0.14, p = .001, R^2 = 0.02)</td>
</tr>
<tr>
<td>Subjective norms</td>
<td>(\beta = -0.30, p &lt; .001, R^2 = 0.09)</td>
</tr>
<tr>
<td>Ethnic pride</td>
<td>(\beta = .10, p = .02, R^2 = 0.01)</td>
</tr>
<tr>
<td>Religiosity</td>
<td>(\beta = -0.02, p = \text{NS}, R^2 = 0.0004)</td>
</tr>
<tr>
<td>Collectivism</td>
<td>(\beta = .06, p = .18, R^2 = 0.004)</td>
</tr>
</tbody>
</table>

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**Figure 1.** Structural model of descriptive, injunctive, and subjective norms to intentions. Descriptive Norms = DN, p = .331; Injunctive Norms = IN, p = .075; Subjective Norms = SN, p < .001; Education p < .001, Breastfeeding History p < .001.
the one-profile (full sample) to two-profile model. Although the above fit indices continued to decrease with five-profile model, the decrease was much smaller. Furthermore, the AWE lowest value was with the four-profile model. The LRT was significant comparing the three- and four-profile models, suggesting the four-profile model fit significantly better; further, the LRT was nonsignificant comparing the four-profile and five-profile model, thus suggesting the greater complexity of the five-profile model did not produce significantly better model fit, and supporting the more parsimonious four-profile model. Across fit and classification statistics and based on judged interpretability, the 4-profile model fit the data best.

The entropy (Ferguson et al., 2020) was 0.858 for the four-profile model, and all classification quality diagnostics supported the quality of this solution (Table 5). All four profiles were distinct from each other for at least one indicator based on the Cohen’s 𝑑 (Table 6). Figure 2 presents the indicator means for each of the four social identity profiles. Profile 1, representing 18.6% (𝑛 = 98) of the sample, was named Spiritual Mothers because, on average, the members of this profile were somewhat proud (𝑀 = 26.06) and religious (𝑀 = 33.61) and slightly collectivistic (𝑀 = 4.22). Profile 2 represented 5.3% (𝑛 = 28) of the sample, and was named Self-Reliant Mothers because, on average, members of this profile had moderately low ethnic pride (𝑀 = −9.78) and religiosity (𝑀 = −19.27) scores and scored negative on the collectivism scale (𝑀 = −9.89). Profile 3 consisted of 8.9% (𝑛 = 47) of the sample, and was named Ethnically Proud and Agnostic Mothers because, on average, members of this profile had high ethnic pride (𝑀 = 53.36) and leaned slightly toward collectivism (𝑀 = 5.42) but had low religiosity (𝑀 = −50.49). Profile 4, the largest profile (67.2%; 𝑛 = 355), was named Devout Collectivists and Ethnically Proud Mothers because, on average, profile members were proud (𝑀 = 58.29), religious (𝑀 = 50.95), collectivists (𝑀 = 18.66).

### Table 5. Classification quality.

<table>
<thead>
<tr>
<th>Class</th>
<th>Model Estimated Class Prop.</th>
<th>90% C.I.</th>
<th>mcaP</th>
<th>AvePP</th>
<th>OCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>19%</td>
<td>.137, .252</td>
<td>0.185</td>
<td>0.806</td>
<td>17.26</td>
</tr>
<tr>
<td>Class 2</td>
<td>5%</td>
<td>.027, .077</td>
<td>0.053</td>
<td>0.925</td>
<td>224.85</td>
</tr>
<tr>
<td>Class 3</td>
<td>9%</td>
<td>.060, .126</td>
<td>0.089</td>
<td>0.860</td>
<td>59.91</td>
</tr>
<tr>
<td>Class 4</td>
<td>66%</td>
<td>.597, .725</td>
<td>0.672</td>
<td>0.959</td>
<td>12.00</td>
</tr>
</tbody>
</table>

mcaP (modal class assignment Proportion); AvePP (Average Posterior Probabilities); OCC (Odds of Correct Classification) which is odds of model estimated class assignment relative to random assignment by class proportion; OCC > 5 supporting adequate class separation and precision

### Table 6. Profile separation characteristics (adapted Cohen’s 𝑑).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Class 1 vs Class 2</th>
<th>Class 1 vs Class 3</th>
<th>Class 1 vs Class 4</th>
<th>Class 2 vs Class 3</th>
<th>Class 2 vs Class 4</th>
<th>Class 3 vs Class 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pride</td>
<td>3.04</td>
<td>−2.31</td>
<td>−2.73</td>
<td>−5.35</td>
<td>−8.50</td>
<td>−0.42</td>
</tr>
<tr>
<td>Collectivism</td>
<td>0.76</td>
<td>−0.05</td>
<td>−0.76</td>
<td>−0.82</td>
<td>−4.35</td>
<td>−0.71</td>
</tr>
<tr>
<td>Relig</td>
<td>1.88</td>
<td>2.98</td>
<td>−0.62</td>
<td>1.11</td>
<td>−6.85</td>
<td>−3.60</td>
</tr>
</tbody>
</table>

Cohen’s 𝑑 values of 2 or greater bolded to highlight class separation.

### LPA validity model results

Social identity profile membership was not significantly predicted by their income (𝑝 = .26), zip code, mom’s age at first birth...
(p = .20), sexual orientation (p = .80), relationship status (p = .96),
or experience of breastfeeding (p = .13); profile membership did
significantly differ by their self-reported religious view (p < .001)
and education (p = .05). Specifically, compared to devout collecti-
vist and ethnically proud mothers, membership differed signi-
ficantly for self-reliant mothers (p = .01) and ethnically proud and
agnostic mothers (p < .001) by religious views; additionally, spiri-
tual mothers differed significantly (p = .02) compared to ethnically
proud and agnostic mothers while controlling for education.
Furthermore, while controlling for religious views, self-reliant
mothers differed significantly (p = .02) compared to devout collec-
tivist and ethnically proud mothers by education.5

Social identity profiles’ moderation of DN predicting
breastfeeding intentions

The second research question was tested by building upon the
above structural model by adding DN and breastfeeding inten-
tions, both of which were regressed on education and breast-
feeding history as control variables. The omnibus test of
moderation of the relationship between DN and breastfeeding
intentions by individuals’ social identity profile membership
was found to be significant (p < .001). Specifically, the regres-
sion relationship was significant for ethnically proud and
agnostic mothers (β = 0.57, SE = 0.08, p < .001) and devout collec-
tivist and ethnically proud mothers (β = 0.211, SE = 0.10,
p = .029), not for spiritual mothers (β = -0.11, SE = 0.23,
p = .63) or self-reliant mothers (β = 0.28, SE = 0.38, p = .46).6
The breastfeeding intentions variance accounted for by the
model was 47% for ethnically proud and agnostic mothers,
and 20% for devout collectivist and ethnically proud mothers.

Discussion

This study tested components of the TNSB in a sample of
African American mothers to contribute to furthering
understanding of how the theory functions in culturally diverse
populations and to gather empirical evidence to support the
development of health communication campaigns for breast-
feeding. We expected strong IN and weak SN to enhance the
relationship between DN and breastfeeding intentions. We also
thought African American social identity might serve as a
moderator of that relationship. Taken together, the data
provide more support for the revised framework of normative
influences (A. Chung & Rimal, 2016) than the TNSB as origin-
ally specified: the DN to behavioral intentions relationship was
moderated by SN and social identity.

Normative influences in African American breastfeeding

SN, or the opinions of close others and motivation to comply with
their desires, were the most influential normative predictor of
breastfeeding intentions among the African American mothers in
this study. These findings are consistent with the body of work based on the Theory
of Planned Behavior in the context of breastfeeding promo-
tion (Manning, 2009). DN interacted with SN. The direc-
tion of the interaction was opposite of the predictions of the
TNSB for IN and what has been found in most research
primarily conducted with samples of college students
(Shulman et al., 2017). But, in this context it makes sense
that if SN are weak, meaning a mother has limited pres-
ures or expectations placed on her by important others to
breastfeed, that her perception of how common breastfeed-
ing is among important referent groups would more
strongly predict her intentions. Further, if a mother per-
ceives stronger expectations to breastfeed from important
others, her perceptions of DN would matter less when
forming intentions. In other words, if she has clear infor-
mation from close referents about what should be done, she
does not need to look to prevalence as a cue to guide
behavior. These findings are an important extension of

![Image](image-url)
the TNSB because prior research focused on IN broadly whereas we studied SN. Focus Theory purports that sometimes DN and IN are incongruent, but what matters is which norm is salient in the context (Cialdini et al., 1991); therefore, we suggest that SN be included in future TNSB research to assess circumstances when different types of social norms are most salient and to further explore their interactions.

The main effect of IN was weak and negative, but no longer statistically significant with SN in the model and education and breastfeeding history controlled for. Thus, SN and their interaction with DN hold the greatest influence in this context. Overall in the sample, social approval was left skewed with most respondents rating favorably that breastfeeding was acceptable to multiple referent groups, a positive sign for breastfeeding advocates and public health practitioners.

These findings suggest that public health interventions should continue to foster positive breastfeeding norms by increasing knowledge, positive attitudes, and support for breastfeeding among romantic partners, close family and friends, and healthcare providers such as obstetricians, pediatricians, and postpartum care providers like nurses. These individuals are the most likely to be sources of positive SN and encouragement that can promote breastfeeding. Public health practitioners should also consider using communication interventions to increase African American women’s perceived DN around the commonness of breastfeeding, especially for longer durations. Surveillance data show that a majority of African American mothers in Washington, D.C. are initiating breastfeeding so it is objectively the norm, despite varied perceived DN. The moderating effect of SN on the pathway from DN to breastfeeding intentions demonstrates that interventions incorporating SN are particularly warranted in communities with low perceived or actual breastfeeding rates.

**African American social identity**

The sample distribution of ethnic pride scores was similar to the left-skewed distribution reported by Kreuter and Haughton (2006), but the scores for religiosity and collectivism were more normally distributed in this sample compared to their sample of urban African American women. This study used latent profiles as the measure for social identity and found profile membership moderated the DN to intentions pathway when controlling for education and breastfeeding history; DN only significantly predicted intentions for two of the four groups. Norms were positively influential in the groups with highest ethnic pride. Collectivism was positive in both groups but varied in magnitude and was also positive in a group that was not significantly influenced by DN, suggesting that pride was the main driver of the effect. Religiosity did not seem to have a consistent influence as part of the profiles because it was strongly positive for devout collectivist and ethnically proud mothers and strongly negative for ethnically proud and agnostic mothers.

The role of ethnic pride as a normative influence is in line with a 2016 review that summarized research demonstrating a direct benefit of strong ethnic pride for African American health (Belgrave & Abrams, 2016). Stronger social group identification enhances susceptibility to influence among members and group affiliation is asserted through engagement in socially accepted behaviors (Christensen et al., 2004; Mackie & Quellar, 2000). Given the referent groups for DN were people close to the respondent and moms the respondent considered similar to herself, and these likely included other African American women, the influence of perceived prevalence of breastfeeding on intentions is logically enhanced by being proud to be Black.

The mixed results for religiosity are also consistent with prior research. Religiosity has been shown to mostly positively influence health beliefs and behaviors in African American populations (Koenig, 2001). In our sample, ethnically proud and agnostic mothers had negative religiosity scores and members were mostly “spiritual, not religious” or identified as atheist whereas devout collectivist and ethnically proud mothers had highly positive religiosity scores and identified mostly as Christian or Muslim. Burdette and Pilkauskas (2012) found that mothers who attended church once a week or more had about 1.6 times the odds of ever breastfeeding relative to those who never attended, but church attendance was less strongly associated with breastfeeding duration. Qualitative interviews with 17 African American women who successfully breastfed revealed spirituality was a key factor in choosing to breastfeed because it was what God intended and the healthiest choice for their child, whereas religiously conservative mothers may have lower rates due to beliefs about modesty and sexual nature of breasts (Spencer et al., 2015). More qualitative research could further understanding of this complex relationship and make spirituality a more informative cultural variable for psychographic targeting in the context of breastfeeding.

Though not significantly directly associated with breastfeeding intentions in this sample, collectivism has been associated with pro-health social norms and attitudes in similar populations in the past (Thompson et al., 2015). In-group norms drive social behavior more so in collectivist cultures than individualistic (Davidson et al., 1976). Though social identity moderation was not driven by collectivist identity, the profile results still provide useful information about the groups that could inform communication messaging or channels.

**Strengths and limitations**

This study has several important strengths and limitations. This is among few studies that have examined the TNSB using structural equation modeling, accounting for measurement error and including multiple latent constructs in a single model. Further, this is the first test of the TNSB in this behavior and limited to an African American cultural context. This study is innovative because it is the first to use LPA to define and test social identity within the TNSB framework.

A primary limitation of this study is its reliance on cross-sectional data, which prohibits consideration of temporality and conclusions about causation. Respondents included women with children who were asked to respond to the survey reporting retrospective breastfeeding intentions and perceived norms; thus, recall or social desirability bias may be an issue. Cognitive interviews prior to survey distribution suggested this bias would be minimal. The ideal study population would have
been pregnant African American women to measure prospective breastfeeding intentions, but recruitment for a sample this large from the geographic area in the study period was not feasible. Although Qualtrics’ methods for study recruitment aimed to minimize self-selection sampling bias, ultimately survey respondents choose whether to participate in individual surveys, and participants who enroll in market research panels may not be fully representative of the general population. While Qualtrics’ aggregated panels are not probability-based or simple random samples, the use of sampling quotas by zip code helped improve the sample diversity and more closely approximate the broader community. While entropy distinguishing the profiles was very high, the size of the groups ranged from 28 to 355, which may limit comparisons and conclusions. Further, measuring culture is complex; it is possible that collectivist identity and normative perceptions cannot be fully disentangled. A final limitation is that like in many other practices of CFA, four error covariances were set as free parameters in our model to improve model fit; to some extent, this is a violation of the assumption of local independence.

Implications for public health communication

Breastfeeding disparities among African American mothers have been suggested to be an important influence on health disparities over the life course of people who identify as Black or African American (Spencer & Grassley, 2013). Researchers have documented racial breastfeeding disparities and designed interventions to address individual and interpersonal factors with some success, mostly in initiation rates (Johnson et al., 2015). Scholars have also documented cultural drivers of low breastfeeding rates in African American communities, but there are normal norms-based interventions aimed at creating a social environment favorable to breastfeeding (DeVane- Johnson et al., 2017). Mass and social media have the potential to serve as critical channels for social marketing around infant feeding (Asiodu et al., 2015; Byalaska-Davies, 2015; Robinson et al., 2019). Investigating how breastfeeding norms propagate is an important future direction for research as well.

In order to eliminate breastfeeding disparities, a coordinated national social marketing approach targeting all levels of the social ecological model is needed (Office of the Surgeon General, Centers for Disease Control and Prevention & Office on Women’s Health, 2011; Pérez-Escamilla, 2012). A handful of national efforts have been implemented including the “Loving Support® Makes Breastfeeding Work” campaign from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), the Office on Women’s Health’s “It’s Only Natural” campaign, and the annual Black Breastfeeding Week, yet opportunities remain to further increase breastfeeding behaviors. Based on the results of this research, these types of social marketing campaigns should incorporate a norms-based approach and employ psychographic profiling to target messaging more effectively. While this study was not designed to test specific messages, public health practitioners should consider promoting pro-breastfeeding SN and use messaging and imagery to increase perceptions that breastfeeding is common in African American communities.

Ethnic pride and collectivism appear to be useful variables for group-level psychographic targeting of norms-based communication messages, but more research is needed to design and test specific messages for different cultural profiles representing social identity. For devout collectivist and ethnically proud mothers, messages would integrate pride and collectivism, and possibly religiosity, pending further research. For ethnically proud and agnostic mothers, messages would be designed to activate the audience’s sense of ethnic pride and empowerment to further enhance the normative influence on intentions. Indeed, Camie Jae Goldhammer (2019), a licensed clinical social worker, lactation consultant, and Native American breastfeeding activist has argued that breastfeeding should be thought of as a traditional practice that used to be passed down within cultures, but was stolen from communities of color through colonization and capitalism. Activating ethnic pride then could foster empowerment for women to reclaim their cultural heritage and return to breastfeeding as the cultural norm. However, no social marketing campaign is likely to be effective in improving breastfeeding rates without being done in conjunction with policy, systems, and environmental changes that improve the structural and economic supports that will enable more African American women who want to breastfeed to succeed. Increasing access for African American mothers to birthing facilities implementing the 10 steps of the Baby-Friendly Hospital Initiative, culturally congruent community lactation support, paid leave, and workplace protections are good places to start.

Notes

1. Racialized identity often serves as a demographic indicator to identify groups with health disparities to study more in-depth. Race should not be considered a risk factor. The authors recognize race is socially constructed. Shared experiences of racism and systemic discrimination based on racialized identity contribute to health inequities. In this article, we use the term African American to refer to People of Color with African heritage across the diaspora born and raised in the U.S., and as an adjective to remind the reader that individuals are always more than their racial or ethnic identity.

2. Breastfeeding initiation is typically defined as nursing an infant even once. Exclusive breastfeeding is considered providing only breast milk and no other food or drink, and duration is the measure of time an infant receives breast milk.

3. LPA was conducted across the different possible variance-covariance structures. The best solution came from the most constrained structure, which did not uniquely estimate variances or covariances. Therefore, respecting page limits, only the results from this variance-covariance structure are presented.

4. Supplemental Figure 1 illustrates the nature of the significant interaction.

5. See Supplemental Figure 2a,b for profile membership probability by participants’ religion and education.

6. See Supplemental Figure 3 for a depiction of the significant positive and linear relationships between DN and breastfeeding intentions for ethnically proud and agnostic mothers as well as devout collectivist and ethnically proud mothers.

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Disclosure of potential conflict of interest

The authors have no conflicts of interest to declare.

Data availability statement

The survey data set is available from the corresponding author upon request to researchers interested in collaborations.

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