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Interactive Behaviors of Ethnic Minority Mothers and their Premature Infants

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Abstract

Objective—To compare the interactive behaviors of American Indian mothers and their premature infants with those of African American mothers and their premature infants.

Design—Descriptive, comparative study.

Setting—Three neonatal intensive care units and two pediatric clinics in the southeast.

Participants—Seventy-seven mother-infant dyads: 17 American Indian mother-infant dyads and 60 African American mother-infant dyads.

Methods—Videotapes of mother-infant interactions and the Home Observation for Measurement of the Environment (HOME) were used to assess the interactions of the mothers and their premature infants at six months corrected age.

Results—American Indian mothers looked more, gestured more, and were more often the primary caregivers to their infants than the African American mothers. American Indian infants expressed more positive affect and gestured more to their mothers, whereas African American infants engaged in more non-negative vocalization toward their mothers. African American mothers scored higher on the HOME subscales of provision of appropriate play materials and parental involvement with the infant. American Indian mothers scored higher on the opportunities for variety in daily living subscale.

Conclusion—Although many of the interactive behaviors of American Indian and African American mother-infant dyads were similar, some differences did occur. Clinicians need to be aware of the cultural differences in mother-infant interactions. To optimize child developmental outcomes, nurses need to support mothers in their continuation or adoption of positive interactive behaviors.

Keywords

mother-infant interactions; premature infants; American Indians; African Americans

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More than one-half million or 12% of all infants are born premature (< 37 weeks gestation) each year in the United States (Martin et al., 2012). Ethnic minorities experience disproportionately high rates of premature birth compared to Whites: 17.1% of births to African Americans and 13.5% to American Indians are premature versus 10.8% for non-Hispanic Whites (Hamilton, Martin, & Ventura, 2010; Martin et al., 2012). Furthermore, at 15.1%, the rate of premature births to American Indians living in North Carolina is higher than the overall rate of premature births to American Indians (National Center for Health Statistics, 2010).

Prematurely born children are at higher risk for poorer academic, behavioral, cognitive, language, and motor outcomes than fullterm children (Davis, Ford, Anderson, & Doyle, 2007; McCormick, Litt, Smith, & Zupancic, 2011; Sansavini et al., 2007). These developmental problems can present at school age or earlier and persist at least into late adolescence (Davis et al., 2007; Grunau, Whitfield, & Fay, 2004; Sansavini et al., 2007; van Baar, van Wassenae, Briet, Dekker, & Kok, 2005). The developmental outcomes of premature infants are further exacerbated by factors within the social environment, such as the quality of mother-infant interactions (Forcada-Guex, Pierrehumbert, Borghini, Moessinger, & Muller-Nix, 2006; McGroder, 2000; Smith, Landry, & Swank, 2006).

While factors affecting interactions between mothers and their premature infants have been studied, nearly all studies focused on mother-infant interactions among Whites and African Americans (Cho, Holditch-Davis, & Belyea, 2004; Holditch-Davis, Bartlett, & Belyea, 2000; McGrath, Sullivan, & Seifer, 1998). Despite the high rates of prematurity in American Indians, only a few studies have examined the interactive behaviors of American Indian mothers and their premature infants (Docherty, Lowry, & Miles, 2007; MacDonald-Clark & Boffman, 1995; MacDonald-Clark & Harney-Boffman, 1994; Nichols, 2004; Seideman et al., 1994). Given the importance of mother-infant interactions for child development (Forcada-Guex et al., 2006; McGroder, 2000; Smith, Landry, & Swank, 2006), examining American Indian mothers' parenting practices with their premature infants is needed. Therefore, the purpose of this study was to compare the interactive behaviors of American Indian mothers from the Lumbee Tribe (the largest tribe east of the Mississippi) and their premature infants with those of a group about which more is known – African American mothers and their premature infants.

Prematurity may affect mother-infant interactions, as premature infants have been found to be less alert, active, and responsive; delayed in behavioral organization; and more likely to show gaze aversion than fullterm infants in the early months of infancy (Feldman & Eidelman, 2006; Field, 1981; Holditch-Davis, Cox, Miles, & Belyea, 2003; Landry, Garner, Denson, Swank, & Baldwin, 1993). Furthermore, mothers of premature infants showed more intrusive behavior without regard to the infant's social engagement, possibly because of the mother's difficulty in interpreting the inconsistent social cues of premature infants (Feldman & Eidelman, 2006; Singer et al., 2003). Early studies reported mothers were more active in their interactions with premature infants than were mothers with fullterm infants (e.g., Barnard, Bee, & Hammond, 1984), but these studies were generally brief observations of mothers and infants interacting in artificial settings. Studies using lengthier home observations found that premature infants received less stimulation than fullterm infants (Holditch-Davis & Thoman, 1988). Mothers of premature infants spent less time talking to, holding, moving, and looking at infants than mothers of fullterm infants (Holditch-Davis & Thoman, 1988).

Mother-infant interactions have also been found to differ by maternal ethnicity (Cho et al., 2004; Cho, Holditch-Davis, & Belyea, 2007; Holditch-Davis, Schwartz, Black, & Scher,

2007; MacDonald-Clark & Boffman, 1995). For example, African American mothers of premature infants have been reported to show more of a combination of warmth, talking, physical contact, social behaviors, and negative control strategies than White mothers (Bradley, Corwyn, McAdoo, & Garcia Coll, 2001; Cho et al., 2004; Holditch-Davis et al., 2007; Tesh & Holditch-Davis, 1997). This particular parenting style was associated with better developmental and social outcomes for African American premature infants compared to African American infants whose mothers did not display this style of parenting (Bradley et al., 2001).

Differences in mother-infant interactions have also been found between American Indian and Whites, but these studies were of full term infants (MacDonald-Clark & Boffman, 1995; Seideman et al., 1994). One study indicated that while American Indian mothers were less verbal, they provided more social-emotional and cognitive growth-fostering activities for their infants than Whites (Seideman et al., 1994). In turn, American Indian full term infants were more responsive and clearer in the cues they provided to their mothers than White full term infants (Seideman et al., 1994). By contrast, in a study of low-income Canadian Indians, mother-infant interactions did not differ from the interactions of Whites, except that Canadian Indian mothers provided less cognitive growth-fostering (Letourneau, Hungler, & Fisher, 2005). Similarly, Alaskan Inuit mothers provided less cognitive growth-fostering than a group that included White, African American, and Hispanic mothers, but the Inuit mothers were more sensitive to their child's cues and responsive to child distress (MacDonald-Clark & Harney-Boffman, 1994). In a qualitative study, Nichols (2004) found that Cherokee mothers lived in two cultures (American Indian and mainstream society) and provided caregiving based on the differing perspectives of these cultures. Other family members were often involved in the care of Cherokee infants. Infants were allowed to explore with minimal adult supervision to promote learning (Nichols, 2004). In general, American Indians provide unobtrusive encouragement without consciously teaching to respect the autonomy of the child, which has been termed "noninterference" (Good Tracks, 1973; Nichols, 2004).

While the limited research indicates that mother-infant interactions differ between American Indians and Whites, many of the findings were based on a small number of American Indian and Canadian Indian mothers and their fullterm children. Extended observations in the home would provide information about interactive behaviors of American Indian mothers and their premature infants as they compare to other ethnic groups with similar socioeconomic backgrounds, such as African Americans. In addition to experiencing high prematurity rates, both African Americans and American Indians living in the southeastern United States experience poorer socioeconomic conditions than Whites on standard census-based indicators. American Indians and African Americans mothers in North Carolina have high rates of female-headed households, low education, poverty, and homes in rural areas with limited resources. In 2008, 21.3% of African American and 21.2% of American Indian families in North Carolina were living below the federal poverty level compared to 6.7% of White families (State Center for Health Statistics and Office of Minority Health and Health Disparities, 2010a; 2010b). About 18% of Lumbee Indians, the largest group of American Indians east of the Mississippi, were below the federal poverty threshold in 1999 (Ogunwole, 2006). African Americans and American Indians have more family households headed by a woman than Whites: 44% of African Americans and 29% of American Indian families compared to 13% for Whites (State Center for Health Statistics and Office of Minority Health and Health Disparities, 2010a; 2010b). Thirty-seven percent of African American families and 38% of American Indian families were headed by women lived in poverty compared to 25% of White families headed by women (State Center for Health Statistics and Office of Minority Health and Health Disparities, 2010a; 2010b).

Disparities in education also exist between ethnic minorities and Whites in North Carolina. In 2008, 20% of African American adults compared to 12.6% of White adults had less than a high school education, and the unemployment rates for African Americans and American Indians were 11% and 7.5% respectively compared to 5.4% for Whites (State Center for Health Statistics and Office of Minority Health and Health Disparities, 2010a; 2010b). Over a third of Lumbee Indians had a high school education or less and only 12.5% had a bachelor's degree or more (Ogunwole, 2006). These inequalities are significant, as less education, lower income, and higher rates of unemployment among African Americans and American Indians may result in poorer health and development for their children (Flores, Bauchner, Feinstein, & Nguyen, 1999).

Although African Americans and American Indians have different cultural experiences, comparison of mother-infant interactions between these two minority groups will minimize the likelihood that differences will be explained using a deficit model that assumes that deviation in behavior from the White norm results in deficiencies and must be corrected to promote the development of minority children (Oyemade & Rosser, 1980). Thus, the purpose of this study was to compare the interactive behaviors of American Indian mothers and their premature infants with those of African American mothers and their premature infants at 6 months of age corrected for prematurity. Six months is a relatively stable time for the mother-infant relationship as the infant has made the transition to home and the initial interactive differences between full term and premature infants have decreased (Crawford, 1982; Willie, 1991). In particular, we examined how the interactions between mothers and their premature infants, as measured by observations and the Home Observation for Measurement of the Environment (HOME), differed by maternal ethnicity, controlling for differences in mother and infant characteristics between the two groups.

This study was guided by the ecological framework that suggests that mother-infant interactions occur within an ecological setting that Bronfenbrenner (1979) first described as a hierarchy of nested structures, referred to as the microsystem, mesosystem, exosystem, and macrosystem. Based on this framework, Bronfenbrenner proposed that the environment was a compilation of related settings that incorporated both social and cultural contexts. Although culture and other concepts, such as social status, ethnicity, and race, are interrelated, they possess discrete boundaries, allowing for the study of their individual effects on mother-infant interactions. Using an ecological approach to examine mother-infant interactions allows for a better understanding of the relationships among the physical and social settings in which premature infants and their mothers are mutually involved (Rogoff, 2003). Because the American Indian and African American groups share similar demographics, the ecological framework allows a focus on understanding the cultural effects on mother-infant interactions within the mother-infant environment.

Method

This descriptive, comparative study examined the interactive behaviors of American Indian mother-infant dyads and compared them with those of African American mother-infant dyads at 6 months of age corrected for prematurity.

Sample

American Indian Participants—American Indian mothers and their premature infants were recruited from two regional medical centers and two pediatric clinics located in the southeast for this study. Infants from singleton and multiple births were eligible for the study if they were of Lumbee Indian ethnicity and born less than 37 weeks gestational age. For multiple births, the sickest infant was selected for inclusion in the study. Exclusion criteria included: congenital neurological problems (such as Down Syndrome, congenital

hydrocephalus, or microcephaly), symptoms resulting from substance exposure, hospitalizations lasting longer than 1 month post term, removal from the custody of the biological mother, and maternal age of less than 15 years. The present study focused on the 17 premature infants and their mothers who had at least 6 months of data beyond term.

African American Participants—Data on African American participants were obtained from a larger nursing support intervention study conducted at two neonatal intensive care units in the southeastern United States from 2001 to 2007 (Holditch-Davis et al., 2009; Miles, Holditch-Davis, Thoyre, & Beeber, 2005). The comparison group for the present study consisted of the 60 African American premature infants and their mothers from the control group who had at least 6 months of data beyond term (Holditch-Davis et al., 2009). Infants from singleton and twin births were eligible for the larger study if they were born less than 35 weeks gestational age and either weighed less than 1,750 g at birth or required mechanical ventilation. Exclusion criteria for the African American participants were similar to that used to recruit the American Indian participants. Demographic characteristics for both groups are shown in Table 1. The groups differed significantly by birthweight, gestational age, and corrected age at observation.

Measures

Mother-Infant Interactions—Six-month videotapes were scheduled at a time when the infant was awake and not due for a feeding. Mothers were informed that the goal was to videotape mother-infant behaviors in the home, as they normally occur. Mother-infant interactions were videotaped for 45 minutes. If the mother-infant interactions were interrupted (e.g., infant fell asleep), the videotaping was stopped and resumed at a later time. Videotapes were scored using the observational schema previously developed by Holditch-Davis (Holditch-Davis et al., 2001, 2007; Holditch-Davis, Bartlett, et al., 2000). High inter-rater reliability, with percentages of agreements above 85% and kappas above .70, has been documented (Holditch-Davis et al., 2007; Holditch-Davis, Bartlett, et al., 2000).

Videotapes were coded for the presence or absence of specific behaviors in each 10-second interval. The number of intervals in which each behavior occurred was measured as a percent of the total number of intervals on the videotape. The African American mother-infant interactions were previously coded using this system. Twelve mother behaviors and seven infant behaviors were chosen to compare the groups based on observed ethnic differences in other studies (Cho et al., 2004; Holditch-Davis et al., 2007). Definitions of these behaviors are listed in Table 2.

Behaviors in this system have been found to differ between African American and White mothers and between boys and girls (Cho et al., 2004). The codes were divided into five subsets of behaviors and each subset of behaviors was coded separately. To ensure acceptable inter-rater reliability, coders were trained until they achieved adequate inter-rater reliability (kappas greater than .70) on each subset of behaviors. Interrater reliability was verified every 2 months by having each pair of scorers code the same videotapes. Kappas for the variables used in this report ranged from .70 to .93 with a mean of .80.

HOME Inventory—The HOME Inventory (Birth to 3 Years version) is a standardized assessment of the quality of environmental stimulation and maternal interactions in the child's home environment from birth to 3 years of age (Caldwell & Bradley, 1980). The HOME Inventory is comprised of 45 binary items organized into six subscales: emotional and verbal responsiveness of the caregiver; avoidance and restriction and punishment; organization of the physical and temporal environment; provision of appropriate play materials; parental involvement with the child; and opportunities for variety in daily

stimulation. Subscale and total scores are calculated by summing the number of “yes” responses. Scores range from 0 to 45 for the total HOME score, with higher scores (above 32) suggesting the home environment provides better quality stimulation for child development (Totsika & Sylva, 2004). Scoring of the HOME Inventory takes about 15 minutes when using the videotaping situation for the observation portion of the tool in combination with information obtained from the mother.

The HOME Inventory has been validated for use with premature infants and has a high internal consistency, with Cronbach’s alphas of .84 to .80 for the total score at 6 and 12 months (Holditch-Davis, Tesh, Goldman, Miles, & D’Auria, 2000). Test-retest reliability for the total scale when administered at 6 months equals .76 to .77 (Caldwell & Bradley, 1980; Holditch-Davis, Tesh et al., 2000). Previous studies indicate moderate to high internal consistency for four of the HOME subscales: emotional and verbal responsiveness of mother (.61), acceptance of the child’s behavior (.70), maternal involvement with the child (.74), and provision of appropriate play materials (.76); and poor internal consistency for two subscales, organization of the environment (.18) and opportunities for variety in daily stimulation (.40) (Tesh & Holditch-Davis, 1997). Previous studies have reported interobserver agreements as high as 90% on the HOME Inventory (Holditch-Davis, Tesh et al., 2000). Internal consistency for this study was 0.74.

Demographic Characteristics—Demographic information was collected at the 6-month contact by maternal report. Years of completed education and family use of public assistance were used as a proxy for socioeconomic status (SES). Other demographic information collected from the mother included gender and age of the child, maternal age, race, occupation, marital status, spouse, and head of household.

Infant Neonatal Medical Data—The infants’ neonatal records were reviewed during hospitalization for descriptive data on infant gender and infant characteristics (such as gestational size) and neonatal illness severity (such as length of mechanical ventilation in days and presence of chronic lung disease).

Procedures

This study was approved by the Duke University Institutional Review Board. Mothers provided informed consent for their and their infants’ participation when the infants were medically stable (not receiving mechanical ventilation and not with an immediately life threatening medical condition). Infants and mothers in this study were followed in the hospital and after discharge through at least 6 months corrected age. Mothers were compensated at enrollment and each follow-up visit. The infant was given a small gift at each home visit. Mothers were provided a copy of the videotape at the end of the study. Similar procedures were used for the comparison sample for the 6-month contact (Holditch-Davis et al., 2009).

Data Analysis

Each mother and infant behavior from the videotaped observations was measured as a percent of the total observation time. Maternal and infant characteristics were compared by maternal ethnicity using *t*-tests for continuous data, Pearson’s chi-square tests for frequency data, and Fisher’s exact tests for frequency data with small expected frequencies. *T*-tests and an analysis of covariance (ANCOVA) was conducted to evaluate the relationship between maternal ethnicity and each interactive behavior covarying for demographic characteristics differing significantly between the groups (infant birthweight and corrected age at observation). *T*-tests and an ANCOVA was also used to evaluate the relationship between

maternal ethnicity and the HOME subscores and total score covarying for infant birthweight and corrected age at observation. Alpha was set at .05 for all analyses.

Results

Effects of Maternal Ethnicity on Demographic Characteristics

As shown in Table 1, the only demographic characteristics differing by maternal ethnicity were infant birthweight, gestational age, and corrected age at observation. The American Indian premature infants had higher birthweights, were born at later gestational ages, and were slightly younger in corrected age at the 6-month contact than the African American premature infants. Birthweight and corrected age were used as covariates in all further analyses. To avoid multicollinearity, gestational age was not used as a covariate, as a Pearson correlation indicated a strong positive association ($r(77) = 0.88, p < .001$) between gestational age and birthweight.

Effects of Maternal Ethnicity on Mother and Infant Behaviors

T-tests were initially used to compare mother and infant behaviors by maternal ethnicity (see Tables 3 and 4). American Indian mothers were the caregivers for a greater percentage of the observation than African American mothers. Also, American Indian mothers looked more, talked more, and gestured more to their infants than African Americans. American Indian infants expressed more positive affect and gestured more to their mothers than did African American infants. African American infants engaged in more non-negative vocalization.

The comparison of the two groups was repeated using an ANCOVA so that birthweight and corrected age could be controlled (see Tables 3 and 4). After controlling for these demographic characteristics, American Indian mothers still were caregivers for more of the observed time, looked more, and gestured more to their infants than African American mothers. Mother talk was no longer significant, but none of the covariates approached significance for mother talk. American Indian infants still expressed more positive affect and gestured more to their mothers than African American infants. Also, African American infants still used more non-negative vocalization. Infants with older corrected ages at observation were held less and had mothers who spent less time as the primary caregiver. Infants with higher birthweights expressed more positive affect towards their mothers.

Effects of Maternal Ethnicity on HOME Inventory Scores

T-tests were initially used to compare HOME scores by maternal ethnicity (see Table 5). African American mothers scored higher on the subscales of provision of appropriate play materials and parental involvement with the child; whereas, American Indian mothers scored higher on the opportunities for variety in daily living subscale.

Then, birthweight and corrected age were controlled for using an ANCOVA (see Table 5). African American mothers still scored higher on the subscales of provision of appropriate play materials and parental involvement with the child than American Indian mothers. Also, American Indian mothers' scores remained higher than those of African American mothers on the opportunities for variety in daily stimulation subscale. Mothers of infants with older corrected ages at observation scored higher on the subscales of avoidance of restriction and punishment, provision of appropriate play materials, and parental involvement with the child. Mothers of infants with higher birthweights provided more organization of the physical and temporal environment.

Discussion

This study is one of the first to compare interactive behaviors of American Indian mother-infant dyads and African American mother-infant dyads. The findings suggest that there were more similarities than differences in the mother-infant interactions of American Indians and African Americans, with no observed group differences for 12 of the 19 interactive behaviors and 4 of the 7 HOME scores. Differences were found in four maternal behaviors, three infant behaviors, and three HOME subscales. American Indian mothers were more often the caregivers, looked more, and gestured more to their infants than African American mothers. American Indian infants expressed more positive affect and gestured more to their mothers than African American infants. African American infants used more non-negative vocalization toward their mothers than the American Indian infants. Mother talk was significantly greater for the American Indian group in the *t*-test but did not differ significantly in the ANCOVA. Since the covariates did not approach significance, the lack of significant group differences in mother talk was probably due to the smaller degrees of freedom in the ANCOVA. African American mothers had better scores on the HOME Inventory subscales of provision of appropriate play materials and parental involvement with the child; whereas, American Indian mothers had better scores on HOME subscale of opportunities for variety in daily living.

Only a few maternal and infant behaviors were affected by birthweight and age at observation. Because these covariates did not explain the observed group differences in mother look, mother gesture, mother not caregiver, infant gesture, and infant positive, these differences may be due to culture. Mothers of infants with older corrected ages at observation scored higher on the HOME subscales of avoidance of restriction and punishment, provision of appropriate play materials, and parental involvement with the child, and infants with older corrected ages were held less and had mothers who spent less time as the primary caregiver. These findings are probably the increasing independence in exploration and play that occurs with infant maturation.

Also, mothers of infants with higher birthweights provided more organization of the physical and temporal environment on the HOME Inventory, and lower birthweight infants expressed less positive affect. Less positive affect displayed by premature infants with lower birthweights may result from their being less responsive to the interactive behaviors of their mothers than larger and healthier infants (Landry, Chapieski, Richardson, Palmer, & Hall, 1990; Singer et al., 2003).

The finding that American Indian mothers were more often the caregivers than African American mothers appears to be consistent with other reports describing American Indian mothers' caregiving (Nichols, 2004). Although African Americans also employ assistance from others in caring for their children, differences may occur in ways family members are utilized in different cultures. Among African Americans, extended family members have been described as sharing equal responsibility for infant care (Burton, 1996; Burton & Dilworth-Anderson, 1991). In contrast, while other family members were often present during the observations, American Indian mothers appeared to maintain sole responsibility while fostering relationships between their infants and extended family members (Nichols, 2004). On the other hand, the American Indian and African American mothers may have differed on their understanding of the purpose of videotaping. Therefore, establishing whether American Indian and African American mothers actually differ in the time they typically spend as the infant's primary caregiver is difficult.

The finding that African American mothers looked less at their infants than the American Indian mothers is consistent with one study that examined ethnic differences in looking

behaviors of mothers and their prematurely born children. Periods during which neither mother nor child looked at each other were longer for ethnic minority mothers and their children than for White children and their mothers (Cho et al., 2007). While American Indians were included in this study, African Americans made up the vast majority of the minority sample, making it difficult to determine how the looking behaviors of American Indians compared to those of Whites or African Americans. However, in a study comparing Mayan Indian mothers and urban middle-class mothers from the United States, Mayan mothers used less organized instruction and more nonverbal behaviors to orient their toddlers (e.g., communicative gaze, gestures, touch, posture, and timing clues) and were more likely to be waiting in readiness to help than the urban, middle-class mothers (Rogoff & Mosier, 1993). Similarly, Callaghan (1981) found that Hopi and Navajo mothers were more likely to follow their children's lead in attempts to engage them in mutual gaze than were White mothers. These findings provide support for our findings about Lumbee mothers' looking behaviors in the current study.

Some differences in infant behaviors between American Indian and African American infants were found: American Indian infants expressed more positive affect and gestured more toward their mothers. These findings are similar to those of others reporting that fullterm American Indian infants provided clearer cues and were more responsive to their mothers than White fullterm infants (Seideman et al., 1994). Our findings of more positive infant behaviors were possibly a response to the positive maternal behaviors displayed toward them. Longitudinal studies examining the timing and sequence of premature infant and mother behaviors in varying ethnic groups may provide more insight on whether these differences are a response to different parenting behaviors or are more related to infant characteristics, such as illness severity.

We found no differences in demographic characteristics of the American Indian mothers and African American mothers. These findings may result from the similarities in the socioeconomic conditions of these ethnic groups in the Southeast. In the present study, mothers averaged 13 years of education and the majority received public assistance. Because less education and low income have been associated with poorer mother-infant interactions and child development, both groups are at increased risk for experiencing these negative outcomes (Cho et al., 2004; Holditch-Davis et al., 2007; Roopnarine, Fouts, Lamb, & Lewis-Elligan, 2005; Schiffman, Omar, & McKelvey, 2003). Given the comparable demographics between American Indian and African American mothers in this study, the observed differences in maternal behaviors were likely related to cultural differences.

Our results reveal that both similarities and differences exist in the interactive behaviors and home environments of ethnic minority mothers and their premature infants. However, in our study, we only examined differences at 6 months corrected age. Thus, we do not know whether these ethnic differences in interactive behaviors persist at later ages. Ethnic differences in maternal behaviors observed in this study might have been affected by procedural differences such as instructions given to mothers. While all individuals involved in data collection were trained in the same manner, slight variations in how the mothers were instructed about the observations may have occurred. Infant behaviors were unlikely to be affected by these instructions due to their immaturity in cognitive development. Also, because the data collectors differed in the two studies, some differences in their data collection methods may have occurred.

The ecological framework used to guide this study was supported by the findings that behaviors of Lumbee and African American mothers and their premature infants differed by ethnicity. Differences in culturally based behaviors (i.e., interactive behaviors) may be partly explained by variations in belief systems; however, examination of belief systems was

beyond the scope of this study. Also, overall the differences found between the American Indians and African Americans were small, probably because despite their different cultures they share the Southern culture and the culture of rural poverty. Future studies examining ethnic minority populations need to be designed to examine factors related to ethnicity, such as cultural identity and beliefs, and their impact on mother-infant interactions, given that these dynamic elements exist in the social environment in which premature infants and their mothers exist.

Overall, findings indicated that while the interactive behaviors between ethnic minority mothers and their premature infants did not show major differences, there were subtle differences in parenting behaviors (more gestures, looking, and time spent as primary caregiver). Future studies examining American Indian mothers' use of certain social behaviors (e.g., looking and time spent as the primary caregiver) with premature and fullterm infants may offer more insight on the extent to which these behaviors vary by gestational age at birth. Moreover, future studies may benefit from including different samples of American Indian mothers and their premature infants given that American Indians are not a cultural monolith and may vary in language and culture. Comparison of their interactions with those of other racial and ethnic groups over time is also warranted. Because our study focused on ethnic groups from similar socioeconomic backgrounds, studies including ethnic groups of various socioeconomic levels would help determine the impact of socioeconomic status on mother-infant interactions and show the extent to which ethnic differences remain stable across different socioeconomic levels.

Implications for Practice

Overall, our findings indicate that there are subtle differences in the mother-infant interactions displayed by American Indians and African Americans. Therefore, nurses need to be aware of the normative interactive patterns of the mothers and infants in their geographic area. Nurses have numerous opportunities to observe the early interactive behaviors of ethnic minority mothers and their premature infants. Nurses can initiate discussions with mothers concerning the interactive behaviors that they observe (i.e., looking, talking), as well as those that may not be as evident (i.e., being primary caregiver) in order to determine the cultural factors that may be affecting these interactions as well as factors specific to individual families. Mothers may need education and demonstration of positive interactive behaviors that are appropriate for their infant's level of prematurity and corrected age. This education will be most effective when it is based on an understanding of typical interactions for the mother's ethnic group and the specific interactive patterns associated with optimal long-term outcomes for the infant. Regardless of ethnicity, nurses need to support mothers in their continuation or adoption of positive interactive behaviors with their premature infants in order to minimize later developmental problems. Finally, clinicians need to be cognizant of and sensitive to the culturally distinct interaction patterns of ethnic minorities rather than expecting conformity to standard parenting behaviors.

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Demographic Differences between American Indian Mother-Infant Dyads and African American Mother-Infant Dyads

Table 1

	American Indian		African American		Group Difference		
	M	SD	%	M	SD	%	$t(1, 75)$ χ^2 (df=1) Fisher's d p
Birthweight (g)	1828.6	651.2		1086.1	400.4		4.47 ****
Gestational age	32.7	3.6		28.3	2.9		5.24 ****
Corrected age at observation (months) ^b	6.3	1.2		7.3	1.6		2.21 *
Maternal age (years)	26.5	7.5		25.2	6.4		0.71
Maternal education (years)	13.6	2.6		12.5	1.8		1.68
Number of previous births	2.1	1.4		2.8	1.8		1.63
Public assistance			58.8			53.3	0.16
Chronic lung disease			0.0			21.7	0.06
Intraventricular hemorrhage			11.8			21.7	0.50
Multiple births			11.8			10.0	1.00

Note.

^aFisher's exact test.

^bInfants' ages were corrected for prematurity (number of weeks premature was subtracted from chronological age).

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 2

Definitions of Mother and Infant Behaviors Used to Code the Videotapes of Mother-Infant Interactions

Mother Behaviors

- Mother hold – holds or carries the infant.
- Mother not caregiver – someone other than the mother is the major caregiver for the infant.
- Mother look – looks at the infant.
- Vis-à-vis with mother – mother and infant have eye-to-eye contact.
- Mother talk – speaks words to infant.
- Mother positive affect – directs positive affect to infant (smile, praise, or affectionate touching).
- Mother gesture – gestures or makes facial expression, such as smiling or showing a toy.
- Mother touch – touches the infant, such as pats or caresses.
- Play with infant – initiates or takes part in infant's play activity or games.
- Interaction – interacts or plays with the infant (hold, talk, teach, smile, touch, hit).
- Passive observation – looks at the infant but does not interact.
- Uninvolved – does not interact with or look at the infant.

Infant Behaviors

- Infant look – looks at the mother.
 - Non-negative vocalization – makes one or more sounds, excluding negative sounds like fussing and crying.
 - Infant positive effect – directs positive affect to the mother (smile or affectionate touching).
 - Infant negative affect – expresses negative affect to the mother, such as crying or frowning.
 - Infant gesture – gestures or makes a facial expression, such as smiling.
 - Infant touch – touches the mother.
 - Play with object – plays with objects (toys, clothes, stuffed animal, etc.).
-

Table 3

Means and Standard Deviations for Maternal Behaviors, Initial t-test Results Comparing the American Indian and African American Mothers, and Analysis of Covariance Comparing the Groups while Controlling for Birthweight and Infant Corrected Age

	American Indian			African American			Group Difference				
	M	SD	M	SD	M	SD	t-test t (1,75)	R ²	Ethnicity F(1,74)	Birthweight F(1,74)	Corrected age F(1,74)
Mother Hold	22.4	19.4	23.8	19.9	0.25	0.08	0.00	1.72	1.72	4.72*	
Mother Not caregiver	2.4	8.2	17.1	24.4	4.00**	0.16**	5.66*	2.15	2.15	6.06*	
Mother Look	66.6	20.2	47.8	21.5	3.22*	0.15**	5.51*	0.00	0.00	1.97	
Vis-à-vis with Mother	17.9	11.2	12.3	10.1	1.96	0.06	1.27	0.50	0.50	0.14	
Mother Talk	39.8	26.1	27.2	18.7	2.25*	0.07	2.73	0.00	0.00	0.43	
Mother Positive Affect	13.6	8.2	9.5	7.7	1.94	0.05	2.46	0.02	0.02	0.16	
Mother Gesture	33.7	17.4	17.8	11.9	3.54***	0.20***	13.35***	0.04	0.04	0.00	
Mother Touch	26.8	15.5	20.0	13.2	1.82	0.08	2.88	0.87	0.87	2.36	
Play with infant	23.0	14.0	16.4	11.4	1.99	0.08	2.18	0.52	0.52	2.22	
Interaction	69.1	17.9	63.8	23.1	0.86	0.02	0.02	0.70	0.70	0.15	
Passive Observation	8.8	7.3	8.0	6.3	0.44	0.01	0.40	0.05	0.05	0.47	
Uninvolved	22.1	16.2	28.1	21.0	1.09	0.03	0.14	0.71	0.71	0.04	

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4

Means and Standard Deviations for Infant Behaviors, Initial t-test Results Comparing the American Indian and African American Premature Infants, and Analysis of Covariance Comparing the Groups while Controlling for Birthweight and Infant Corrected Age

	American Indian			African American			Group Difference			
	M	SD	M	SD	t-test t (1,75)	R ²	Analysis of Covariance			
							Ethnicity F(1,74)	Birthweight F(1,74)	Corrected age F(1,74)	
Infant Look	22.7	11.2	19.6	11.4	1.00	0.02	0.19	0.33	0.05	
Infant Non-negative Vocalize	20.2	10.3	28.9	16.7	2.62*	0.09	4.11*	1.66	1.19	
Infant Positive Affect	7.4	4.0	3.2	3.0	4.70***	0.29***	8.77**	5.27*	1.58	
Infant Negative Affect	6.7	6.4	4.9	4.3	1.10	0.05	1.08	0.17	2.19	
Infant Gesture	18.7	6.1	9.9	6.0	5.31***	0.30***	11.69***	1.89	1.03	
Infant Touch	18.3	13.4	17.8	15.1	0.12	0.08	0.64	3.75	3.07	
Infant Play with Object	33.8	11.1	36.8	16.9	0.70	0.03	0.66	0.42	1.24	

Note.

* $p < .05$.

**

$p < .01$.

$p < .001$.

Means and Standard Deviations for the HOME Subscales and Total Score, Initial t-test Results Comparing the American Indian and African American Mothers, and Analysis of Covariance Comparing the Groups while Controlling for Birthweight and Infant Corrected Age

Table 5

	American Indian			African American			Group Difference				
	M	SD	M	SD	M	SD	t-test t(1,75)	R ²	Analysis of Covariance		
									Ethnicity F(1,74)	Birthweight F(1,74)	Corrected age F(1,74)
Maternal Responsivity	9.2	1.6	9.4	1.9	0.23	0.00	0.07	0.03	0.00		
Acceptance of Infant	6.2	1.0	6.2	0.7	0.20	0.07	0.49	0.00	5.24*		
Organization of the Environment	5.4	0.9	5.5	0.9	0.61	0.11*	2.55	6.76*	3.09		
Provision of Play Materials	5.5	1.5	7.2	1.9	3.40**	0.18**	5.70*	0.00	3.97*		
Maternal Involvement	4.2	1.6	5.3	1.2	3.20**	0.13*	6.10*	0.00	0.54*		
Variety in Daily Stimulation	3.7	0.8	2.9	1.0	2.88**	0.10	6.10*	0.04	0.01		
Total score	34.2	4.5	36.6	5.0	1.72	0.07	1.77	0.22	2.66		

Note.

* $p < .05$.

** $p < .01$.

*** $p < .001$.