Interactions between Mothers and their Premature American Indian Infants

by

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Alfred Bryant, Jr.

Dissertation submitted in partial fulfillment of
the requirements for the degree of Doctor of Philosophy in the Department of
Nursing in the Graduate School
of Duke University

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ABSTRACT

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Abstract

The overall purpose of this longitudinal exploratory study was to describe the interactive behaviors of American Indian mothers and their prematurely born infants. The first study examined behaviors of American Indian mothers and their premature infants when the infants were 3, 6, and 12 months of age corrected for prematurity as well as the effects of infant illness severity (NBRS) and socioeconomic status (maternal education) on these behaviors. Higher infant illness severity was associated with more maternal touch, more infant vocalization, and fewer opportunities for variety in daily stimulation. Higher maternal education was associated with more maternal talk; more infant vocalization; less infant touch; and higher scores on the provision of appropriate play materials, parental involvement with the child, and opportunities for variety in daily stimulation subscales of the HOME. The second study compared the interactions of American Indian and African American mothers with their prematures when the infants were 6 months corrected age. Most of the interactions between American Indian mothers and their premature infants were similar to those of African American mothers and their premature infants. However, American Indian mothers were more often the caregivers, looked more, and gestured more to their infants than African American mothers. Furthermore, American Indian infants expressed more positive affect and gestured more to their mothers than African American infants. The third study explored Lumbee mothers’ responses to the birth and hospitalization of their
premature infant at 3 months and explored the extent to which these early responses were related to maternal experiences of parenting at 12 months. This study indicated that culture appeared to be important in Lumbee mothers’ responses to having a premature infant in the hospital and in caring for their infants. Promoting a strong cultural identity and family involvement may be protective factors for American Indians that enhance child development and health of premature infants who are at high risk for developmental delays and illnesses.
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1. A Longitudinal Study of Lumbee Mothers and their Premature Infants

Between 1990 and 2006, the number of premature births (births occurring at < 37 weeks gestation) in the United States increased by more than 20% (Hamilton, Martin, & Ventura, 2010). However, from 2008 to 2009 the percentage of infants born premature declined from 12.3 to 12.2 percent (Hamilton et al., 2010). Significant racial, ethnic, and socioeconomic disparities continue to exist in the rates of premature birth, with ethnic minorities experiencing higher rates than Whites: 17.5% of births to African Americans and 13.5% to American Indians are premature versus 10.9% for non-Hispanic Whites (Hamilton et al., 2010). Even more startling is the discrepancy between national and state prematurity rates for American Indians. In particular, the rate of premature births among American Indians (15.1%) living in North Carolina is higher than the national rate for American Indians (National Center for Health Statistics, 2010). Further, premature birth rates are higher in the southeastern counties of North Carolina in which the majority of American Indians live (National Center for Health Statistics, 2010).

Prematurely born infants are at risk for more cognitive, language, and attention problems than fullterm infants (Davis, Ford, Anderson, & Doyle, 2007; Grunau, Whitfield, & Fay, 2004; Hack et al., 2005; Sansavini et al., 2007; Thompson et al., 1997; van Baar, van Wassenaer, Briet, Dekker, & Kok, 2005). Their poorer developmental outcomes are exacerbated by factors within the social environment, such as the quality of mother-infant interactions (Duncan & Brooks-Gunn, 2000; Forcada-Guex, Pierrehumbert, Borghini, Moessinger, &
Muller-Nix, 2006; Jackson, Brooks-Gunn, Huang, & Glassman, 2000; McGroder, 2000; Smith, Landry, & Swank, 2006).

While factors affecting interactions between mothers and their prematurely born infants have been studied extensively (Bakeman & Brown, 1980; Cho, Holditch-Davis, & Belyea, 2004; Holditch-Davis, Bartlett, & Belyea, 2000; Holditch-Davis, Schwartz, Black, & Scher, 2007; Holditch-Davis & Thoman, 1988; McGrath, Sullivan, & Seifer, 1998), nearly all of the studies have focused on mother-premature infant interactions among Whites and African Americans. Despite the high rates of prematurity in American Indians, few studies have examined the interactive behaviors of American Indian mothers and their prematurely born infants. One of the few studies of American Indian mothers used a qualitative method to examine the social infant caring process of Cherokee mothers with their fullterm infants ranging in age from 1 month to 21 months (Nichols, 2004). Also, quantitative studies have examined parenting of fullterm infants by Alaskan Eskimo and urban American Indians from Oklahoma (MacDonald-Clark & Boffman, 1995; MacDonald-Clark & Harney-Boffman, 1994; Seideman et al., 1994). Lumbee mothers’ perceptions of parenting their premature infants were also reported, but this study focused more on the influence of poverty than on culture (Docherty, Lowry, & Miles, 2007). While these studies provide some description of mother-infant interactions in American Indian groups (MacDonald-Clark & Boffman, 1995; MacDonald-Clark & Harney-Boffman, 1994; Seideman et al., 1994), they were limited to observing small samples at a single time point. Since mother-premature infant interactions change with age (Holditch-Davis et al., 2007), there is a need to study these interactions over time. Further, factors affecting these interactions and how
American Indian mothers parent their premature infants should be explored to enhance our understanding of this understudied population.

Given the importance of mother-infant interactions for the development of premature infants (Duncan & Brooks-Gunn, 2000; Forcada-Guex et al., 2006; Jackson et al., 2000; McGroder, 2000; Smith et al., 2006), research is needed to examine American Indian mothers’ parenting practices with their prematurely born infants. An understanding of their interactions could provide nurses with culture-specific tools to assess and intervene to improve child development. Therefore, I conducted a longitudinal exploratory study of the interactive behaviors of rural American Indian mothers from the Lumbee Tribe (the largest tribe east of the Mississippi) and their prematurely born infants. Since infant illness severity and socioeconomic status (SES) are thought to affect interactive behaviors (Chapieski & Evankovich, 1997; Holditch-Davis, Cox, Miles, & Belyea, 2003; Jarvis, Myers, & Creasey, 1989; Roopnarine, Fouts, Lamb, & Lewis-Elligan, 2005), their effects on interactions were also examined. Interactions between Lumbee mothers and their premature infants were compared to those of rural African American mothers and their premature infants using African American data from an existing data set (2001-2007, R01 NR035962). This comparison allowed for identification of similarities and differences in groups at similar sociodemographic risk. In addition, through semistructured interviews, maternal perceptions of parenting experiences were explored, including responses of Lumbee mothers to having a premature infant in the Neonatal Intensive Care Unit (NICU) and their experiences in parenting their prematurely born infants, as these experiences also may affect mother-infant interactions.
1.1 Understanding Interactions between Lumbee Mothers and their Premature Infants Using the Ecological Systems Perspective

Mother-premature infant interactions occur within an ecological setting that Bronfenbrenner (1979) first identified as a hierarchy of nested structures referred to as the microsystem, mesosystem, exosystem, and macrosystem. These systems comprise the infant’s environment. Bronfenbrenner’s view of the environment as a collection of related settings includes the social and cultural contexts found within the different settings.

Ecological systems theory (Bronfenbrenner, 1989) has become one of the most important conceptual schemes for studying the relationships between parenting and child development within a culture (Reifsnider, Gallagher, & Forgione, 2005). Culture plays an important role in shaping the ecology of parenting and childhood through the immediate contexts children experience, the short- and long-term goals parents create for their children, and the practices parents employ in attempting to meet these goals (Bornstein & Cheah, 2006). Bronfenbrenner’s ecological perspective on parenting recognizes that child development is influenced by the mutual interdependence of the systems that constitute the social and physical environment surrounding the mother and infant (Bronfenbrenner, 1979).

Since the quality of mother-infant interactions is critical to the optimal development of prematurely born infants, understanding factors’ influencing these interactions is important. Therefore, this framework was used to explore mother-infant interactions among Lumbee Indian mothers and their premature infants in the context of their unique culture. Interactions between mothers and
premature infants are affected by characteristics of the mother (e.g., ethnicity, parenting beliefs, interactive behaviors, and parenting experiences), characteristics of the premature infant (e.g., infant illness severity), and factors in the larger physical environment (e.g., socioeconomic status and culture). Further, this study explored factors in the environment surrounding the mother and premature infant, as well as the dynamic interactions between the premature infant and their immediate environment. The conceptual model presented in Figure 1 incorporates these environmental characteristics, as well as mother and premature infant characteristics that may influence mother-premature infant interactions.

The ecological model (see Figure 1) is appropriate for assessing the effects of American Indian culture on mother-infant interactions and parenting experiences, as the concept of culture has been used consistently and appropriately within this framework. Positioned within the ecological system, culture maintains its boundaries when integrated with other concepts potentially occurring within the model, such as social status, ethnicity, and race. Examining mother-infant interactions and parenting experiences from an ecological approach emphasizes the study of relationships among the physical and social settings in which infants and their families are mutually involved (Rogoff, 2003), including the culturally constructed environment of the infant. Although the ecological model appears relevant for studying cultural effects on mother-infant interactions, some important concerns have been raised. One, is the assumption that individual and cultural processes can be treated as separate entities (Rogoff, 2003). This assumption removes the ability to recognize the complexity of
Figure 1: Conceptual Model. Mother-infant interactions in relation to child development.
individual beliefs and values in their relation to the larger culture to which they belong. Despite this limitation, the ecological approach to studying the effects of culture on mother-infant interactions may be an important step in furthering the development of nursing science because it provides some insight on the role that culture plays in mother-infant interactions in different populations. Introducing theories and related measures of culture to explain differences in mother-infant interactions across ethnic groups can possibly advance knowledge in this area. Also, progress in the understanding of culture and its role in nursing would result in our ability to provide more universally appropriate care and tailor interventions based on the cultural diversity found in mother-infant interactions.

1.2 Factors Affecting Interactions between Lumbee Mothers and their Premature Infants within the Microsystem

The innermost level of the environment affecting Lumbee mother-premature infant interactions is the microsystem (Bronfenbrenner, 1989). This system includes structures with which the infant has direct contact, such as the mother and the home environment. Factors within the microsystem, including the characteristics of the mother and premature infant, have the most direct impact on infant experiences (Bronfenbrenner, 1989).

1.2.1 Characteristics of the Mother

Characteristics of the mother may impact her interactive behaviors with her premature infant. One important characteristic is the mother’s response to having a premature infant in the NICU. These responses have been studied primarily in White and African American mothers. Several studies have reported that mothers of premature infants experience distress as a result of giving birth to
an infant who is admitted to the NICU (Franck, Cox, Allen, & Winter, 2005; Holditch-Davis & Miles, 2000; Meyer et al., 1995; Singer et al., 1999). During the hospitalization period, mothers experience distress related to their inability to protect the infant from pain and to comfort or help their infant during the time they are receiving care and treatment for various complications of prematurity (Miles, Burchinal, Holditch-Davis, Brunssen, & Wilson, 2002; Miles, Funk, & Kasper, 1991; Wereszczak, Miles, & Holditch-Davis, 1997). Other stressors for mothers include the size and appearance of the infants; alterations in expected parenting roles, including extended periods of separation and reduced opportunities to hold or interact with their infants (Holditch-Davis & Miles, 2000; Miles et al., 1991; Wereszczak et al., 1997); and characteristics of the NICU environment – the sights and sounds of the unit, the surrounding equipment, and relationships with health care providers (Affonso et al., 1992; Miles et al., 2002; Miles et al., 1991). Guilt over their failure to carry the infant to term; uncertainty about the infant’s medical condition; feelings of disappointment, sadness, helplessness, and worry about infant survival; and health crises have also been found to increase distress in mothers (Holditch-Davis & Miles, 2000; Miles et al., 2002; Shin & White-Traut, 2007; Trause & Kramer, 1983; Wereszczak et al., 1997). Understanding mothers’ responses to having a premature infant in the NICU is important, as early stressful experiences for mothers of hospitalized prematures may have negative long-term effects on the quality of mother-infant interactions.

Some studies have shown mothers’ responses to the birth and hospitalization of a premature infant vary with ethnicity, with minorities experiencing higher levels of hospital-related distress compared to Whites.
(Beckman & Pokorni, 1988; Miles et al., 2002). Further, Miles and colleagues (2002) found that the level of maternal education also might affect maternal responses to having a premature infant in the NICU, as mothers with less education expressed more worry about their infants. Although the infants in this study were chronically ill, these findings suggest that maternal ethnicity and educational level may be important factors in understanding the experience of having a premature infant in the NICU. Therefore, the response of American Indian mothers to prematurity may be affected by their ethnic and educational backgrounds.

Distress experienced by mothers during the period while their infants are hospitalized in the NICU often continues after hospital discharge when they must assume responsibility for caring for their premature infant (Bakewell-Sachs & Gennaro, 2004; Holditch-Davis, Bartlett, Blickman, & Miles, 2003; Kersting et al., 2004). Previous research findings indicated that the events in the NICU are traumatic for mothers and result in the posttraumatic stress symptoms of increased arousal, re-experiencing, and avoidance (Holditch-Davis, Bartlett, et al., 2003). When their infants were 6 months corrected age, mothers continued to re-experience the premature birth through intrusive thoughts elicited by events similar to the birth, avoided recalling certain aspects of their infant’s birth and hospitalization, and described increased arousal (Affleck, Tennen, Rowe, & Higgins, 1990; Holditch-Davis, Bartlett, et al., 2003; Miles & Holditch-Davis, 1995). Mothers continued to experience increased anxiety when their prematurely born infant was left with a child care provider at 1 year of age (Jeffcoate, Humphrey, & Lloyd, 1979). Mothers of prematurely born infants have also reported feelings of extreme protectiveness and persistent fears that the
infant might become ill or die through at least 3 years of age (Holditch-Davis, Bartlett, et al., 2003; Miles & Holditch-Davis, 1995; Miles, Holditch-Davis, & Shepherd, 1998).

In addition to mothers’ responses to having a premature infant in the NICU and experiences in parenting a prematurely born infant, characteristics of the mother, such as ethnicity, may affect the quality of interactive behaviors between the mother and infant. Mother-infant interactions have been found to differ between Whites and African Americans (Cardona, Nicholson, & Fox, 2000; Cho et al., 2004; Holditch-Davis et al., 2007; MacDonald-Clark & Boffman, 1995). For example, African American mothers of premature infants have been shown to provide less warmth, talking, looking, positive affection, and time interacting with their infants than White mothers (Bradley, Corwyn, McAdoo, & Coll, 2001; Brooks-Gunn, Klebanov, & Duncan, 1996; Cho et al., 2004; Holditch-Davis et al., 2007; Tesh & Holditch-Davis, 1997).

Differences in mother-infant interactions have been also been found between American Indians and Whites, though these studies were all of fullterms (MacDonald-Clark & Boffman, 1995; Seideman et al., 1994). In their study of urban American Indians from Oklahoma and Kansas, Seideman and colleagues (1994) found that while American Indian mothers were less verbal, they provided more social-emotional and cognitive growth-fostering activities than White mothers. In turn, their fullterms provided clearer cues and were more responsive to their mothers than White fullterms (Seideman et al.). However, in a study of low-income Canadian Indians, mother-infant interactions did not differ from interactions of Whites, except that Canadian Indian mothers provided less cognitive growth-fostering than White mothers (Letourneau, Hungler, & Fisher,
Similarly, Alaskan Inuit mothers were found to provide less cognitive growth-fostering than a normative group of White, African American, and Hispanic mothers (MacDonald-Clark & Harney-Boffman, 1994). While these mothers were less involved with their fullterms and less emotionally and verbally responsive, they were more sensitive to their infant’s cues and more responsive to their infant’s distress than White mothers (MacDonald-Clark & Harney-Boffman, 1994). A more detailed study of mother-child interactions in American Indians (Nichols, 2004) found that Cherokee mothers felt they lived bicultural lives and provided personal and health care based on the differing perspectives of these cultures. Cherokee mothers also felt that living spiritually and passing the Cherokee heritage on to their children was important in the care they provided (Nichols, 2004).

Observed variations in American Indian families may reflect the varying levels of acculturation to the dominant society (Joe, 1997). Acculturation has been described as a form of adaptation whereby members of an ethnic cultural group relinquish various elements of their cultural identity to acquire elements belonging to the dominant culture (DuBray & Sanders, 1999; Williams-Gray, 2001). Persons of American Indian ethnicity have achieved varying degrees of acculturation in order to survive in the dominant society (DuBray & Sanders, 1999). The literature describes at least three main categories of acculturation – traditional, assimilated, and bicultural (DuBray & Sanders, 1999). In the traditional form of acculturation, the traditional culture is strongly maintained despite exposure to the dominant culture (DuBray & Sanders, 1999). In the assimilated form of culture, individuals and/or families replace their traditional culture with behaviors, customs, and language of the dominant culture (DuBray
& Sanders, 1999). Here, the bicultural form of acculturation will be elaborated on, as a number of American Indian tribes, including the Lumbee, fall into this category. Biculturalism refers to the ability to function effectively in and between multiple ethnic cultural groups simultaneously (Williams-Gray, 2001). Generally speaking, American Indians live in two worlds – the dominant society and their tribal world. Their ability to live and socialize in the dominant society while maintaining their ethnic identity ensures the preservation of their tribal culture (Williams-Gray, 2001). As identified by Nichols (2004), it is important for American Indian mothers to maintain a positive cultural identity and to pass on these values and beliefs to their children.

In addition to the need to understand how maternal characteristics influence American Indian mother-premature infant interactions, we need to understand mothers’ perceptions of their experience as a maternal characteristic that may influence their interactive behaviors. The process of transition to motherhood for mothers of prematurely born infants is different than that for fullterms as these mothers tend to experience difficulty in transitioning while their infant is in the NICU (Shin & White-Traut, 2007). During this time, mothers of prematures are highly distressed and develop concerns about parenting a prematurely born infant (Holditch-Davis & Miles, 2000; Schenk, 2007). These concerns often persist into toddlerhood (Miles & Holditch-Davis, 1995; Miles et al., 1998). Some of the concerns identified include behavioral management, health and development concerns, protectiveness, obligations at home, and touching and holding the infant (Miles et al., 1998; Schenk, 2007). These studies have been limited primarily to Whites and African Americans with the examination of a small number of other ethnicities. Because there have been few
studies to examine these experiences in American Indian mothers of prematures, studying the perceptions of Lumbee mothers parenting of premature infants is important.

1.2.2 The Influence of Culture on Characteristics of the Mother

Culture may influence the way American Indian mothers parent and manage their infants’ needs (MacDonald-Clark & Boffman, 1995; MacPhee, Fritz, & Miller-Heyl, 1996; Nichols, 2004; Staples & Mirande, 1980; Sui, 1998). Describing the effects of American Indian culture on parenting is a challenge for many reasons, the foremost of which is the heterogeneity of the 562 federally recognized tribes in the United States (Department of State, 2008). This figure does not include non-federally recognized tribes or state-recognized tribes. The term “American Indian” is often used to denote members of all categories aforementioned, including Alaskan Natives, Aleuts, and Eskimos. Although American Indians are culturally diverse in terms of tribal traditions, languages, and acculturation experiences (DuBray & Sanders, 1999), members of this ethnic group often share common family values and traditions (DuBray & Sanders, 1999; Nichols & Keltner, 2005).

Understanding how culture may influence the mother presents a challenge because culture is closely related to the concepts of race and ethnicity (Betancourt & Lopez, 1993; Quintana et al., 2006). There have been several attempts to establish a clear definition and differentiation of culture in the literature, however, some obscurity still remains (Betancourt & Lopez, 1993; Straub, Loch, Evaristo, Karahanna, & Strite, 2002). Briefly, culture can be defined as “a system of shared beliefs, values, customs, behaviors, and artifacts that the
members of society use to cope with their world and with one another, and that are transmitted from generation to generation through learning” (Rubin et al., 2006, p. 91). Formal definitions, such as the preceding, have been expanded (Logan, Freeman, & McRoy, 1990; Williams-Gray, 2001) to encompass the nature of a people, which includes their way of life. Based on these and other interpretations, culture is a multidimensional and dynamic concept (Bornstein & Cheah, 2006) that can penetrate social boundaries to influence several life domains including personal identity, thoughts, actions, expressions, interactions, and beliefs (Williams-Gray, 2001).

Central to the concept of culture is the assumption that mothers possess different beliefs and behave in different ways based on their goals and the developmental abilities of their children (Bornstein & Cheah, 2006). Because culture shapes maternal beliefs about parenting, culture indirectly affects the care mothers provide for their children, the extent to which mothers permit children freedom to explore, how nurturant or restrictive mothers are, and which child behaviors mothers appreciate and emphasize (Bornstein & Cheah, 2006). Cognitive, language and social development of children are thereby shaped by the mothers’ values, beliefs, and behaviors demonstrated within a particular culture (Rubin et al., 2006).

The effects of culture on parenting have been examined in several disciplines, including psychology, nursing, education, and medicine (Bachtold, 1982; Choi, 1995; McEvoy et al., 2005; Sui, 1998). Culture has mostly been measured implicitly or inferred by researchers; some authors have operationally defined culture as membership in an ethnic group (Choi & Hamilton, 1986; Julian, McKenry, & McKelvey, 1994; Staples & Mirande, 1980), whereas others
have used country of origin (Cabrera, Shannon, West, & Brooks-Gunn, 2006; Choi, 1995; Johnston & Wong, 2002; McEvoy, et al., 2005). Few studies have used structured instruments to measure culture. Although some studies recognize universal parenting practices (McEvoy, et al., 2005), other studies suggest that the major domains of mother-infant interactions are affected by culture (Bornstein & Cheah, 2006; Choi, 1995; Choi & Hamilton, 1986; Julian et al., 1994). These interactive domains include nurturing, social interaction, cognitive stimulation, provisioning the environment (e.g., providing toys, books, etc.), and speaking to children (Bornstein & Cheah, 2006). Previous research suggests that parenting practices that differ from Western norms lead to deficits in child development (Oyemade & Rosser, 1980). This assumption warrants further investigation of culture as a guiding concept for understanding cultural variations in parenting beliefs and behaviors.

1.2.3 The Relationship between Culture and Ethnicity

One approach used to investigate culture is the examination of shared cultural practices (e.g., customs, beliefs, values) within a specific ethnic group. The term ethnic group indicates “membership in a self-identified kinship group, defined by specific cultural values, language, and traditions, and that engages in transmission of the group’s culture to its members” (Helms, 2007, p. 236). Individuals belonging to an ethnic group undergo a developmental process over the course of their lifetime that includes the formation of an ethnic identity, defined as “that part of an individual’s self-concept which derives from [his] knowledge of [his] membership of a social group (or groups) together with the value and emotional significance attached to that membership” (Phinney & Ong,
Awareness of an individual’s ethnic identity may be useful in explaining variations in cultural practices.

1.2.4 Effects of American Indian Culture on Mother-Infant Interactions

An example of cultural variations in parenting behaviors includes beliefs regarding child autonomy. Child autonomy is highly valued in American Indian families. A number of studies have found that American Indian mothers demonstrate liberal parenting practices that promote independence at early ages (Bachtold, 1982; Conners & Donnellen, 1993; Good Tracks, 1973; MacDonald-Clark & Boffman, 1995; MacDonald-Clark & Harney-Boffman, 1994; Nichols, 2004; Seideman et al., 1994; Staples & Mirande, 1980) “with the freedom to experience natural consequences” (Glover, 2001, p.218). Researchers have found that Cherokee and Navajo mothers promote child learning by allowing their children to explore with minimal adult supervision (Conners & Donnellen, 1993; Nichols, 2004). Similarly, in Alaskan Eskimo families, children’s actions were uninhibited unless they proved life-threatening (Glover, 2001). To interrupt children when they are playing, even when it is in the child’s best interest, generally goes against American Indian parenting practices (Good Tracks, 1973). Rather, American Indians provide unobtrusive encouragement without consciously teaching to respect the autonomy of the child (Conners & Donnellen, 1993; Nichols, 2004); a principle described as “non-interference” (Good Tracks, 1973). The relative freedom granted to American Indian children does not indicate a lack of maternal concern, but rather highlights their beliefs about child autonomy (Glover, 2001).
A second example of cultural variations in parenting behaviors involves child discipline. Three forms of child discipline described in the literature include (a) power assertion, (b) love withdrawal, and (c) inductive discipline (e.g., recognizing the effects of your behavior on others; Glover, 2001). Based on previous studies of discipline, American Indian parents tend to use the inductive approach. Rather than the use of physical punishment, American Indian parents promote socialization through permissive methods (Nichols, 2004; Red Horse, 1997). These actions may include modeling of appropriate behavior; using non-verbal signals or disapproving words; avoiding the child; or requiring the child to give restitution for wrongful actions (DuBray & Sanders, 1999; Glover, 2001; Red Horse, 1997; Seideman, Jacobson, Primeaux, Burns, & Weatherby, 1996). Generally, American Indian parents avoid spanking because it is thought to promote shyness and a lack of confidence in children (MacPhee et al., 1996). In an early study of children’s social interaction and parental attitudes among Hupa Indians, Batchold (1982) found that parents preferred reasoning with their children above physical punishment. However, more Hupa Indian parents than White parents reported that they would use physical punishment with an angry child who struck the parent (Batchold, 1982). For Cherokee mothers, the disciplinary approach taken was based on the developmental age of the child (Nichols, 2004). Cherokee mothers’ disciplinary practices involved restructuring their infants’ behaviors without force while respecting their infants’ individual autonomy. One mother reported using redirection and soft vocal tones as a means to distract an irritable infant. The overall belief of Cherokee mothers, that children are innately good and are not intentionally disobedient, serves as an
example of how culture influences parenting beliefs and interactive behaviors (Nichols, 2004).

1.2.5 Characteristics of the Premature Infant

In addition to characteristics of the mother, interactive behaviors between mothers and their premature infants may also be affected by characteristics of premature infants. In the first 2 years of life, the immature and disorganized behaviors of premature infants have been found to result in parenting difficulties (Bakeman & Brown, 1980; Barnard, Bee, & Hammond, 1984; Miles & Holditch-Davis, 1997; Willie, 1991). Prematures were found to be less alert, active, and responsive; delayed in behavioral organization; and more likely to show gaze aversion than fullterms in the early months of infancy (Bakeman & Brown, 1980; Crnic, Ragozin, Greenberg, Robinson, & Basham, 1983; Feldman & Eidelman, 2006; Field, 1981; Landry, Garner, Denson, Swank, & Baldwin, 1993). Mothers of prematures showed higher levels of intrusive behavior without regard to the infant’s state or level of social engagement (Feldman & Eidelman, 2006), possibly because of the mother’s difficulty in interpreting the inconsistent social cues of prematures (Singer et al., 2003). Earlier studies reported more active interactions between mothers and their premature children than fullterm children (Bakeman & Brown, 1980; Barnard et al., 1984). However, these studies were generally brief observations of mothers and their premature infants interacting in an artificial setting. Studies using more lengthy home observations found that prematures received markedly less stimulation than fullterms (Holditch-Davis & Thoman, 1988). Overall, mothers of prematures spent less time with their infants than mothers of fullterms and they spent less time talking to, holding, moving, and
looking at their premature infants (Holditch-Davis & Thoman, 1988). Thus, the level of synchrony (a construct used to denote mother-infant interactions timed to occur together) between premature mothers and their children is disrupted due to characteristics of premature infants (Feldman, 2007).

Greater infant illness severity is another characteristic of premature infants that may affect the quality of mother-premature infant interactions (Chapieski & Evankovich, 1997; Holditch-Davis, Cox, et al., 2003; Jarvis et al., 1989). Many investigators have found that prematures with more severe illnesses, including chronic lung disease and intraventricular hemorrhage, are at greater risk for interactive difficulties than infants with milder illnesses (Landry, Smith, Miller-Loncar, & Swank, 1997). This may be, in part, because mothers of prematures with more medical complications are less sensitive to their infants’ cues and distress and less nurturing, both socially and emotionally, than mothers of fullterms or prematures with fewer medical complications (Jarvis et al., 1989; Muller-Nix et al., 2004). Researchers have also found premature infants to be less responsive to the interactive behaviors of mothers than healthier infants (Landry, Chapieski, Richardson, Palmer, & Hall, 1990; Landry et al., 1997; Singer et al., 2003; Zarling, Hirsch, & Landry, 1988). However, other researchers have found that mothers of chronically ill prematures provide more positive interactions (i.e., more gestures, touching, involvement, playing, and looking) than mothers of non-chronically ill fullterms (Greenberg & Crnic, 1988; Holditch-Davis, Cox, et al., 2003; Holditch-Davis et al., 2007). These latter findings are probably related to mothers’ increased efforts to elicit infant responses as a means to compensate for their infants’ immaturity and lack of responsiveness (Holditch-Davis, Cox, et al., 2003; McGrath et al., 1998; Miles & Holditch-Davis, 1995). These apparently
contradictory findings may be due to different ages studied and differences in definitions of illness severity. It is likely that some aspects of mother-premature infant interactions are less positive and other aspects are more positive than those of fullterms and their mothers. Thus, the interactions of mothers and premature infants are more inconsistent than those of mothers and fullterms.

1.2.6 The Interaction of Culture and Characteristics of the Premature Infant

Because culture appears to play an important role in parenting and child development, accommodation of mothers’ beliefs, values, and practices is critical in providing culturally competent care to infants experiencing illness. Mothers’ responses to infant illness may be shaped by cultural factors related to her social position and systems of meaning (Kleinman, Eisenberg, & Good, 1978). By understanding the complex relationship between illness and culture, we can begin to reveal which culturally relevant parenting values and behaviors shape the mother’s response to children with illness.

The conceptual definition of illness holds that illness is the personal, interpersonal, and cultural reaction to disease or distress (Kleinman et al., 1978). Illness is a culturally constructed concept that determines a mother’s expectations, perception, experience, and ability to cope (Kleinman et al., 1978). Thus, the potential variation in how illness is conceptualized across cultures is great (Kleinman et al., 1978). American Indian family responses will be discussed as they relate to children with both illness and disabilities because a limited number of articles were found that described American Indian family responses to children with illness exclusively. Further, since it has been reported that mothers of ill premature infants and infants with disabilities experience
comparable reactions and adaptations, the term illness will be used mostly to denote illness and disabilities.

Definitions of illness have been reported to vary by culture (Conners & Donnellen, 1993; Joe, 1997; Nichols & Keltner, 2005; Siantz & Keltner, 2004). Members of the Navajo and Native Hawaiian cultures maintain a worldview that assigns no special meaning to having a child with an illness; “the children and their medical conditions are not labeled” (McCubbin, Thompson, Thompson, McCubbin, & Kaston, 1993, p. 1067). Further, the Navajo tribal language contains no negative terminology or vernacular to refer to disability. Rather, a Navajo child diagnosed with mental retardation may be described as “lags or falls behind others” or may not be viewed as disabled if he or she exhibits no signs of physical disability and is able to function similarly to others (Conners & Donnellen, 1993; Joe, 1997; Nichols & Keltner, 2005; Siantz & Keltner, 2004). In general, American Indians view child illness in the larger context of wellness and harmony; regardless of the degree of child illness or wellness, all children are accepted and valued (McCubbin et al., 1993). The responsibility for long-term care and treatment of these children is placed upon the shared family and kin system (McCubbin et al., 1993).

Culture plays an influential role in shaping the family’s responses to having an ill child. In a recent study, Nichols and Keltner (2005) described American Indian families’ adaptation to having school age children with illness in two ways: constructive adjustment or limited adjustment. American Indian families using constructive adjustment believed that the child was given to them for a reason. Despite the illness, children belonging to families using constructive adjustment were included in everyday activities. Nichols and Keltner (2005)
described these families as healthy and “in harmony” because they demonstrated adjustment to children with illness through the following behaviors: coming together as a family, showing love, getting the services needed, altering the environment, adjusting to illnesses, maintaining sobriety, and caring for the child with disabilities in indirect ways. American Indian families using limited adjustment were viewed as “out of harmony” due to their decreased ability to make the necessary adaptations that would allow them to care for the child with illness (Nichols & Keltner, 2005).

A review of the literature of child illness across American Indian cultural groups pointed to the importance of recognizing that cultural differences may partly explain the observed variability in parenting children with illness. Previous efforts to apply White perceptions of illness to ethnic minority families have contributed to erroneous conclusions and wrongful attempts to provide culturally competent care (Joe, 1997). For example, African American mothers more commonly use an authoritarian parenting style that combines authority, physical punishment, and warmth compared to White mothers (Bradley et al., 2001; Cho et al., 2004; Holditch-Davis et al., 2007; McGroder, 2000; Smentana, 2000; Tesh & Holditch-Davis, 1997). Better developmental and social outcomes have been reported for African American premature infants of mothers who use this particular parenting style compared to mothers who did not (Bradley et al., 2001; Brooks-Gunn et al., 1996). Therefore, further research is needed to understand between-group and within-group diversity to illustrate cultural similarities and differences rather than accept global assumptions of family responses and adaptation to child illness that does not consider cultural background. In assessing the responses of the American Indian mothers in caring
for a child with a illness, it is important for researchers to explore the diverse aspects of the American Indian culture and its parenting practices in determining delivery of care (DuBray & Sanders, 1999).

1.3 Factors Affecting Interactions between Lumbee Mothers and their Premature Infants within the Mesosystem

The second level of the environment affecting Lumbee mother-premature infant interactions, the mesosystem, can be viewed as a network of microsystems in which the parent and child are situated (Bronfenbrenner, 1989). This system shapes and is shaped by the complexity of exosystem influences in which it is embedded (Bronfenbrenner, 1989). Mesosystem factors include members of the extended family and environmental factors (e.g., maternal education and socioeconomic conditions).

1.3.1 Involvement of Extended Family

Although cultural differences exist between and within American Indian tribal groups, most findings suggest that American Indian parenting is characterized by shared parenting (MacPhee, et al., 1996; Nichols, 2004; Red Horse, 1997; Rogoff, 2003; Staples & Mirande, 1980). In contrast to the White nuclear parenting pattern, shared parenting within American Indian families highlights the importance of the extended family in parenting. In general, mothers primarily provide care; however, members of the extended family, including aunts, uncles, and grandparents may be actively involved in parenting and serve as mentors or role models (Bahr, 1994; DuBray & Sanders, 1999; Glover, 2001; Mutchler, Baker, & Lee, 2007; Nichols, 2004; Red Horse, 1980, 1997; Rogoff, 2003). In a recent study, Nichols (2004) reported that Cherokee mothers
formed a coalition of family members to help them provide culturally appropriate care for their children. When exploring factors that may affect interactions between Lumbee mothers and their premature infants, it is important to recognize the complex caregiving relationships found between the infant, their mother, and other caregivers in American Indian families.

1.3.2 Environmental Factors

Environmental factors also may affect interactions between Lumbee mothers and their premature infants. Low maternal education, single-parent families, and poverty are all associated with less positive mother-infant interactions and child development (Cho et al., 2004; Holditch-Davis et al., 2007; Jackson et al., 2000; Roopnarine et al., 2005; Schiffman, Omar, & McKelvey, 2003). Socioeconomic conditions of American Indians living in the United States are startling when compared to Whites on standard census-based indicators. The percent of American Indian families in North Carolina living below the federal poverty threshold in 2008 were 21.2% compared to 6.7% for White families (State Center for Health Statistics and Office of Minority Health and Health Disparities, 2010b). About 18% of Lumbee Indians fell below the federal poverty threshold in 1999 (Ogunwole, 2006). American Indians have more family households headed by women than Whites: 29% of American Indian women compared to 13% for Whites (State Center for Health Statistics and Office of Minority Health and Health Disparities, 2010b). Thirty-eight percent of families headed by American Indian women lived in poverty compared to 25% of families headed by White women (State Center for Health Statistics and Office of Minority Health and Health Disparities, 2010b). In 2008, the unemployment rates for American
Indians were 7.5% compared to 5.4% for Whites (State Center for Health Statistics and Office of Minority Health and Health Disparities, 2010b). American Indians had a higher percentage of persons with a high school education or less (60%) than Whites (47%) in 2000 (State Center for Health Statistics and Office of Minority Health and Health Disparities, 2010b). Over a third (35.3%) of Lumbee Indians had a high school education or less and only 12.5% had a bachelor’s degree or more (Ogunwole, 2006). The reasons that American Indians are less educated and earn less than Whites is not well established, but this presents a problem for the health and development of their children.

Within the last decade, researchers have linked the effects of poverty and low maternal education to less positive mother-infant interactions (Jackson et al., 2000; Roopnarine et al., 2005; Schiffman et al., 2003; Tesh & Holditch-Davis, 1997). The first attempts to document the quality of care provided to infants by Canadian Indian mothers, made during 1962 and 1963 by the Department of National Health and Welfare, found that although a large percentage of parents provided less positive parenting, their overcrowded, substandard housing with poor sanitation and unsafe water supplies were more significant contributors to their less positive parenting than were parental characteristics (Graham-Cumming, 1967). Mothers from lower socioeconomic class have been found to be less sensitive to their infant’s cues than middle class mothers, use less verbal and nonverbal communication when interacting with their infants (Schiffman et al., 2003), provide less help to their stationary infants (Roopnarine et al., 2005), and provide less stimulation to their infants (Bradley, Mundfrom, Whiteside, Casey, & Barrett, 1994). Lumbee mothers of premature infants living in poverty reported lack of access to health care and issues related to substance abuse and single
parenting; had limited social exposure; and experienced challenges in visiting with their infants during their hospitalization (Docherty et al., 2007). Single mothers with low education levels, employed in low-wage jobs, and living in poor economic conditions are less likely to provide positive mother-infant interactions than mothers with higher socioeconomic status. Among ethnically diverse mothers, lower maternal education was associated with more use of negative control and less nurturing touch, looking, talking, interactions, and stimulation for learning than mothers with higher education levels (Feeley, Gottlieb, & Zelkowitz, 2005; Gordon, Chase-Lansdale, & Brooks-Gunn, 2004; Tesh & Holditch-Davis, 1997; Weiss, Wilson, Hertenstein, & Campos, 2000). Because Lumbee mothers of premature infants are more likely to experience poverty and provide single parenting, they are at increased risk for experiencing less positive interactions with their premature infants than married mothers not living in poverty.

Poverty produces harmful effects not only on mother-infant interactions, but also on various child measures of health, behavior, and development (Duncan & Brooks-Gunn, 2000; Jackson et al., 2000; McGroder, 2000; Qi, Kaiser, Milan, Yzquierdo, & Hancock, 2003; Rose-Jacobs, Cabral, Beeghly, Brown, & Frank, 2004). For example, cognitive and language skills of at-risk premature infants were more strongly related to how well mothers maintained their infants’ attention during toy play and daily activities than for fullterms (Smith et al., 1996). Therefore, assessment of socioeconomic status, especially maternal education and poverty, is necessary to understand factors affecting the quality of mother-premature infant interactions among the Lumbee.
1.4 Factors Affecting Interactions between Lumbee Mothers and their Premature Infants within the Macrosystem

The macrosystem is the outermost level of the ecological model affecting Lumbee mother-premature infant interactions. This system includes the belief systems, resources, hazards, life styles, opportunity structures, life course options, and patterns of social interchange that are embedded in the contextual patterns of systems (microsystem, mesosystem, and exosystem) characteristic of a given culture, subculture, or other broader social context (Bronfenbrenner, 1989). Macrosystems of ethnicity and social class that exist within a particular culture or subculture support and encourage parenting practices and patterns of mother-infant interaction (Bronfenbrenner, 1989).

1.4.1 History and Culture of the Lumbee

Previously known as the “Croatan Indians” (1885), “Indians of Robeson County” (1911), and “Cherokee Indians of Robeson County” (1913), the Lumbee were recognized as Indian in 1953 by the State of North Carolina. The Lumbee Tribe of North Carolina comprises the largest American Indian tribe east of the Mississippi River with more than 54,000 members (Lumbee Tribe of North Carolina, 2009). Although the Lumbee can be found living in metropolitan cities along the east coast, most reside in Robeson, Hoke, Scotland, and Cumberland Counties (Knick, 2000; Wolfram, Dannenberg, Knick, & Oxendine, 2002). Some of the traditional elements of Lumbee culture include kinship, religion, and spirituality. Kinship is central to Lumbee culture. Similar to a clan, the extended family and immediate community provides individuals with a sense of belonging and a base from which to explore (Knick, 2000). Religion is another important element of the Lumbee culture. The church serves as the hub for the
practice of religion, knowledge exchange, and social functions (Dial & Eliades, 1996). Spirituality, practiced to varying degrees in the Lumbee community, emphasizes the vertical spiritual connection between the Creator and human beings, as well as the horizontal spiritual relationship of human beings and nature (Knick, 2000).

1.4.2 Need for Cross-Cultural Comparison

American Indians and African American mothers in North Carolina have high rates of female-headed single households, low education levels, and live in rural areas with limited resources. While limited research indicates that mother-infant interactions differ between American Indians and Whites (Seideman et al., 1994), many of the findings are based on a small number of American Indian groups of mothers and their fullterm infants. Therefore, extended observation of American Indian mothers and premature infants in naturalistic situations would provide information about interactive behaviors between American Indian mothers and their infants. Although African Americans and American Indians have different cultural experiences, comparison to an ethnic group about which more is known would improve our understanding of the cultural and socioeconomic factors that impact parenting. Further, comparison of these two minority groups will minimize the likelihood that differences will be explained using a deficit model, which assumes that deviation in environment and behavior from the White norm results in deficiencies and must be corrected to promote survival and development of ethnically diverse children (Oyemade & Rosser, 1980). Therefore, additional research is needed to compare interactive
behaviors of these demographically similar groups to determine similarities and differences between their parenting practices.

**1.5 Overall Purpose of Dissertation and Research Questions**

The overall purpose of this longitudinal exploratory study was to describe the interactive behaviors of American Indian mothers from the Lumbee Tribe and their prematurely born infants.

**Specific aims were to:**

1) Describe the interactive behaviors of Lumbee mothers and their prematurely born infants and how these interactions change from 3 to 12 months;
   a. Determine to what extent the interactive behaviors of Lumbee mothers and their prematurely born infants, as measured by naturalistic observations and the HOME Inventory, are affected by infant illness severity (neurological insults) and mothers’ SES (years of education);

2) Compare the interactive behaviors of Lumbee mothers and their prematurely born infants with African American mothers and their prematurely born infants as measured by naturalistic observations at 6 months; and

3) Explore Lumbee mothers’ responses to having a premature infant in the NICU at 3 months and their experience in parenting their prematurely born infants at 12 months.

Together, these studies and their associated chapters are necessary to capture the complex phenomena operating within the environment surrounding the mother and infant. The ecological systems framework allows for the examination of these phenomena by identifying the influential factors functioning within various levels of the environment.
2. Interactive Behaviors between Lumbee Mothers and their Premature Infants

Between 1990 and 2006, the number of premature births (births occurring at < 37 weeks gestation) in the United States increased by more than 20% (Hamilton, Martin, & Ventura, 2010). However, from 2008 to 2009 there was a slight decline in the percentage of infants born premature from 12.3 to 12.2 percent (Hamilton et al., 2010). Despite this decline, significant racial and ethnic disparities persist in the rates of premature birth, with ethnic minorities experiencing higher rates than Whites: 13.5% of births to American Indians are premature versus 10.9% to non-Hispanic Whites (Hamilton et al., 2010). Further, the rate of premature births to American Indians living in North Carolina (15.1%) is higher than the overall rate of premature births to American Indians (National Center for Health Statistics, 2010).

Prematurely born infants experience higher morbidity and mortality than infants delivered at term (Genzel-Boroviczeny, MacWilliams, Von Poblotzki, & Zoppelli, 2006; Kierans, Verhulst, Mohamed, & Foster, 2007; Richardson et al., 1998) and exhibit more cognitive, language, and attention problems than fullterm infants (Davis, Ford, Anderson, & Doyle, 2007; Grunau, Whitfield, & Fay, 2004; Hack et al., 2005; Sansavini et al., 2007; Thompson et al., 1997; van Baar, van Wassenaer, Briet, Dekker, & Kok, 2005). Their poorer developmental outcomes are exacerbated by factors within the social environment, such as the quality of mother-child interactions (Duncan & Brooks-Gunn, 2000; Forcada-Guex, Pierrehumbert, Borghini, Moessinger, & Muller-Nix, 2006; Jackson, Brooks-Gunn, Huang, & Glassman, 2000; McGroder, 2000; Smith, Landry, & Swank,
Despite the high rates of premature births to American Indians and their risk for poor developmental outcomes related to prematurity, literature reporting the quality of interactions between American Indian mothers and their premature infants is scarce. Therefore, the purpose of this first study was to describe interactive behaviors between American Indian mothers from the Lumbee tribe and their premature infants at 3, 6, and 12 months corrected for prematurity, describe how these interactions change over time, and identify factors that affect them.

While interactions between mothers and their prematurely born children have been studied (Bakeman & Brown, 1980; Cho, Holditch-Davis, & Belyea, 2004; Holditch-Davis, Bartlett, & Belyea, 2000; Holditch-Davis & Thoman, 1988; McGrath, Sullivan, & Seifer, 1998), nearly all of the studies have focused on mother-child interactions among Whites and African Americans. Although few studies have examined the interactions of American Indian mothers with their premature infants, interactions have been studied between American Indians and their fullterm infants (MacDonald-Clark & Boffman, 1995; Seideman et al., 1994). In their study of urban American Indians from Oklahoma and Kansas, Seideman et al. (1994) found that while American Indian mothers were less verbal, they provided more social-emotional and cognitive growth-fostering activities to their infants than White mothers. Urban American Indian fullterms also provided clearer cues and were more responsive to their mothers than White fullterm infants (Seideman et al.). However, Canadian Indian mother-infant interactions did not differ from those interactions of Whites, except that Indian mothers provided less cognitive growth-fostering than White mothers (Letourneau, Hungler, & Fisher, 2005). Alaskan Inuit mothers were found to be
less involved, to be less emotionally and verbally responsive, and to provide less cognitive growth-fostering, but were more sensitive to their fullterm’s cues and responsive to fullterm distress than a comparative group, including White, African American, and Hispanic mothers (MacDonald-Clark & Harney-Boffman, 1994).

Generally, these studies failed to describe American Indian mother-infant interactions in detail. However, Nichols (2004) examined infant caring among American Indians and found that Cherokee mothers felt they lived in two cultures and felt compelled to provide personal and health care based on the differing perspectives of these cultures. Cherokee mothers also felt that living spiritually and passing the Cherokee heritage on to their infants was important. To provide culturally appropriate care, Cherokee mothers formed a coalition of family members to help them care for their infants. They reported being less involved with their infants and allowed them to explore with minimal adult supervision to promote learning (Nichols, 2004). To interrupt children when they are playing, even when it is in the child’s best interest, generally goes against American Indian childrearing practices (Good Tracks, 1973). Rather, American Indians provide unobtrusive encouragement without consciously teaching to respect the autonomy of the child (Nichols, 2004). This has been termed “non-interference” (Good Tracks, 1973).

In addition to ethnicity, infant illness severity is a characteristic of premature infants that may affect the quality of Lumbee mother-premature infant interactions (Chapieski & Evankovich, 1997; Holditch-Davis, Cox, Miles, & Belyea, 2003; Jarvis, Myers, & Creasey, 1989). Some investigators have found that prematures with more severe illness, including chronic lung disease and
intraventricular hemorrhage, are at greater risk for interactive difficulties than infants with milder illness (Landry, Smith, Miller-Loncar, & Swank, 1997). This may be in part because mothers of prematures with more medical complications are less sensitive to their infants’ cues and distress and are less nurturing, both socially and emotionally, than mothers of fullterms or prematures with fewer medical complications (Jarvis et al., 1989; Muller-Nix et al., 2004). Premature infants with more severe illnesses also have been found to be less responsive to the interactive behaviors of mothers than healthier infants (Landry, Chapieski, Richardson, Palmer, & Hall, 1990; Landry et al., 1997; Singer, Fulton, et al., 2003; Zarling, Hirsch, & Landry, 1988). However, other researchers have found that mothers of chronically ill prematures provide more positive interactions (i.e., more gestures, touching, involvement, playing, and looking) than mothers of non-chronically ill fullterms or prematures (Greenberg & Crnic, 1988; Holditch-Davis, Schwartz, Black, & Scher, 2007; Holditch-Davis, Cox, et al., 2003). These findings are probably related to mothers’ increasing efforts to elicit infant responses as a means to compensate for their infant’s immaturity and lack of responsiveness (Holditch-Davis, Cox, et al., 2003; McGrath et al., 1998). These apparently contradictory findings may be due to different ages studied and differences in definitions of illness severity.

The quality of Lumbee mother-premature infant interactions also may be affected by socioeconomic factors. Within the last decade, researchers have linked the effects of poverty and lower maternal education to less positive mother-infant interactions (Jackson, Brooks-Gunn, Huang, & Glassman, 2000; Roopnarine, Fouts, Lamb, & Lewis-Elligan, 2005; Schiffman, Omar, Mc Kelvey, 2003; Tesh & Holditch-Davis, 1997). Although a large percentage of low income
Canadian Indian mothers provided poor parenting, their overcrowded, substandard housing with poor sanitation and unsafe water supplies were more significant contributors to their poor parenting than were maternal characteristics (Graham-Cumming, 1967). Mothers living in poverty have been found to be less sensitive to their infant’s cues, use less verbal and nonverbal communication when interacting with their infants (Schiffman et al., 2003), provide less help to their stationary infants (Roopnarine et al., 2005), and provide less stimulation to their infants than middle class mothers (Bradley, Whiteside, et al., 1994). Lumbee mothers of chronically ill infants living in poverty reported lack of access to health care and issues related to substance abuse (Docherty, Lowry, & Miles, 2007). They also reported a high incidence of single parenting, resulting in limited social exposure, and experienced challenges in establishing consistent visitation in the neonatal intensive care unit (NICU; Docherty et al., 2007). Among ethnically diverse mothers, lower maternal education was associated with more use of negative control and less nurturing touch, looking, talking, stimulation for learning and interactions than higher maternal education (Feeley, Gottlieb, & Zelkowitz, 2005; Gordon, Chase-Lansdale, & Brooks-Gunn, 2004; Tesh & Holditch-Davis, 1997; Weiss, Wilson, & Hertenstein, 2000). Thus, single American Indian mothers with low education, employed in low-wage jobs, and living in poor economic conditions are less likely to provide quality parenting than their counterparts.

Strengths of these studies are that they provide some description of mother-infant interactions in American Indian groups (MacDonald-Clark & Boffman, 1995; MacDonald-Clark & Harney-Boffman, 1994; Seideman et al., 1994). However, the cross-sectional nature, small samples, and lack of inclusion...
of premature infants underscore the need for further study. Since mother-
premature child interactions change with age (Holditch-Davis et al., 2007), there
is a need to study these interactions over time. Further, these studies did not
examine factors affecting the interactions. Given the importance of mother-infant
interactions in the development of prematurely born infants (Duncan & Brooks-
Gunn, 2000; Forcada-Guex et al., 2006; Jackson et al., 2000; McGroder, 2000;
Smith et al., 2006), research is needed to examine American Indian mothers’
parenting of their premature infants.

Therefore, the purpose of this longitudinal exploratory study was to
examine behaviors of rural American Indian mothers from the Lumbee Tribe (the
largest tribe east of the Mississippi) and their premature infants during
videotaped interactions at 3, 6, and 12 months corrected age and describe how
these interactions change over time. At 3 months, the mother and child have
made the initial transition to home and are settled in their daily routine. Six
months is a relatively stable time to assess the mother-infant relationship as
infants are becoming more active and involved in social interactions with their
mothers. Twelve months is an important time to observe the mother-infant
relationship as it is affected by the infant’s developing motor and language
abilities. Since infant illness severity (Neurobiologic Risk Score) and the
socioeconomic status (maternal education) of the mother are thought to affect
interactive behaviors (Brazy, Goldstein, Oehler, Gustafson, & Thompson, 1993;
Chapieski & Evankovich, 1997; Holditch-Davis, Cox, et al., 2003; Jarvis et al.,
1989; Roopnarine et al., 2005), their effects were also examined.

Bronfenbrenner’s (1979) ecological systems framework was used to guide
this study. According to this conceptual framework, mother-premature infant
interactions occur within an ecological setting comprised of a hierarchy of nested structures, referred to as the microsystem, mesosystem, exosystem, and macrosystem (Bronfenbrenner, 1979). Within this ecological framework, the environment is viewed as a collection of related settings and the social and cultural contexts of these different settings. Examining mother-infant interactions from an ecological approach emphasizes the study of relationships among the physical and social settings in which premature infants and their mothers are mutually involved (Rogoff, 2003). Because this Lumbee Indian group is situated in a geographically defined area, the ecological framework allows for the study of individual factors affecting mother-premature infant interactions that occur within the mother-infant environment. This study focused on factors occurring in the immediate environment (meso level) of American Indian mothers and their premature infants including characteristics of the mother (ethnicity, mother behaviors, socioeconomic status) and infant characteristics (infant illness severity, infant behaviors).

2.1 Methods

In this longitudinal exploratory study, the interactive behaviors of Lumbee mothers and their premature infants were examined at 3, 6, and 12 months corrected age.

2.1.1 Participants

Mother-infant interactions were examined in a sample of 18 Lumbee biological mothers and their premature infants (i.e., infants born at 37 weeks gestational age or less). Infants were excluded if they had congenital problems associated with neurological or developmental problems (such as Down
Syndrome or congenital hydrocephalus), were symptomatic from substance exposure, were hospitalized longer than 1 month post-term, or were not in the custody of the biological mother. Infants were also excluded if follow-up for 12 months was unlikely (e.g., military or out-of-state visitors as mothers) or if the maternal age was less than 15. Mothers and their infants were recruited from either a NICU (Cape Fear Valley Medical Center or Southeastern Regional Medical Center) or a pediatric clinic (Pembroke Pediatrics or Lumberton Children’s Clinic). Table 1 shows the demographic and birth characteristics of these infants and their mothers.

2.1.2 Measures

2.1.2.1 Naturalistic Observation

Naturalistic observation was conducted at the ages of 3, 6, and 12 months of age corrected for prematurity. Naturalistic observation is a systematic method of observing and quantifying discrete mother-infant interactive behaviors (Holditch-Davis & Thoman, 1988; Thoman, Acebo, Dreyer, Becker, & Freese, 1979) to capture typical interactive behaviors in the home. Three and six-month videotape recordings were scheduled at a time when the infant was awake and due for a feeding. The 12-month videotape recordings were scheduled when the infant was awake and not eating a meal because infants are more independent at this age. Mothers were informed that the goal was to videotape mother-infant behaviors in the home, as if they were interacting in the absence of the researcher. Infants continued to be videotaped during times when the mother left the room. These videotape-recording procedures have been used successfully in earlier studies by Holditch-Davis with African American families and other
Table 1: Demographic Characteristics of the 18 American Indian Premature Infants and their Mothers

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Range</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>13</td>
<td>72.2</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>5</td>
<td>27.8</td>
<td></td>
</tr>
<tr>
<td>Birthweight (g)</td>
<td>1773.7–2775</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gestational age (weeks)</td>
<td>24.4–37.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical ventilation (days)</td>
<td>0–50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NBRS*</td>
<td>0–10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intraventricular hemorrhage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>16</td>
<td>88.9</td>
<td></td>
</tr>
<tr>
<td>Maternal age (years)</td>
<td>17–42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal education (years)</td>
<td>9–17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of previous births</td>
<td>1–6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public assistance**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>4</td>
<td>22.2</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>14</td>
<td>77.8</td>
<td></td>
</tr>
</tbody>
</table>

*Neurobiologic Risk Scale (Brazy, Goldstein, Oehler, Gustafson, & Thompson, 1993).
**Received public assistance during the study period.
minorities, including small numbers of American Indians (Cho et al., 2004; Holditch-Davis, Bartlett, et al., 2000; Holditch-Davis, Tesh, Burchinal, & Miles, 1999), and thus are appropriate for observing Lumbee mothers and their infants.

Videotape recordings were scored using the observational schema previously used by Holditch-Davis (Holditch-Davis et al., 2001, 2007; Holditch-Davis, Bartlett, et al., 2000; Holditch-Davis, Roberts, & Sandelowski, 1999; Holditch-Davis, Tesh, et al., 1999; Holditch-Davis & Thoman, 1988). The scoring system is reliable across investigators, with percentages of agreement above 85% and kappas above .70 (Holditch-Davis et al., 2007; Holditch-Davis, Bartlett, et al., 2000; Holditch-Davis, Sandelowski, & Harris, 1999; Holditch-Davis, Tesh, et al., 1999). This scoring system accommodates infant behaviors from birth to 12 months and allows infants with delayed development to be scored as easily as infants with normal development.

Further, this scoring system has proven useful in distinguishing between behaviors found between African American and White mothers (Tesh & Holditch-Davis, 1997), boys and girls (Cho, Holditch-Davis, & Belyea, 2007), developmentally delayed and normal infants 3 years of age (Holditch-Davis, Bartlett, et al., 2000), and chronically ill infants and prematures without chronic illnesses (Holditch-Davis, Cox, et al., 2003). Definitions of the maternal and infant behaviors are presented in Table 2. The behaviors examined in this study were selected based on findings from previous studies (Cho et al., 2004; Holditch-Davis et al., 2007).
Table 2: Definitions of Mother and Infant Behaviors Used to Code the Videotapes of Mother-Infant Interactions

<table>
<thead>
<tr>
<th>Mother Behaviors</th>
<th>Infant Behaviors</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hold</td>
<td>Positive</td>
<td>Holds or carries the infant.</td>
</tr>
<tr>
<td>Interact</td>
<td></td>
<td>Interacts or plays with the infant (hold, talk, teach, smile, touch, hit).</td>
</tr>
<tr>
<td>Uninvolved</td>
<td></td>
<td>Does not interact with or look at the infant.</td>
</tr>
<tr>
<td>Play with infant</td>
<td></td>
<td>Initiates or takes part in infant’s play activity or games.</td>
</tr>
<tr>
<td>Positive</td>
<td>Positive</td>
<td>Directs positive affect to mother or infant (smile, praise, or affectionate touching).</td>
</tr>
<tr>
<td>Passive observation</td>
<td></td>
<td>Looks at the infant but does not interact.</td>
</tr>
<tr>
<td>Touch</td>
<td>Touch</td>
<td>Touches the mother or infant, such as pats or caresses.</td>
</tr>
<tr>
<td>Look</td>
<td>Look</td>
<td>Looks at the mother or infant.</td>
</tr>
<tr>
<td>Vis-à-vis with mother</td>
<td></td>
<td>Mother and infant have eye-to-eye contact.</td>
</tr>
<tr>
<td>Gesture</td>
<td>Gesture</td>
<td>Gestures or makes a facial expression, such as smiling or showing a toy.</td>
</tr>
<tr>
<td>Talk</td>
<td></td>
<td>Speaks words to infant.</td>
</tr>
<tr>
<td>Not caregiver</td>
<td>Negative</td>
<td>Expresses negative affect to the mother, such as crying or frowning.</td>
</tr>
<tr>
<td></td>
<td>Vocalize</td>
<td>The infant makes one or more sounds.</td>
</tr>
<tr>
<td></td>
<td>Object play</td>
<td>The infant plays with objects (toys, stuffed animal, etc).</td>
</tr>
</tbody>
</table>
Lumbee mother-premature infant interactions were videotaped for 45 minutes. Videotapes were coded so that each 10-second interval was coded for the presence or absence of the identified behaviors. In this study, observation codes were divided into five subsets of behaviors and each subset of behaviors was coded separately. The scored videotape data were entered into a computer for analysis. To ensure acceptable inter-rater reliability, coders were trained until they achieved adequate inter-rater reliability (more than 85% exact agreements and kappas greater than .70) on each behavior they were scoring. 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 .71 to .91 with a mean of .80.

2.1.2.2 HOME Inventory

The Home Observation for Measurement of the Environment (HOME; Birth to 3 Years version) was used to examine social-emotional and stimulation characteristics of the mother and the home environment that are known to positively contribute to the developmental outcomes of infants from birth to 3 years of age (Caldwell & Bradley, 1980). The HOME Inventory was completed at each contact (3, 6, and 12 months corrected age). The scale is comprised of 45 binary items grouped into six subscales to assess various aspects of the home environment: (a) emotional and verbal responsivity of the primary caregiver; (b) avoidance of restriction and punishment; (c) organization of the physical and temporal environment; (d) provision of appropriate play materials; (e) parental involvement with the child; and (f) opportunities for variety in daily stimulation. Subscale and total scores equal the number of “yes” responses recorded (range 0
to 45 for the total HOME score). Although no cut-off points have been established, total scores falling in the lowest fourth of the score range (below 32) indicates a possible risk for delayed development (Totsika & Sylva, 2004). Information required to score the HOME Inventory is collected through a combination of observation in the home and information obtained from the mother. Scoring the HOME Inventory generally takes 15 minutes when using the videotaping situation for the observation portion of the tool.

Numerous studies of the psychometric properties of the HOME Inventory have been reported (Holditch-Davis, Tesh, Goldman, Miles, & D'Auria, 2000; Tesh & Holditch-Davis, 1997). The HOME Inventory has been used as a predictor of development in numerous populations, including American Indian and African American (Bradley et al., 1989; MacDonald-Clark & Boffman, 1995; Tesh & Holditch-Davis, 1997; Williams et al., 2003). Further, previous studies have validated the use of the HOME Inventory with prematures (Bradley, Mundfrom, Whiteside, Casey, & Barrett, 1994; Censullo, 1994). The HOME Inventory has a high internal consistency of the total score, with Cronbach’s alphas of .84 to .80 for 6 and 12 month old infants (Holditch-Davis, Tesh, et al., 2000). Test-retest reliability for the total scale when administered at 6 and 12 months equals .76 to .77 (Caldwell & Bradley, 1980; Holditch-Davis, Tesh, et al., 2000; Tesh & Holditch-Davis, 1997). Inter-observer agreement on the HOME Inventory was as high as 90% in previous studies (Holditch-Davis, Tesh, et al., 2000; Tesh & Holditch-Davis, 1997).

2.2.2.3 Socioeconomic Variables

The socioeconomic variable (maternal education) was collected from
demographic information recorded at enrollment and at subsequent contacts (3, 6, and 12 corrected age). Data were obtained using a revised Demographic Information Questionnaire previously developed by Holditch-Davis (Holditch-Davis et al., 2007). The questionnaire includes questions on the completed years of maternal education.

2.1.2.4 Infant Illness Severity

Infant illness severity (Neurobiologic Risk Score; NBRS) was determined using data collected from the infant’s medical record at enrollment. Data on the severity and duration of seven possible neurological insults – mechanical ventilation, acidosis, seizures, intraventricular hemorrhage, periventricular leukomalacia, infection, and hypoglycemia – were scored 0, 1, 2, or 4 and were summed to provide a total score ranging from 0 to 28 (Brazy et al., 1993; Thompson et al., 1994). Higher scores indicate more severe neurological insults. Inter-rater reliability with the NRBS was reported to be 97% (Brazy et al., 1993). Correlations between the NBRS and the Bayley Mental and Psychomotor Index at 6 and 24 months corrected age were reported as .37 and .65 respectively (Brazy et al., 1993).

2.1.3 Procedures

The staff nurses and case managers at Cape Fear Valley Medical Center (CFVMC) and Southwestern Regional Medical Center (SRMC) determined infant eligibility for the study weekly. If a mother and her premature infant met all eligibility criteria, the staff nurses or case manager provided the mother with a study brochure and obtained verbal consent for follow-up by telephone from the researcher. Whenever possible, enrollment was performed in person during a
mother’s visit to CFVMC or SRMC. When enrollment at CFVMC or SRMC was not possible (because of infrequent visitation or limited time before transfer back to a less-acute care hospital), the researcher scheduled a home visit with permission from the mother.

At Pembroke Pediatrics and Lumberton Children’s Clinic, the health care provider identified eligible participants at the time of the infant’s visit. Following the visit, the health care provider mailed a letter and study brochure to the mothers to obtain verbal consent for follow-up by telephone from the researcher. Enrollment was performed in person during a home visit or during a scheduled visit to the clinic.

When enrolled, mothers signed a consent form approved by the Institutional Review Board of each participating institution. Before data collection, a Lumbee Parent Advisory Committee was assembled to ensure the cultural appropriateness of the questionnaires and data collection procedures. The Lumbee Parent Advisory Committee was comprised of three Lumbee parents of premature infants identified through Pembroke Pediatrics prior to enrollment of study participants. Data was collected on each study participant by the researcher at enrollment and during home visits (at 3, 6, and 12 months corrected age). The home visits were made at a time convenient for the mother. Mother-infant interactions were videotaped at each of the home visits. Mothers were compensated ($10) at enrollment and at each home visit. Infants were given a small gift worth about $10 at each home visit. At the end of the study, the mothers were given a copy of the three videotaped interaction sessions.
2.1.4 Data Analysis

The SAS statistical analysis software (Version 9.2) was used to analyze data using correlations and general linear mixed models (hereafter referred to as mixed models). Univariate summaries were conducted for independent and dependent variables to inspect for missing data and violations of statistical distribution assumptions. Binary data were summarized as frequencies and percentages, and continuous data as means, medians, standard deviations, and ranges.

Statistical models variously referred to as mixed models (Byrk & Raudenbush, 1992; Littell, Milliken, Stroup, & Russell, 1996; Verbeke & Molenberghs, 1997) and multilevel models (Goldstein, 1995) were used to examine the relationship of maternal and infant interactions (naturalistic observation and HOME Inventory) to infant illness severity and socioeconomic status longitudinally. Mixed models extend the standard repeated measures ANOVA to allow for error structures other than compound symmetry and measurements taken at unequal intervals, and make better use of available information when missing data are present (Verbeke & Molenberghs, 1997). In addition, by weighting for differential reliability, mixed models provide more precise estimates of the individual growth trajectories (Singer & Willett, 2003). With this approach, each subject’s repeated measures on the behavior and HOME Inventory were first parameterized as an individual growth trajectory plus an error term. The estimated trajectories were then modeled as a function of differences between individuals on independent variables. Because the ages of the infants at the contacts varied slightly, the actual age of the infant in weeks past term (40 weeks post-menstrual age) was used in analyses. Only the intercept
was included in the random effects component, providing mother–infant dyad specific intercepts across age. Covariates for behavior and HOME outcomes included infant illness severity (NBRS) and socioeconomic status (maternal education).

### 2.2 Results

#### 2.2.1 Mother-Premature Infant Interactions

The results of the mixed models analyses for the mother and premature infant behaviors are presented in Table 3. Five mother variables (mother hold, mother look, mother touch, interaction, and uninvolved) were affected by infant age. Mothers spent less time holding, looking at, touching, and interacting with their premature infants over time. Mothers also spent more time uninvolved with their premature infants over time. In addition, the covariates, infant illness severity (NBRS) and maternal education, had a few effects on mother-infant interactions. Mothers spent more time touching infants with higher illness severity compared to those with lower illness severity. Premature infants with higher illness severity spent more time vocalizing to their mothers than premature infants with lower illness severity. Mothers with more education spent more time talking to their infants than mothers with less education. Premature infants of mothers with more education spent more time vocalizing and less time touching their mothers than premature infants of mothers with lower education.

#### 2.2.2 HOME Inventory

Table 4 presents the results of the mixed model analyses for the HOME Inventory. Although the means of several of the HOME variables appeared to
Table 3: Changes in Mother and Infant Interactions Over Time and Effects of Infant Illness Severity and Socioeconomic Status

<table>
<thead>
<tr>
<th></th>
<th>Corrected Age</th>
<th>Parameter Estimate (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 Months M (SD)</td>
<td>6 Months M (SD)</td>
</tr>
<tr>
<td>Mother hold</td>
<td>52.2 (27.3)</td>
<td>22.4 (18.8)</td>
</tr>
<tr>
<td>Mother not caregiver</td>
<td>2.5 (8.3)</td>
<td>2.3 (8.0)</td>
</tr>
<tr>
<td>Mother look</td>
<td>71.4 (22.3)</td>
<td>66.6 (20.2)</td>
</tr>
<tr>
<td>Vis-à-vis with mother</td>
<td>17.8 (7.5)</td>
<td>17.9 (11.2)</td>
</tr>
<tr>
<td>Mother talk</td>
<td>41.7 (23.9)</td>
<td>39.8 (26.1)</td>
</tr>
<tr>
<td>Mother positive</td>
<td>16.3 (11.3)</td>
<td>13.6 (8.2)</td>
</tr>
<tr>
<td>Mother gesture</td>
<td>27.6 (16.9)</td>
<td>33.7 (17.4)</td>
</tr>
<tr>
<td>Mother touch</td>
<td>37.8 (17.5)</td>
<td>26.8 (15.5)</td>
</tr>
<tr>
<td>Interaction</td>
<td>85.7 (22.4)</td>
<td>69.1 (17.9)</td>
</tr>
<tr>
<td>Passive</td>
<td>3.1 (3.9)</td>
<td>8.8 (7.3)</td>
</tr>
<tr>
<td>observation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uninvolved</td>
<td>11.3 (21.9)</td>
<td>22.1 (16.2)</td>
</tr>
<tr>
<td>Inf: look</td>
<td>21.8 (9.4)</td>
<td>22.7 (11.2)</td>
</tr>
<tr>
<td>Inf: vocalize</td>
<td>28.5 (7.6)</td>
<td>25.1 (12.2)</td>
</tr>
<tr>
<td>Inf: positive</td>
<td>5.2 (4.3)</td>
<td>7.4 (4.0)</td>
</tr>
<tr>
<td>Inf: negative</td>
<td>13.0 (6.4)</td>
<td>6.7 (6.4)</td>
</tr>
<tr>
<td>Inf: gesture</td>
<td>19.2 (7.0)</td>
<td>18.7 (6.1)</td>
</tr>
<tr>
<td>Inf: touch</td>
<td>24.1 (12.6)</td>
<td>18.3 (13.4)</td>
</tr>
<tr>
<td>Inf: play with caregiver</td>
<td>20.4 (12.2)</td>
<td>23.0 (14.0)</td>
</tr>
<tr>
<td>Inf: play with object</td>
<td>7.2 (7.4)</td>
<td>33.8 (11.1)</td>
</tr>
</tbody>
</table>

†p < .10; ‡p < .05; °p < .01
Table 4: Changes in HOME Inventory and Effects of Infant Illness Severity and Socioeconomic Status

<table>
<thead>
<tr>
<th></th>
<th>Corrected Age</th>
<th>Parameter Estimate (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 Months M (SD)</td>
<td>6 Months M (SD)</td>
</tr>
<tr>
<td>Emotional and Verbal Responsivity of the Caregiver</td>
<td>8.4 (2.1)</td>
<td>9.2 (1.6)</td>
</tr>
<tr>
<td>Avoidance of Restriction and Punishment</td>
<td>6.2 (0.5)</td>
<td>6.2 (1.0)</td>
</tr>
<tr>
<td>Organization of the Physical and Temporal Environment</td>
<td>4.9 (1.1)</td>
<td>5.4 (0.9)</td>
</tr>
<tr>
<td>Provision of Appropriate Play Materials</td>
<td>3.2 (1.6)</td>
<td>5.5 (1.5)</td>
</tr>
<tr>
<td>Parental Involvement with the Child</td>
<td>4.2 (1.8)</td>
<td>4.2 (1.6)</td>
</tr>
<tr>
<td>Opportunities for Variety in Daily Stimulation</td>
<td>3.0 (1.1)</td>
<td>3.7 (0.8)</td>
</tr>
<tr>
<td>Total Score</td>
<td>30.0 (5.6)</td>
<td>34.2 (4.5)</td>
</tr>
</tbody>
</table>

†p < .10; ‡p < .05; °p < .01
increase over age, there were no significant changes over age in the subscale and total scores on the HOME Inventory. However, the covariates did affect the HOME Inventory. Mothers provided premature infants with higher illness severity with fewer opportunities for variety in daily stimulation compared to infants with lower illness severity. Mothers with more education scored higher on the subscales for provision of appropriate play materials, parental involvement with the child, and opportunities for variety in daily stimulation than mothers with lower education.

2.3 Discussion

The findings of this study support the use of Bronfenbrenner’s ecological systems framework (Bronfenbrenner, 1989). Of the factors examined, infant illness severity (NBRS) and socioeconomic status (maternal education) were associated with the interactive behaviors and HOME Inventory scores of American Indian mothers and their premature infants over the first 12 months of corrected age. In particular, higher infant illness severity was associated with more maternal touch, more infant vocalization, and fewer opportunities for variety in daily stimulation. Higher maternal education was associated with more maternal talk and infant vocalization; less infant touch; and higher scores on the subscales for provision of appropriate play materials, parental involvement with the child, and opportunities for variety in daily stimulation. Examining the effects of these environmental factors along with the changes in interactive behaviors and the home environment over time allows for a better understanding of the study of relationships between mothers and their premature infants and the social settings in which they exist.
Infant illness severity was related to the interactive behaviors of mothers and their premature American Indian infants. We found that American Indian mothers spent more time touching infants with higher illness severity compared to those with lower illness severity and infants with higher illness severity spent more time vocalizing to their mothers than infants with lower illness severity. Although some investigators have reported less positive interactions between mothers and infants with more medical complications (Feldman et al., 2004; Jarvis et al., 1989), other investigators found that mothers of chronically ill prematures provided more positive interactions (i.e., more gestures, touching, involvement, playing, and looking) than mothers of non-chronically ill fullterms, possibly increasing their efforts to elicit infant responses as a means to compensate for their infant’s prematurity and lack of responsiveness (Greenberg & Crnic, 1988; Holditch-Davis et al., 2007; Holditch-Davis, Cox, et al., 2003; McGrath et al., 1998). Despite mothers’ positive interactions with sicker infants, we found that mothers provided fewer opportunities for variety in daily stimulation to infants with higher illness severity than to those with less illness severity. It is possible that mothers with sicker infants felt more compelled to limit public outings and incorporate fewer social meetings with others to reduce their infants’ potential exposure to infections. As a result, these infants may be at increased risk for poorer social functioning. Others have reported that mothers provided less organization of the environment to premature infants with higher illness severity than those with lower illness severity (Cho et al., 2004). Based on these findings, infant illness severity may exert both positive and negative affects on the quality of interactions between American Indian mothers and their premature infants.
Socioeconomic status was also related to the interactive behaviors between mothers and their premature American Indian infants. The finding that American Indian mothers with more education spent more time talking to their infants than mothers with less education is similar to reports from others stating that mothers with higher socioeconomic status had more episodes and durations of talk with their 3-year-old prematurely born children than mothers with lower socioeconomic status (Cho et al., 2007). Similarly, other investigators have reported that among ethnically diverse mothers, lower maternal education was associated with less talking and stimulation for learning and interactions (Feeley et al., 2005; Gordon et al., 2004; Tesh & Holditch-Davis, 1997; Weiss et al., 2000). Further, mothers with lower socioeconomic status have been found to use a limited vocabulary and shorter utterances in talking to their children than mothers with higher socioeconomic status (Hoff & Tian, 2005). These findings suggest that regardless of ethnicity, lower maternal education may significantly reduce opportunities for talking and stimulation, resulting in an additional risk for poor language development in these at-risk infants. Premature infants of American Indian mothers with more education spent more time vocalizing and less time touching their mothers than infants of mothers with lower education. The increased vocalizing behavior of premature American Indian infants may be due in part to the mother’s increased use of talking behaviors with their infants. These findings suggest that the quality of Lumbee mother-premature infant interactions may be affected by socioeconomic conditions, such as maternal education. In particular, lower maternal education may result in less positive mother-infant interactions (Jackson et al., 2000; Roopnarine et al., 2005; Schiffman et al., 2003; Tesh & Holditch-Davis, 1997).
Our findings that less educated mothers scored lower on the subscales for provision of appropriate play materials, parental involvement with the child, and opportunities for variety in daily stimulation than mothers with higher education are consistent with others who have reported that mothers with less education scored lower on the opportunities for variety in daily stimulation subscale compared to mothers with more education (Cho et al., 2004). Further, other researchers have reported similar findings for mothers living in poverty (Bradley, Corwyn, McAdoo, & Garcia Coll, 2001; Watson, Kirby, Kelleher, & Bradley, 1996). These findings suggest that some aspects of the physical (i.e., stimulating environment with appropriate play materials) and social environments (i.e., mother-infant interaction) of premature infants may be negatively affected in Lumbee mothers with lower maternal education levels. Lower maternal education may result in decreased opportunities for Lumbee mothers, like mothers of other ethnicities with low socioeconomic status, to provide stimulating environments and adequate interaction because of the related effects of poverty. Premature infants living in these types of environments may experience less than optimal parenting resulting in an increased risk for developmental problems (Bradley et al., 2001).

Overall, American Indian mothers’ mean total scores on the HOME Inventory approached the lowest fourth of the score range (below 32), indicating the potential for problems in the social-emotional and stimulation characteristics of the mother and home environment. Scores on the HOME Inventory have been found to be lower for American Indian families than for White families (Bradley, Mundfrom, et al., 1994; Bradley, Whiteside, et al., 1994; Seideman, Haase, Primeaux, & Burns, 1992). Although these cut-off points are arbitrary, low
HOME scores might indicate aspects of the home environments of American Indian premature infants that negatively affect their development (Caldwell & Bradley, 1980; Totsika & Sylva, 2004).

Some mother behaviors increased in frequency over the first 12 months of corrected age, but none of the infant behaviors or scores on the HOME Inventory changed significantly over the first 12 months of corrected age. This lack of significance in findings may be an issue of low power due to our small sample size. Consistent with studies of healthy fullterm infants and medically fragile infants, mothers in our study spent less time holding, looking, touching, involved, and interacting with their premature infants with increasing infant age (Bornstein & Tamis-LeMonda, 1990; Holditch-Davis, Tesh, Miles, and Burchinal, 1999; Minde, Perrotta, & Marton, 1985). These findings are probably due to mothers’ responses to changes in the infant’s social development with increasing infant age. Similar to mothers of fullterm infants, mothers of premature infants may be more likely to be involved in more distal interactions (e.g., talking and gesturing) than more proximal interactions (e.g., holding and touching) with their infants as they age due to the infant’s increasing alertness and vocalization (Belsky, Gilstrap, & Rovine, 1984; Bornstein & Tamis-LeMonda, 1990; Holditch-Davis & Thoman, 1988; Minde et al., 1985). Based on our findings, there is the need for additional research that examines the effects of infant and maternal characteristics, such as illness severity and maternal education, on the interactions between American Indian mothers and their premature infants over time.

Several factors may limit the generalizability of this study. First, the interactions of 18 mothers and their premature infants were examined at 3 time
points. The small sample size of this study may have resulted in inadequate power to detect changes in mother and infant behaviors over time. While the longitudinal design was considered a strength of this study, future studies including larger samples of American Indian mothers and their premature infants followed over a longer period of time may result in more generalizability of the findings. Another limitation may be the medical and socioeconomic homogeneity of the study sample. Future studies including recruitment of premature infants with a larger range of gestational ages and more complicated medical conditions are warranted, as they might result in different findings.

Study findings emphasize the importance for nurses and other health care professionals to be aware of the environmental factors affecting the quality of interactions between American Indian premature infants and their mothers. During the infant’s hospitalization, nurses can gather data related to the medical course of the infant and the mother’s socioeconomic situation to determine what resources they can offer to mothers and their infants following discharge if necessary to improve the quality of mother-infant interactions or aspects of their home environment. Mothers, particularly those with low education, should be provided with information on ways they can provide a stimulating environment to their infants and the importance of being physically and emotionally involved with their infants. These small but important changes in maternal behavior may potentially reduce the risk for poor developmental outcomes associated with prematurity and lower maternal education. Further, healthcare efforts focused on the needs of American Indian mothers of premature infants in the first 12 months of corrected age, particularly those with inadequate resources, may improve the quality of mother-infant interactions by providing a better home environment.
and lead ultimately to improvements in the developmental outcomes for these at-risk premature American Indian infants.
3. Effects of Maternal Ethnicity on the Interactions between Mothers and their Premature Infants

More than one-half million or 12.2% of all infants are born premature (< 37 weeks gestation) each year in the United States (Hamilton, Martin, & Ventura, 2010). Significant racial and ethnic disparities exist in the rates of premature birth, with ethnic minorities experiencing higher prematurity rates than Whites: 17.5% of births to African Americans and 13.5% to American Indians are premature versus 10.9% for non-Hispanic Whites (Hamilton et al.). Further, 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).

Infants delivered preterm experience higher morbidity and mortality than infants delivered fullterm (Genzel-Boroviczeny, MacWilliams, Von Poblotzki, & Zoppelli, 2006; Kierans, Verhulst, Mohamed, & Foster, 2007; Richardson et al., 1998). 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, 2010; 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 Wassenaer, Briet, Dekker, & Kok, 2005; Walther, den Ouden, & Verloove-Vanhorick, 2000). The developmental outcomes of premature infants are further exacerbated by factors within the social environment, such as the quality of mother-infant interactions.
While factors affecting interactions between mothers and their premature infants have been studied, nearly all of the studies have focused on mother-infant interactions among Whites and African Americans (Bakeman & Brown, 1980; Cho, Holditch-Davis, & Belyea, 2004; Holditch-Davis, Bartlett, & Belyea, 2000; Holditch-Davis & Thoman, 1988; McGrath, Sullivan, & Seifer, 1998). Studies that compared mother-infant interactions of American Indians and Whites focused on fullterm infants (MacDonald-Clark & Boffman, 1995; MacDonald-Clark & Harney-Boffman, 1994; Seideman et al., 1994). 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, research is needed to examine American Indian mothers’ parenting practices with their premature infants (Duncan & Brooks-Gunn, 2000; Forcada-Guex et al., 2006; Jackson et al., 2000; McGroder, 2000; Smith et al., 2006). Therefore, the purpose of this second study was to examine the interactive behaviors of American Indian mothers from the Lumbee Tribe (the largest tribe east of the Mississippi) and their premature infants in comparison to a group about which more is known - African American mothers and their premature infants.
3.1 Factors Affecting Mother-Infant Interactions

Prematurity may affect mother-infant interactions, as prematurely born infants have been found to be less alert, active, and responsive; delayed in behavioral organization; and more likely to show gaze aversion than fullterms in the early months of infancy (Bakeman & Brown, 1980; Crnic, Ragozin, Greenberg, Robinson, & Basham, 1983; Feldman & Eidelman, 2006; Field, 1981; Holditch-Davis, Cox, Miles, & Belyea, 2003; Landry, Garner, Denson, Swank, & Baldwin, 1993). Further, mothers of prematures have shown 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 prematures (Feldman & Eidelman, 2006; Singer et al., 2003). Earlier studies reported mothers were more active in their interactions with their premature infants than fullterm infants (Bakeman & Brown, 1980; Barnard, Bee, & Hammond, 1984). However, these studies were generally brief observations of mothers and their premature infants interacting in artificial settings. Studies using more lengthy home observations found that premature infants received markedly less stimulation than fullterms (Holditch-Davis & Thoman, 1988). Overall, mothers of prematures spent less time talking to, holding, moving, and looking at infants than mothers of fullterms (Holditch-Davis & Thoman, 1988). Thus, the level of synchrony (mother-infant interactions timed to occur together) between premature mothers and their infants is disrupted due to characteristics related to prematurity, including infant’s health status (Feldman & Masalha, 2007; Holditch-Davis et al., 2003).
Mother-premature infant interactions have also been found to differ by maternal ethnicity (Cardona, Nicholson, & Fox, 2000; Cho et al., 2004; Cho, Holditch-Davis, & Belyea, 2007; Holditch-Davis, Schwartz, Black, & Scher, 2007; MacDonald-Clark & Boffman, 1995). For example, more warmth, talking, physical contact, and social behaviors combined with negative control strategies have been reported for African American mothers of premature infants as compared to White mothers (Bradley, Corwyn, McAdoo, & Garcia Coll, 2001; Brooks-Gunn, Klebanov, & Duncan, 1996; Cho et al., 2004; Holditch-Davis et al., 2007; Tesh & Holditch-Davis, 1997). This particular parenting style has resulted in better developmental and social outcomes for African American premature infants of mothers who use these specific parenting behaviors compared to mothers who did not (Bradley et al., 2001; Brooks-Gunn et al., 1996).

Differences in mother-infant interactions have also been found between American Indian and Whites, but these studies were all of fullterms (MacDonald-Clark & Boffman, 1995; Seideman et al., 1994). In their study of urban American Indians from Oklahoma and Kansas, Seideman and colleagues (1994) found that while American Indian mothers were less verbal, they provided more social-emotional and cognitive growth-fostering activities to their infants than Whites. Urban American Indian fullterms also provided clearer cues and were more responsive to their mothers than White fullterms (Seideman et al.). However, in a study of low-income Canadian Indians, parent-child interactions did not differ from the interactions of Whites, except that Canadian Indian parents provided less cognitive growth-fostering than White parents.
Similarly, Alaskan Inuit mothers provided less cognitive growth-fostering than a comparative group, including White, African American, and Hispanics (MacDonald-Clark & Harney-Boffman, 1994). While Alaskan Inuit mothers were less involved with their fullterms and less emotionally and verbally responsive, they 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 resided in two cultures (American Indian and mainstream society) and provided personal and health care based on the differing perspectives of these cultures. Cherokee mothers also reported that living spiritually and passing the Cherokee heritage on to their children was important to the care they provided. To provide culturally appropriate care, Cherokee mothers formed a coalition of family members to help them care for their children. Infants were allowed to explore with minimal adult supervision to promote learning (Nichols, 2004). To interrupt children when they are playing, even when it may be in the child’s best interest, generally goes against American Indian childrearing practices (Good Tracks, 1973). Rather, American Indians provide unobtrusive encouragement without consciously teaching to respect the autonomy of the child, which has been termed “non-interference” (Good Tracks, 1973; Nichols, 2004).

While limited research indicates that mother-infant interactions differed 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 naturalistic situations would provide
information about interactive behaviors between 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 ($21,834 for a family of four) 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, fell 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 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).
Discrepancies in education also exist between ethnic minorities and Whites in North Carolina. In 2008, 20% of African American adults (ages 25 and older) 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 (35.3%) 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 of children belonging to these families (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 environment and 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 examine the influence of maternal ethnicity on the interactive behaviors between mothers and their premature infants at 6 months of age corrected for prematurity. Six months is a relatively stable time to assess the mother-infant relationship as the mother and infant have made the transition to home and the initial interactive differences observed between
fullterm 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 naturalistic observations, differed by maternal ethnicity, controlling for pre-existing differences in mother and infant characteristics between the two groups.

This study was guided by the ecological framework that suggests that mother-premature 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. Within this framework, the environment is viewed as a collection of related settings and the social and cultural contexts found within these settings. 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. Examining mother-infant interactions and parenting experiences from an ecological approach emphasizes the study of relationships among the physical and social settings in which infants and their families are mutually involved (Rogoff, 2003). Because these two ethnic groups share similar demographics, the ecological framework allows a focus on understanding the cultural effects on mother-premature infant interactions within the mother-infant environment.

3.2 Methods

This descriptive, comparative study examined the effect of maternal
ethnicity on the interactive behaviors of mothers and their 6-month-old premature infants.

3.2.1 Sample

3.2.1.2 American Indian Participants

American Indian mothers and their premature infants were recruited from two regional medical centers and two pediatric clinics located in southeastern North Carolina. Infants from singleton and multiple births were eligible for the larger study if they were of Lumbee Indian ethnicity and born at 37 weeks gestational age or less. For multiple births, the sickest infant was selected for inclusion in the study. Infants were excluded if they had congenital neurological problems (such as Down Syndrome, congenital hydrocephalus, or microcephaly), were symptomatic from substance exposure, were hospitalized longer than 1 month post term, or were not in the custody of the biological mother. Infants also were excluded if the mother was less than 15 years of age. The present study focused on the 17 premature infants and their mothers from the original sample who had at least 6 months of data beyond term. Table 5 summarizes the demographics and birth characteristics of these infants.

3.2.1.2 African American Participants

Data on African American mothers and their premature infants were obtained from a larger nursing support intervention study \( (N = 197) \) conducted at two regional perinatal centers 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 belonging to the control group who had at least 6 months of data beyond term (Holditch-Davis et al., 2009). Infants from either singleton and twin births were eligible for the larger study if they were born fewer than 35 weeks gestational age and considered high risk for developmental and health problems because they either weighed less than 1,750 g at birth or required mechanical ventilation. Similar exclusion criteria that were used to recruit the Lumbee participants were used to recruit African American participants in the comparison group. Demographic characteristics for the comparison group are shown in Table 5.

3.2.2 Measures

3.2.2.1 Mother-Infant Interactions

Naturalistic observation is a systematic method of observing and quantifying discrete mother-infant behaviors to capture typical interactive behaviors in the home (Holditch-Davis & Thoman, 1988; Thoman, Acebo, Dreyer, Becker, & Freese, 1979). Six-month videotapes were scheduled at a time when the infant was awake and due for a feeding. Mothers were informed that the goal was to videotape mother-infant behaviors in the home, as if they were alone. Videotapes were scored using the observational schema previously developed by Holditch-Davis (Holditch-Davis et al., 2000, 2001, 2007; Holditch-Davis, Roberts, & Sandelowski, 1999; Holditch-Davis, Tesh, Burchinal, & Miles, 1999). High inter-rater reliability, with percentages of agreements above 85 and
Table 5: Differences in the Demographic Characteristics of the 6-month-old Premature Infants and their American Indian and African American Mothers

<table>
<thead>
<tr>
<th></th>
<th>American Indian (n=17)</th>
<th>African American (n=60)</th>
<th>Group Difference</th>
<th>χ² (df=1)</th>
<th>Fisher’s† p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birthweight (g)</td>
<td>1828.6 (651.2)</td>
<td>1086.1 (400.4)</td>
<td>4.47***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gestational age (weeks)</td>
<td>32.9 (4.0)</td>
<td>28.3 (2.9)</td>
<td>5.32***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected age at observation (months) ‡</td>
<td>6.3 (1.2)</td>
<td>7.3 (1.6)</td>
<td>2.21*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic lung disease (%)</td>
<td>0.0</td>
<td>21.7</td>
<td>0.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intraventricular hemorrhage (%)</td>
<td>11.8</td>
<td>21.7</td>
<td>0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother’s age (years)</td>
<td>26.5 (7.5)</td>
<td>25.2 (6.4)</td>
<td>0.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother’s education (years)</td>
<td>13.6 (2.6)</td>
<td>12.5 (1.8)</td>
<td>1.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of previous births</td>
<td>2.1 (1.4)</td>
<td>2.8 (1.8)</td>
<td>1.63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple births (%)</td>
<td>11.8</td>
<td>10.0</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public assistance (%)</td>
<td>58.8</td>
<td>53.3</td>
<td>0.16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05; **p < .01; ***p < .001.
†Fisher’s exact test.
‡Infants’ ages were corrected for prematurity (number of weeks premature was subtracted from chronological age.)
kappas above .70, has been documented (Holditch-Davis et al., 2007; Holditch-Davis, Bartlett, et al., 2000; Holditch-Davis, Roberts et al., 1999; Holditch-Davis, Sandelowski, & Harris, 1999).

Behaviors have been found to differ between African American and White mothers, boys and girls, and medically fragile infants and premature infants without chronic illnesses (Cho et al., 2004; Holditch-Davis, Cox, et al., 2003; Tesh & Holditch-Davis, 1997). To ensure acceptable inter-rater reliability, coders were trained until they achieved adequate inter-rater reliability (more than 85% exact agreements and 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 .71 to .91 with a mean of .80.

Data from videotaped recordings of naturalistic observations were used to compare interactive behaviors of Lumbee mothers and their premature infants with those of African American mothers and their premature infants at 6 months corrected age. For these observations, American Indian mother-infant interactions were videotaped for 45 minutes. Videotapes were coded such that the presence or absence of the identified behaviors in each 10-second interval was scored. The African American mother-infant interactions were previously coded using this system. In this study, the codes were divided into five subsets of behaviors and each subset of behaviors was coded separately. These recorded observations were used to analyze the occurrences of twelve mother behaviors (hold, interact, uninvolved, play, positive, passive, touch, look, vis-à-vis, gesture, talk, and not caregiver) and seven infant behaviors (positive, touch, look, gesture, negative, vocalize, and object play; see Table 2 for variable definitions) based on
observed ethnic differences in other studies (Bakeman & Brown, 1980; Cho et al., 2004; Holditch-Davis et al., 2007). After scoring, the scored videotape data were entered into a computer for analysis.

3.2.2.2 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 to measure 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.

3.2.2.3 Infant Neonatal Medical Data

The infants’ medical 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).

3.2.3 Procedures

The original studies were approved by the Institutional Review Boards for protection of human subjects of the participating institutions. Mothers provided informed consent for their and their infants’ participation when the infants were no longer critically ill (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.
3.2.4 Data Analysis

Each mother and infant behavior from the naturalistic observations was measured as a percent of the total observation time. T-tests, Pearson’s chi-square tests, and Fisher’s exact tests were conducted to compare infant and maternal characteristics by maternal ethnicity: t-tests were used to compare group differences for continuous data; Pearson’s chi-square tests were used for frequency data; and Fisher’s exact tests were used 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 birth weight and corrected age at observation). Alpha was set at .05 for all analyses.

3.3 Results

3.3.1 Effects of Maternal Ethnicity on Demographic Characteristics

The infants and mothers were divided into groups based on maternal ethnicity. As shown in Table 5, 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 birth weights, were born at later gestational ages, and were slightly younger in corrected age at the 6-month observation than the African American premature infants. Birth weight and corrected age were used as covariates in all further analyses. To avoid multicollinearity, gestational age was not retained as a covariate, as a Pearson correlation indicated a strong positive association ($r (77) = 0.88, p < .001$) between gestational age and birth weight.
3.2.2 Effects of Maternal Ethnicity on Mother and Infant Behaviors

*T*-tests were used to compare mother and infant behaviors by maternal ethnicity (see Table 6). American Indian mothers were the caregivers for a greater percentage of the observed time than African American mothers. Also, American Indian mothers looked more, talked 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 did African American Infants.

An ANCOVA was employed to control for birth weight and corrected age. 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 (*p* = .10), 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. Infants with older corrected ages at observation were held less and had mothers who spent less time as the primary caregiver. Infants of younger corrected ages at observation vocalized more to their mothers. Infants with higher birth weights expressed more positive affect towards their mothers.

3.4 Discussion

This study is one of the first studies to compare interactions of 6-month-old American Indian and African American premature infants and their mothers. The findings suggest that there were more similarities than differences in the mother-infant interactions of American Indians and African Americans, with no
Table 6: Effects of Maternal Ethnicity and Covariates from $T$-test and Analysis of Covariance for Mother and Infant Behaviors

|                        | American Indian (n=17) | African American (n=60) | $t$-test $t$ (1,75) | $R^2$ Ethnicity $F (1,74)$ Birth weight $F (1,74)$ Corrected age $F (1,74)$ |
|------------------------|-----------------------|-------------------------|---------------------|---------------------------------|----------------------------------|
| Mother hold            | 22.4 (18.8)           | 23.8 (19.9)             | 0.25                | 0.08                            | 1.72                             | 4.72†                             |
| Mother not caregiver   | 2.3 (8.0)             | 17.1 (24.4)             | 4.00‡               | 0.16‡                           | 5.66†                            | 2.15                              | 6.06†                             |
| Mother look            | 66.6 (20.2)           | 47.8 (21.5)             | 3.22†               | 0.15‡                           | 5.51†                            | 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                              | 0.14                              |
| Mother talk            | 39.8 (26.1)           | 27.2 (18.7)             | 2.25†               | 0.07                            | 2.73                             | 0.00                              | 0.43                              |
| Mother positive        | 13.6 (8.2)            | 9.5 (7.7)               | 1.94                | 0.05                            | 2.46                             | 0.02                              | 0.00                              |
| Mother gesture         | 33.7 (17.4)           | 17.8 (11.9)             | 3.54‡               | 0.20*                           | 13.35*                           | 0.04                              | 0.00                              |
| Mother touch           | 26.8 (15.5)           | 20.0 (13.2)             | 1.82                | 0.08                            | 2.88                             | 0.87                              | 2.36                              |
| Interaction            | 69.1 (17.9)           | 63.8 (23.1)             | 0.86                | 0.02                            | 0.02                             | 0.70                              | 0.15                              |
| Passive observation    | 8.8 (7.3)             | 8.0 (6.3)               | 0.44                | 0.01                            | 0.40                             | 0.05                              | 0.47                              |
| Uninvolved             | 60.3 (22.1)           | 55.8 (26.5)             | 0.63                | 0.03                            | 0.14                             | 0.71                              | 0.04                              |
| Infant look            | 22.7 (11.2)           | 19.6 (11.4)             | 1.00                | 0.02                            | 0.19                             | 0.33                              | 0.05                              |
| Infant vocalize        | 25.1 (12.2)           | 28.2 (17.6)             | 0.68                | 0.07                            | 1.40                             | 0.08                              | 4.73†                             |
| Infant positive        | 7.4 (4.0)             | 3.2 (3.0)               | 4.70*               | 0.29*                           | 8.77‡                            | 5.27†                             | 1.58                              |
| Infant negative        | 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       | 23.0 (14.0)           | 16.4 (11.4)             | 1.99                | 0.08                            | 2.18                             | 0.52                              | 2.22                              |
| caregiver              |                       |                        |                     |                                 |                                  |                                   |                                   |
| Infant play with       | 33.8 (11.1)           | 36.8 (16.9)             | 0.70                | 0.03                            | 0.66                             | 0.42                              | 1.24                              |
| object                 |                       |                        |                     |                                 |                                  |                                   |                                   |

†p < .05; ‡p < .01; *p < .001
observed group differences for 14 of the 19 maternal and infant behaviors. Differences were found in three maternal behaviors and two infant behaviors. 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. 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, they are not likely to explain the group differences in mother talk observed in the *t*-test. Thus, the lack of significant group differences in mother talk was probably due to the smaller degrees of freedom in the ANCOVA. Only a few of the maternal and infant behaviors were affected by the covariates, birth weight and age at observation. Because the covariates did not explain the observed group differences in mother look, mother gesture, mother not caregiver, infant gesture, and infant positive, these differences were likely to be due to culture.

The finding that American Indian mothers were more often the caregivers than African American mothers appears to be inconsistent with other reports about American Indian parenting practices. Generally, American Indian mothers, including Lumbees, have been described as utilizing a coalition of family members to help them care for their children (Nichols, 2004). Although African Americans also employ assistance from others in caring for their children, there may be differences 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, American Indian mothers appeared to maintain
sole responsibility while fostering relationships between their infant and extended family members (Nichols, 2004). While other family members were often present during the observations for American Indians, these mothers may have assumed responsibility in caring for the infant based on their cultural expectation. On the other hand, the Lumbee mothers may have been acting based on their understanding that the purpose of the study was to videotape the mother’s interactions with her infant. Therefore, establishing whether American Indian mothers and African American mothers naturally differ in the amounts of time they spend as the infant’s primary caregiver is difficult.

The finding that African American mothers looked less at their infants than 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 compared to 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 White mothers. However, in a cross-cultural 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). This suggests that Mayan mothers were more likely to display more looking behaviors, as did the Lumbee mothers in the current study. 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.

The finding that American Indian mothers talked more to their infants than African American mothers became non-significant when including covariates. Because the ethnic differences in maternal talking behaviors were not explained by infant birth weight or age at observation, these differences may be related to ethnic variations in patterns of talking behaviors. Others have also shown differences in maternal talking between non-Whites and Whites: non-White children and their mothers had fewer episodes and shorter duration of talk than White children and their mothers (Cho et al., 2007). These differences in talking may be due to parenting practices originating from the cultural norms and values for American Indian mothers. Identifying cultural differences in talking behaviors is important, as less quality mother-infant interactions and especially less talking, were found to be associated with language delays in children (Holditch-Davis, Bartlett, et al., 2000; Skuban, Shaw, Gardner, Supplee, & Nichols, 2006).

Several 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 than African American infants. 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 fullterms (Seideman et al., 1994). It is possible that our findings of more positive infant behaviors were 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 (e.g., illness severity).

Mother-premature infant interactions were also affected by age at observation and birth weight: infants with older corrected ages were held less and had mothers who spent less time as the primary caregiver; infants of younger corrected ages vocalized more to their mothers; and lower birth weight infants directed less positive affect to their mothers. The finding that older infants were held less and had mothers who spent less time as the primary caregivers may be related to the increasing level of independence in play and exploration that occurs with infant development. It is possible that infants of younger corrected ages vocalized more to their mothers because they tended to be fussier than older infants. Less positive affect displayed by the smaller and less developed premature infants in the present study may result from their being less responsive to the interactive behaviors of their mothers than healthier infants (Landry, Chapieski, Richardson, Palmer, & Hall, 1990; Landry, Smith, Miller-Loncar, & Swank, 1997; Singer et al., 2003; Zarling, Hirsch, & Landry, 1988).

We found no differences in demographic characteristics between American Indian mothers and African American mothers. These findings show 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-premature 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; Jackson et al., 2000; Roopnarine, Fouts, Lamb, & Lewis-Elligan, 2005; Schiffman, Omar, & McKelvey, 2003). Given the comparable demographics between American Indians and African Americans in this study, the observed differences in maternal and infant behaviors were likely related to cultural differences.

Our results reveal that differences in interactive behaviors between mothers and their premature infants exist between different groups of ethnic minority mothers. However, our study only examined differences at 6 months corrected age. Thus, we do not know whether these ethnic differences in interactive behaviors persist in 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 to interact with their infants during the observations may have occurred. It is unlikely that the infant behaviors were affected by these instructions due to their immaturity in age and 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 in to guide this study was supported by the findings that behaviors of Lumbee and African American mothers and their premature infants differed by ethnicity. Their unique cultural backgrounds, an important environmental factor, was shown to impact both maternal and infant behaviors. Future studies designed to examine factors related to ethnicity, such as cultural identity and beliefs, and their impact on mother-premature infant
interactions is warranted, given that these dynamic elements exist in the social environment in which premature infants and their mothers exist.

3.4.1 Recommendations for Future Research

Our 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 prematures and fullterms may offer more insight on the extent to which these behaviors vary by gestational age at birth. Moreover, future studies may benefit from including larger samples of American Indian mothers and their premature infants and comparing their interactions with those of other racial and ethnic groups over time. Larger sample sizes would improve the power to detect ethnic differences and increase generalizability of the findings while extended periods of observation would provide information on changes in ethnic differences in mother-premature infant interactions over time. 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.
4. Lumbee Mothers’ Responses to the Birth and Hospitalization of their Premature Infant and their Parenting Experiences

Giving birth to a premature infant who is hospitalized in a neonatal intensive care unit (NICU) often causes distress for mothers (Franck, Cox, Allen, & Winter, 2005; Holditch-Davis & Miles, 2000; Meyer et al., 1995; L. T. Singer et al., 1999). Distress often continues after hospital discharge when the mothers must assume responsibility for caring for their premature infants (Bakewell-Sachs & Gennaro, 2004; Holditch-Davis, Bartlett, Blickman, & Miles, 2003; Kersting et al., 2004; Olshtain-Mann & Auslander, 2008). While mothers’ experiences of having a premature infant in the NICU have been studied (Holditch-Davis & Miles, 2000; Miles, Burchinal, Holditch-Davis, Brunssen, & Wilson, 2002; Miles, Funk, & Kasper, 1991, 1992), nearly all of the studies have focused on the experiences of White and African American mothers. Similarly, mothers’ experiences of parenting after discharge have been studied mostly among White and African American mothers (Miles, Holditch-Davis, & Shepherd, 1998; Miles & Holditch-Davis, 1995). Despite the high rates of prematurity in American Indians (Hamilton, Martin, & Ventura, 2010), little is known about these mothers’ responses to the birth and hospitalization of their premature infants and how their responses impact their parenting experiences over time. Therefore, the purpose of this third study was to describe Lumbee Indian (the largest American Indian tribe east of the Mississippi) mothers’ responses to the birth and hospitalization of their premature infant at 3 months corrected for prematurity and to explore the extent to which these early responses are related to maternal experiences of parenting at 12 months.
corrected age. Three months corrected age occurs after the transition home and the establishment of a daily routine. Twelve months corrected age was an important time to explore mothers’ perceptions of parenting as major changes have occurred in infant development.

Maternal distress during the infant’s hospitalization may result from the mother’s inability to protect the infant from pain and to comfort the infant through treatments for various complications related to prematurity (Miles et al., 1991, 2002; Wereszczak, Miles, & Holditch-Davis, 1997). Distress may also arise from the appearance and size of the premature infant; alterations in expected parenting roles, including extended periods of separation and reduced opportunities to hold or interact with the infant (Dudek-Shriber, 2004; Holditch-Davis & Miles, 2000; Miles et al., 1991; Wereszczak et al., 1997); and characteristics of the NICU environment – the sights and sounds of the unit, the equipment, and relationships with health care providers and nursing staff (Affonso et al., 1992; Miles et al., 1991, 2002). Mothers’ guilt over their failure to carry the infant to term; uncertainty about the infant’s medical condition; and feelings of disappointment, sadness, helplessness, and worry about infant survival and health may all further increase maternal distress (Holditch-Davis & Miles, 2000; Miles et al., 2002; Shin & White-Traut, 2007; Trause & Kramer, 1983; Wereszczak et al., 1997). Feelings of extreme protectiveness, persistent fears of infant sickness and death, and concern about the child’s physical health and development have been found to extend into later infancy and childhood (Holditch-Davis, Bartlett, et al., 2003; Miles et al., 1998; Miles & Holditch-Davis, 1995; Miles, Holditch-Davis, Thoyre, & Beeber, 2005).
These maternal responses to the birth and hospitalization of a premature infant may vary with ethnicity, with minority mothers having been found to experience more hospital-related distress than White mothers (Beckman & Pokorni, 1988; Miles et al., 2002). Further, Miles and colleagues (2002) found that maternal education influenced responses to having a premature infant in the NICU, as mothers with less education expressed more worry about their infants. Lumbee Indian mothers’ responses to prematurity may be affected by both their ethnic and educational backgrounds because demographically these mothers have high rates of female-headed households, low education, and live in poverty with access to limited resources (State Center for Health Statistics and Office of Minority Health and Health Disparities, 2010b).

In addition, the ethnic backgrounds of American Indian mothers of premature infants is likely to affect their parenting. Although cultural differences exist between and within American Indian tribal groups, most findings with parents of fullterm infants suggested that American Indian parenting was characterized by shared parenting (MacPhee, Fritz, & Miller-Heyl, 1996; Nichols, 2004; Red Horse, 1997; Rogoff, 2003; Staples & Mirande, 1980). Mothers primarily provided care, but extended family members, including aunts, uncles, and grandparents, were actively involved in parenting and served as mentors or role models for the infants (DuBray & Sanders, 1999; Glover, 2001; Mutchler, Baker, & Lee, 2007; Nichols, 2004; Red Horse, 1980, 1997; Rogoff, 2003). Nichols (2004) reported that Cherokee mothers formed a coalition of family members to help them provide culturally appropriate care for their infants. Rather than using physical punishment, American Indian parents tended to promote socialization using permissive methods (Nichols, 2004; Red Horse, 1997), including modeling
of appropriate behavior, using non-verbal signals or disapproving words, avoiding the child, or requiring the child to give restitution for wrongful actions (DuBray & Sanders, 1999; Glover, 2001; Red Horse, 1997; Seideman, Jacobson, Primeaux, Burns, & Weatherby, 1996). Some American Indian parents avoid spanking because it is thought to promote shyness and a lack of confidence in children (MacPhee et al., 1996). Cherokee mothers’ disciplinary practices involved the restructuring of their infants’ behaviors, such as the use of redirection; whereas Hupa parents preferred reasoning with their children to physical punishment (Bachtold, 1982). Cherokee mothers reported that living spiritually and integrating the child into Cherokee culture were important (Nichols, 2004). Infant development was also a central concern for Cherokee mothers, as they were constantly working to prevent and correct perceived developmental delays (Nichols, 2004). Although American Indian parenting of fullterms has been explored, few studies have described American Indian parenting of premature infants over time.

Aspects of Lumbee culture may influence parenting of mothers of premature infants. Chavis (1998) reported kinship, importance of land, and the practice of religion or spirituality as traditional forms of Lumbee culture. Powwow attendance and owning or visiting beauty shops were also important to contemporary Lumbees (Chavis 1998). Kinship is probably the most important traditional element defining and sustaining Lumbee culture. Over time, the Lumbee Indians of North Carolina have managed to keep their kin affiliations a priority, as the emphasis on extended family and kin relationships continues to remain strong (Knick, 2000), and they typically interact with extended family on a regular basis (i.e., daily). Often living in close physical proximity, Lumbee
Indians’ frequent contact and interaction with extended family creates a network of sharing and an emotional support base on which they can rely (Glover, 2001).

Like kinship, religion and spirituality have long been a focus of Lumbee Indian culture. The church serves as a symbolic symbol and significant force in the lives of Lumbee Indians (Dial & Eliades, 1996; Mattis, 2005). Frequent participation in church services and functions (e.g., youth and elder programs, Bible study programs, and community outreach) promotes the maintenance of religiosity. According to Knick (2000), Lumbees focus on spirituality, the relationship with the divine and with others, rather than on the practice of conventional religion (Mattis, 2005). However, both oral and written documentation of the importance of religion in Lumbee culture suggests that spirituality and religiosity operate interdependently within this group (Lumbee Tribe of North Carolina, 2009; Mattis, 2005).

The paucity of empirical evidence suggests that additional research on the responses of Lumbee Indian mothers to parenting their premature infants is needed. Bronfenbrenner’s ecological model was selected as a conceptual framework to explore Lumbee Indian mothers’ responses to the birth and hospitalization of their premature infant and their parenting experiences (Bronfenbrenner, 1989). Examining mothers’ responses and perceptions of parenting from an ecological approach emphasizes the study of relationships among the physical and social settings in which infants and their mothers are mutually involved (Rogoff, 2003), including the culturally constructed environment of the infant.
4.1 Methods

A longitudinal descriptive qualitative design was used to explore the NICU and parenting experiences of Lumbee mothers’ of premature infants at 3 and 12 months corrected age for prematurity (Sandelowski, 2000).

4.1.1 Sample

A sample of Lumbee mothers and their premature infants were recruited from one of four sites: two medical centers and two pediatric clinics located in southeastern North Carolina. Participants met the inclusion criteria of being at least 15 years of age and having a premature infant of 37 weeks gestation or less at birth and who was hospitalized in a NICU. Participants were enrolled during or immediately following the infant’s hospitalization. Participants were 18 Lumbee mothers and their premature infants. Maternal age ranged from 17 to 42 years ($M = 26.4$, $SD = 1.7$). Eleven out of the eighteen mothers were primiparas. Seven out of the 18 mothers were married. Seventy-eight percent of the mothers received public assistance at one or more times during the study. Mothers averaged 13.4 years of education ($SD = 2.5$). The infants (13 boys and 5 girls) birth weights ranged from 664 grams to 2775 grams ($M = 1790.2$, $SD = 158.3$). The gestational age at birth for infants ranged from 24 weeks to 37 weeks ($M = 32.5$, $SD = 1.0$). Infants received mechanical ventilation an average of 6.6 days ($SD = 14.8$).

4.1.2 Procedures

The Duke University School of Medicine Institutional Review Board and study sites approved the study. Tribal approval to conduct the study was obtained from the Lumbee Tribe of North Carolina, and the North Carolina
Commission of Indian Affairs provided a letter of support. Each participant provided informed consent and permission to tape-record the interview during study enrollment. Arrangements were made to interview the informants in their homes, and a trained researcher who was a member of the Lumbee community conducted the interviews.

A semi-structured interview, using open-ended questions, was used to explore the NICU and parenting experiences of Lumbee mothers. The purpose of these interviews was to examine mothers’ responses to the birth and hospitalization of their premature infants and their experiences of parenting their premature infants with a particular focus on the influence of Lumbee culture. Semi-structured interviewing, a combination of structured and unstructured questions, was chosen to allow the participant to have some control over the amount and depth of responses and to ensure that areas of interest to the researcher were explored (Fontana & Frey, 2005).

The primary focus of the 3-month interview (see Appendix A) was to explore the mother’s perceived experience of the birth and hospitalization of her premature infant (e.g., Tell me about being a mother of a premature baby in the NICU). Probes were used to elicit details of the mother’s story and her experience of having a premature infant in the NICU (e.g., When were you able to hold your baby?). The primary focus of the 12-month interview (see Appendix B) was to continue to explore the experience of parenting a premature infant and to search for patterns of parenting that may have developed since the first interview (e.g., Now that your baby is almost a year old, do you ever think about the time he/she was born and in the NICU?). Probes were used to capture mothers’ specific descriptions of parenting since discharge from the NICU (e.g.,
How do you care for your baby when he/she gets sick?). Questions encouraging the mother to explore possible cultural aspects of parenting and her understanding of how culture may have influenced her parenting (e.g., Are there any special ceremonies that you and your baby participate in?) were threaded throughout both interviews. The 3-month and 12-month interviews averaging 42 minutes and 26 minutes in length respectively, were tape-recorded, and transcribed verbatim. The tape recordings were erased following verification of the transcripts. Field notes were written following the interviews to record relevant contextual information.

4.1.3 Data Analysis

Data analysis began with the completion of the first interview and proceeded in tandem with data collection in order to further explore areas found to be important to the participants. Throughout the analysis the research questions were compared against the data obtained from the semi-structured interviews to establish the suitability of the questions and to determine whether any data was missing. This ongoing analysis provided the investigator with the opportunity to refine interviewing skills and the interview guides.

Data from the semi-structured interviews were analyzed using content analysis. Content analysis is a method of interpreting the data using a systematic process of coding and identifying global themes and topics within the interviews (Hsieh & Shannon, 2005). Each narrative was initially read in depth to gain an understanding of each mother’s story and the context of her experience. Field notes were reviewed for additional information that was not apparent in the tape-recorded interview. The data from the narrative interview were coded line
by line and general categories were developed from the main concepts. Data with the same topic or theme were aggregated into one category and labeled using defined codes inductively derived from the narrative text (Coffey & Atkinson, 1996; Miles & Huberman, 1994). These codes were then organized into categories based on how the codes were related (Coffey & Atkinson, 1996; Hsieh & Shannon, 2005). The categories were further organized by forming subcategories (Morse & Field, 1995). Interpretation of the findings included an understanding of the configurations and patterns identified by inspection of the themes and regularities, as well as contrasts, paradoxes, and irregularities in the data (Coffey & Atkinson, 1996).

4.2 Results

Consistent with the purpose of the study, descriptions of mothers’ responses to the birth and hospitalization of the premature infant and parenting experiences are presented and arranged in three broad categories: Lumbee mothers’ descriptions of having a premature infant in the NICU, parenting a premature infant, and the influence of Lumbee culture on parenting an infant. At 3 months, Lumbee mothers’ stories focused on the premature birth and NICU experience and parenting a premature infant. At 12 months, Lumbee mothers’ stories focused less on the premature birth and NICU experience and more on parenting an infant over 12 months.

4.2.1 Lumbee Mothers’ Descriptions of Having a Premature Infant in the NICU

This theme was characterized by Lumbee mothers’ descriptions of their premature birth experience and their experience of having a premature infant in
the NICU. Subthemes also included the relationship with the NICU providers and maternal role alteration.

4.2.1.1 Premature Birth and the NICU Experience

Lumbee mothers could vividly recall their premature birth experience at 3 months. When discussing the arrival of their premature infants, many mothers felt unprepared for their birth, “I wasn’t ready for him to be born yet.” Another mother described the frustration associated with not having time to prepare for her infant’s arrival, “I didn’t have her nursery ready and I just hadn’t done all my nesting stuff that I needed to do so when we came home I felt like I was behind, I was preparing for her and that was aggravating to me, and I couldn’t get out and go like I wanted to, and that was annoying because I felt like I hadn’t done what I needed to do to have everything ready for her.” Although many mothers discussed some aspects of the premature birth experience at 12 months, their descriptions were shorter in length and less detailed.

For some mothers, having a premature infant meant dealing with the uncertainty of the infant’s medical condition, which resulted in distress, “I couldn’t keep my composure when I went in there to see them [the triplets] in that state [medically unstable] because I didn’t know from one minute to the next what was going to actually happen to them.” Some mothers also worried or questioned their infant’s survival, “I actually thought that he would die. I didn’t think that he would make it out.” Another mother contemplated the death of her infant and how she would cope with his death after forming an attachment to him. “I would sit there and wonder how was I going to make it leaving that hospital without him.”
Guilt about their failure to carry the infant to term was often mentioned at 3 months, followed by the mothers’ conscious search for the cause of their infant’s premature birth, “I know my placenta detached and the doctors said it either comes from falling or being on drugs or something, and I didn’t fall and I’m not on drugs. I just don’t know how it could have happened, but if I ever do have another one I would be more cautious of my stomach and taking care of him.” The guilt and search persisted for some mothers through 12 months, “I felt like it was my fault that he was premature. And I was wondering why he was premature or what happened, what did I do to make me have him so early.” This mother went on to describe that she and her father had attributed the premature birth of her infant to her becoming overheated while sunbathing.

Most of the mothers commented on some aspect of their premature infant’s appearance at 3 and 12 months. Some mothers experienced sadness and grief about the appearance of their infant. One mother described her initial reaction as “sad, because he was so small. It was pitiful.” Another mother viewed the infant as unattractive in appearance, “He looked like a baby kangaroo because he was so little and he was red, I couldn’t hear him cry, he wouldn’t open his eyes up, he was just laying there.” In the 12-month interviews, mothers focused on how much the infant had grown in size and how others could no longer tell the infants were born premature based on their appearance.

4.2.1.1.1 Relationships with Providers

The mothers had both positive and negative experiences with NICU providers. In some instances there was a lack of consistent communication between providers and mothers about the infant’s medical care plan. A few
mothers were upset about the lack of information they received regarding their infant’s medical treatment, “What really disturbed me was when I went back the next evening, from my room, down to see them and Joe was intubated, no one told me. And even though I was in the hospital, I feel someone should have called me and told me that he had a setback, and that he was intubated.”

There were variations in the type of support mothers received from members of the healthcare team. One mother described being treated negatively by a nurse when she wanted to be involved in the infant’s care, “She asked me whether I wanted to change Joe’s diaper, it was the first time I would have done it and I was like ‘yeah.’ Well he had soiled his diaper, and he was intubated and I didn’t know – I didn’t want to move him too much and she snapped at me like ‘you’re just going to mess up everything and you need to move him down.’ She just said it in a more rude tone than that. I was already very emotional, and that really bothered me and it made me not want to go back when they [the triplets] were there.” The same mother also described being treated positively by another nurse, “There was actually another NICU nurse who had twins and she would try to give me advice because she had twins and she kind of knew what I was going to be up against… [some nurses] had very positive things to say, the ones that had children, you could tell the nurses that had children versus the ones that didn’t have any.”

In a few instances, mothers were offended by the healthcare providers’ failure to acknowledge their ethnic background. One mother described being mistakenly viewed as Black and how it affected the care she received while her infant was in the NICU. “I was talking about breastfeeding and then one of the people in the hospital gave me a book for African Americans breastfeeding...
African American moms. And I felt offended by that because I’m not Black. I think they really thought I was Black, not really knowing Lumbee.”

4.2.1.1.2 Maternal Role Alteration

Some mothers described the absence of feeling like a mother during their infant’s NICU hospitalization. In response to being asked did she feel like a mom, one mother answered “No, not really because I wasn’t able to be with him like a mother should. It didn’t sink in until he came home.” Some mothers were fearful of caring for their premature infant after hospital discharge resulting in a lack of maternal competence, “I was scared when I brought him home if something would happen because they let him come home at four pounds and something. I had never seen a baby at home that small, it was different.”

The development of the maternal role was negatively affected by hospital experiences and regulations. For example, mothers’ time with their infants was negatively affected by visiting hours, “We weren’t able to be at his bedside because they were changing shifts.” The mother didn’t agree with or understand why these regulations were in place. Visiting was important to mothers, as some mothers traveled great distances to be with their infants. Although mothers visited with their infants during their hospital stay, they were disappointed about not always being able to be with the infant, “Having to go up there every day and knowing you’re not able to be with him every minute...just different things about it made me feel bad.” Further, mothers were separated from their premature infants for reasons related to medical complications and hospital policies. Mothers experienced disappointment about not being able to hold their infants, “we were finally going to hold her, but because she contracted MRSA
she had to be on the ventilator. We couldn’t hold her with the tube going down her throat. So, we had to wait to hold her.”

4.2.2 Lumbee Mothers’ Descriptions of Parenting a Premature Infant

This theme was characterized by Lumbee mothers’ descriptions of parenting a premature infant over the first year of life, which included their infant’s health and development and their own posttraumatic stress symptoms.

4.2.2.1 Infant Health and Development

While most mothers reported that their children had no serious health problems at 3 and 12 months corrected age, only “some problems with runny nose,” others reported their infants had a number of health problems during the first year, including colds, pneumonia, streptococcal pharyngitis, and ear infections. Some mothers felt that their infant was vulnerable to illness due to prematurity, “I can take him to the doctor’s office, and if sick kids are there he automatically gets what they’ve got.” Mothers also reported that their infants experienced problems in recovering from illness, “He’s had that cold now for 2 months. If he gets a cold or something like that, not only because of being a baby but also because of being premature, it’s real hard for him to get rid of it. It stays with him for a while.”

Of the infants with prematurity-related health problems, some experienced improvements in health over the first year, “She doesn’t get tired out like she used to.” However, a number of infants continued to experience health problems from prematurity, including being monitored for vision problems related to retinopathy of prematurity and optic nerve hypoplasia, gastrointestinal problems related to necrotizing enterocolitis, respiratory problems
related to bronchopulmonary dysplasia, and adrenal insufficiency. A few mothers of infants requiring ongoing medical care described the challenges associated with frequenting the doctor, “I might have two different, three different places I have to go to, in that month and that’s rough.”

In addition to the health problems, mothers also expressed worries about potential developmental delays. As one mother stated, “He goes to the babysitters with a baby whose 2 weeks older than him and she’s able to lay on her stomach and pick up things now. She can hold her head up real good and he can’t. I just feel he’s going to be behind with all his skills.” In an effort to prevent perceived developmental delays, one mother said, “I try and help him grasp things, like with the book.”

Lumbee mothers described balancing everyday needs with medical needs related to prematurity. Although they desired to view and treat their premature infants the same as fullterm siblings, the prematures required special care, “It’s about the same as Sissy [first child], things can be complicated at times. Jay [premature infant] is a little bit more special than Sissy was. You’ve got to be more careful with him and he has a lot more doctor’s appointments and he gets sick easy. He has been sicker than Sissy was when she was little. I guess his immune system is weak.”

4.2.2.2 Posttraumatic Stress Symptoms

Some mothers experienced post-traumatic stress symptoms following their infant’s hospital discharge, which included reliving the birth and hospitalization of their infant. At 3 months, Lumbee mothers frequently thought about their infant’s hospitalization in the NICU. “I find myself thinking back to
the NICU about every day even still, some part of that environment comes back to my mind every day.” For one mother, thoughts of the NICU experience were triggered by the infant’s current illness. “Now I think about him being sick a lot here lately when he has been sick, I had flashbacks from him being in [the NICU].” At 12 months, some mothers continued to relive the birth and hospitalization of their infant, “every day, I think about it because at that time it was stressful, a lot of stuff was going on when he was born.”

4.2.3 The Influence of Lumbee Culture on Parenting an Infant

The final theme from the interviews was characterized by factors that influence parenting an infant in the Lumbee culture, such as multigenerational infant care, balancing traditional and non-traditional infant medicine, and spirituality.

4.2.3.1 Multigenerational Infant Care

The majority of Lumbee mothers utilized multigenerational infant care while maintaining their maternal role. Grandparents, aunts, and uncles were often involved in providing routine infant care, such as bathing and feeding, however, mothers maintained sole responsibility for the infant. As one mother stated, “I just don’t want them to try and take my responsibility. I like doing it on my own too. Just to know that they’re there and care for him is fine with me. And, helping out when they can or when I need them yeah, that’s fine but all mothers want their child to know who’s their mom. So that’s me. I want him to know I’m his mom.” Having a supportive family structure provided mothers with security that their infants would be cared for and fostered the development of relationships between the infants and their immediate relatives.
4.2.3.2 Balancing Traditional and Non-Traditional Medicine

Lumbee mothers described balancing traditional and non-traditional medicine when providing health care to their infant. Mothers would offer over-the-counter medications, seek medical treatment, or use home remedies based on the nature of the problem. One mother provided examples of the different health care she provided when her child was ill, “If it’s a fever I give her Tylenol and then the next 4 hours I’ll alternate it with the Motrin.” When another child developed oral thrush, the mother took “him to [her] aunt’s house and she [the aunt] took a piece of fatback and washed off the salt and rubbed it all around his mouth and that next day that thrush was gone.” Like Cherokee mothers described by Nichols (2004), Lumbee mothers of premature infants provided health care using both the perspectives of their Lumbee culture and the mainstream culture.

4.2.3.3 Pride in the Lumbee Heritage

Most Lumbee mothers spoke proudly of their heritage, “When I say ‘our Lumbee heritage’ I associate that with the pride of being Native American and the stories that grandma told how it was when she was growing up, that you don’t take things for granted, that you have to work, get an education,” and felt that it was their responsibility to pass on the Lumbee heritage to their infants, “Being a Lumbee mother, there are just certain things you try to instill in them [the children] to protect your heritage.” Most Lumbee mothers described their plans to immerse the child into Lumbee culture, “I want them to be involved with whatever programs that are going on especially federal recognition [the process of getting the Lumbee American Indian tribe recognized by the United

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States federal government].” However, one mother stated that instilling “Christian values are just as important [because it] all works together to build our community and our society as a whole. It’s like there’s a fine line with the powwows and how other tribes believe like with the creation, we believe that God created the heaven and earth and Adam and Eve, and I want them to feel that sense of pride as being Native American but still instill our Christian values in them [the children] so that they’re not confused about things.” One Lumbee mother described the need to inculcate her children with racial identity, “Teaching our children that they’re equal no matter where you come from, there’s no certain race that’s better than any other.” Some Lumbee mothers felt obligated to teach the importance of education to their children, “You just have to instill that in them that you have to work hard and get an education if you’re going to succeed in life.”

Lumbee mothers’ views of their infants may be affected by their cultural beliefs and practices, which include religiosity and spirituality. One mother described a spiritual relationship with her infant, “I think being Lumbee is more than just the color of our skin, I think it’s more spiritual, maybe that’s the difference in other races that there’s a spirituality about Lumbee, the closeness you have with your child.”

4.3 Discussion

The findings of this study indicated many similarities between Lumbee mothers’ perceptions of the birth and hospitalization of their premature infants and the perceptions of mothers of other ethnicities. Both Lumbee mothers and other mothers reported experiencing distress during their infant’s hospitalization
related to their inability to provide protection and comfort (Miles et al., 1991, 2002; Wereszczak et al., 1997). The majority of Lumbee mothers discussed their infant’s size and appearance in the NICU, which is consistent with other studies reporting that certain infant characteristics related to prematurity may result in maternal distress (Miles et al., 2002). Similar to other mothers, Lumbee mothers experienced guilt over their failure to carry their infant to term; uncertainty about the infant’s medical condition; and feelings of sadness and worry about their infant’s survival and health (Holditch-Davis & Miles, 2000; Miles et al., 2002; Shin & White-Traut, 2007; Trause & Kramer, 1983; Wereszczak et al., 1997).

Additional NICU experiences of Lumbee mothers showing similarities to those of other mothers of prematures included distress related to extended periods of separation, reduced opportunities to hold or interact with the infant, and characteristics of the NICU environment (Dudek-Shriber, 2004; Holditch-Davis & Miles, 2000; Miles et al., 1991; Wereszczak et al., 1997). Lumbee mothers reported both positive and negative experiences with health care providers and nursing staff, which is also consistent with the findings of other studies (Affonso et al., 1992; Miles et al., 2002).

However, one important and distinct finding was that Lumbee mothers wanted to be recognized by their health care providers as Lumbee rather than being mistakenly viewed as having another ethnic background. In one case, the provider’s failure to recognize the mother’s cultural background was offensive to the mother and led to her rejection of the health information provided on breastfeeding. This subtle yet important finding emphasizes the need to recognize distinct cultures and potential differences in culture that may affect the care that healthcare personnel provide to mothers and their premature infants.
Moreover, future studies exploring the delivery of culturally appropriate health education materials to ethnically diverse mothers and its impact on patient knowledge and health behaviors are warranted.

Consistent with other mothers of premature infants, Lumbee mothers’ feelings of protectiveness, fears of infant sickness and death, and concern about the child’s physical health and development persisted throughout the first year of life (Holditch-Davis, Bartlett, et al., 2003; Miles et al., 1998, 2005; Miles & Holditch-Davis, 1995). In the present study, Lumbee mothers’ health and developmental concerns were illustrated in their attempts to identify perceived developmental delays related to prematurity. Similar findings have been reported for Cherokee mothers of fullterm infants (Nichols, 2004) and for other mothers of premature infants (Miles et al., 1998; Nichols, 2004). Although the majority of Lumbee mothers’ efforts to identify developmental delays were based on infant behaviors related to prematurity, Cherokee mothers’ perceptions and parenting behaviors were not based on prematurity-related delays, as their infants were born fullterm. This suggests that the apparent similarities in certain parenting practices between ethnic groups may also result from characteristics of American Indian parenting and may not be entirely based on prematurity.

Although Lumbee mothers had similar perceptions about the birth and hospitalization of their premature infants as other mothers, they also had unique perceptions. The finding that Lumbee mothers utilized multigenerational infant care while maintaining the maternal role is comparable to practices of other American Indians in which extended family members take an active, yet supportive, role in caring for infants and children (MacPhee et al., 1996; Nichols, 2004; Red Horse, 1997; Rogoff, 2003; Staples & Mirande, 1980). In their
interviews, Lumbee mothers elaborated on their primary caregiving role and the role of other family members who often assisted them with their caregiving when needed. These findings are also consistent with Lumbee Indian culture, which emphasizes involvement of extended family and cultivation of kin relationships (Chavis, 1998; Knick, 2000). Living in close physical proximity allows Lumbee mothers frequent contact and interaction with extended family members that results in a parenting network on which they rely (Glover, 2001), much like the coalition formed by Cherokee mothers (Nichols, 2004). The parenting network that exists within the Lumbee culture may be beneficial for infants’ social development, as it provides support and security in relationships with kin.

Certain aspects of parenting by Lumbee mothers of premature infants are consistent with their cultural values, such as the practice and sharing of religion, living spiritually, and attending social events with their children (Chavis, 1998). These findings are also similar to the parenting practices of Cherokee mothers who felt that living spiritually and integrating the child into Cherokee culture were important aspects of the care they provided (Nichols, 2004). The spiritual relationship between the mother and infant described by Lumbee mothers may result from the emphasis that Lumbee place on the relationship with God and with others, including their children (Knick, 2000). These aspects of Lumbee parenting practices are important for the continuation of values and traditions associated with Lumbee heritage.

The current study was limited to a convenience sample of American Indian mothers and their premature infants from one tribe located in the southeastern United States. Inclusion criteria included mothers’ self-
identification as American Indian. Although all mothers in this study identified with the Lumbee heritage, there may be differences in the degree to which mothers identified with their culture, as expressed in their parenting beliefs and practices. Further, there may be important distinctions between mothers who self-selected to participate than mothers who chose not to participate in this study. Finally, having a Lumbee interviewer may have created an environment in which mothers felt comfortable in sharing their birth stories and parenting experiences. However, it also may have resulted in mothers’ limiting details specific to Lumbee culture because the mothers may have assumed the interviewer already understood their stories because they shared the same culture.

Recognizing that Lumbee mothers’ experiences of having a premature infant in the NICU are similar to those of other mothers is important, yet some of their parenting experiences differ as a result of their distinctive culture. Neonatal nurses are in a unique position to provide mothers with resources and support during their infant’s hospitalization and arrange for services following discharge if necessary to minimize the effects of separation and posttraumatic stress symptoms. Nurses can also serve as a liaison by consistently communicating information to the mother regarding the infant’s health status and care delivery plan. Further, providing mothers with opportunities to be involved in their premature infant’s care will facilitate the development of the maternal role and may empower them to take an active role in their infant’s care. Based on findings from this study, it is imperative that health care providers take cultural factors into account when providing medical care by identifying and acknowledging these mothers’ ethnic background rather than ignoring or incorrectly classifying
their background. Respecting these mothers’ unique parenting experiences (e.g., involvement of extended family in infant care) and cultural practices (e.g., use of non-traditional medication) is an essential component in the successful coordination of infant care.

The premature birth and NICU experience of Lumbee mothers was salient at 3 months, however, for some mothers this experience continued to be salient at 12 months as certain aspects of their experiences were often recalled. Parenting a premature infant also appeared to be more salient at 3 months than 12 months; however, there were a number of mothers whose parenting experiences continued to be impacted by their infant’s premature birth. Posttraumatic stress symptoms, feelings of protectiveness, fears of infant sickness and death, and concern about the child’s physical health and development persisted throughout the first year of life for Lumbee mothers and have been reported for mothers of other ethnic backgrounds (Holditch-Davis, Bartlett, et al., 2003; Miles et al., 1998, 2005; Miles & Holditch-Davis, 1995). Further, mothers’ parenting experiences were largely influenced by Lumbee culture throughout the first year of life. Finally, Bronfenbrenner’s ecological model appears to be a useful framework for examining Lumbee Indian mothers’ responses to the birth and hospitalization of their premature infants and their parenting experiences (Bronfenbrenner, 1989). Findings from this study highlight the direct impact of the mother’s environment on parenting experiences, particularly the physical and social settings in which premature infants and their mothers are mutually involved (Rogoff, 2003). Factors occurring with the microsystem (ethnicity), mesosystem (extended family network), and macrosystem (culture) appeared to exert influences on Lumbee mothers’ responses to having a premature infant in the NICU and in caring for
their infants. Future qualitative studies focused on other factors occurring within the ecological systems that may affect the birth and hospitalization experience of American Indian mothers are warranted.

Bronfenbrenner’s (1989) ecological systems theory was used in this longitudinal, exploratory study as a conceptual framework to examine the effects of American Indian culture, infant illness severity, and socioeconomic status on mother-premature infant interactions and parenting experiences at 3, 6, and 12 months and to compare ethnic differences in interactions between American Indian and African American mothers and their premature infants at 6 months. In our findings, infant illness severity and socioeconomic status were associated with the interactive behaviors and Home Observation for Measurement of the Environment (HOME) scores of American Indian mothers and their premature infants over the first 12 months of corrected age. Higher infant illness severity was associated with more maternal touch, infant vocalization, and fewer opportunities for variety in daily stimulation. Higher maternal education was associated with more maternal talk and more infant vocalization; less infant touch; and higher scores on the subscales for provision of appropriate play materials, parental involvement with the child, and opportunities for variety in daily stimulation. Overall, interactions between American Indian mothers and their premature infants were similar to those of African American mothers and their premature infants at 6 months corrected age. However, 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. Another aim of this study was to describe Lumbee mothers’ responses to the birth and hospitalization of their premature infant at 3 months and to explore their parenting experiences at 12 months. Together, these studies indicated that environmental factors, such as culture, maternal education, and infant illness severity, affect mother-infant interactions. Further, culture was important in Lumbee mothers’ responses to having a premature infant in the neonatal intensive care unit (NICU) and in caring for their infants. Using different studies to focus on distinctive aspects of the interactive behaviors between American Indian mothers and their premature infants were necessary to collectively capture the impact of the environment as illustrated in the ecological systems framework. Findings from these three studies revealed two additional areas requiring further discussion: appropriateness of the Ecological Systems Framework for examining the effects of culture on mother-infant interactions and parenting experiences and the effects of culture on American Indian parenting experiences.

5.1. The Appropriateness of the Ecological Systems Framework for Examining the Effects of Culture on Mother-Infant Interactions and Parenting Experiences

The Ecological Systems Framework provided a useful means to examine the effects of environmental factors on mother-premature infant interactions and elucidate mothers’ responses to the birth and hospitalization of their premature infant and their parenting experiences. Based on this framework, the immediate settings of mothers and their premature infants consist of nested structures that
Bronfenbrenner (1989) conceptualized as the ecological environment. Culture plays an important role in shaping the ecology of parenting and childhood through the immediate contexts experienced by infants, the short- and long-term goals mothers create for their infants, and the practices mothers employ in attempting to meet these goals (Bornstein & Cheah, 2006). Therefore, this study focused on the place of culture and parenting in the ecological contextual framework. The ecological perspective on parenting recognizes that child development is influenced by the mutual interdependence of the systems that constitute the social and physical environment surrounding the mother and infant (Bronfenbrenner, 1979). Therefore, the ecological model (Bornstein & Cheah, 2006) provides the framework in which child development and parenting occur within a particular culture or subculture.

This interconnected system is portrayed as an ecological setting that Bronfenbrenner (1979) first identified as a hierarchy of nested structures – microsystem, mesosystem, exosystem, and macrosystem – that comprise the mother and infant’s environment. Bronfenbrenner’s view of the environment as a collection of related settings includes the social and cultural contexts found within the different settings. At the innermost level of the ecological model is the microsystem (Bronfenbrenner, 1989), which encompasses structures with which the child has direct contact, such as the mother-infant relationship and physical features in the home environment. Factors within the micro level, including parental belief systems, have the most direct impact on infant experiences (Bronfenbrenner, 1989). The second level, referred to as the mesosystem, can be
viewed as a network of microsystems in which the parent and infant are situated (Bronfenbrenner, 1989). Mesosystem factors would include members of the extended family and/or peers, the mother’s work environment, religious institutions, and neighborhood. This system shapes and is shaped by the community of exosystem influences in which it is embedded (Bronfenbrenner, 1989). Events or activities that occur within the exosystem may not directly involve the infant or mother as active participants but may impact infant development indirectly though maternal behavior (Bronfenbrenner, 1989). Examples of an exosystem would be the activities of the local school board, neighborhood association, or city council. The outermost level of the ecological model is the macrosystem. This system includes the belief systems, resources, hazards, life styles, opportunity structures, life course options, and patterns of social interchange that are embedded in the contextual patterns of systems (microsystem, mesosystem, and exosystem) characteristic of a given culture, subculture, or other broader social context (Bronfenbrenner, 1989). Macrosystems of ethnicity and social class existing within a particular culture or subculture support and encourage parenting practices and patterns of mother-infant interaction (Bronfenbrenner, 1989).

5.1.1 Applicability of the Ecological Systems Framework and Influence on Research Design

Based on findings from the studies in this dissertation, the ecological model was appropriate for assessing the effects of American Indian culture on mother-infant interactions and parenting experiences. From an ecological
approach, the study of relationships among the physical and social settings in which infants and their mothers are mutually involved (Rogoff, 2003) incorporates the culturally constructed environment of the infant. In this study, factors within micro, meso, and macro levels were found to impact the mother-infant relationship. These factors included maternal characteristics (maternal education), infant characteristics (infant illness severity) and physical and social features of the home environment.

Because the ecological framework is focused on the influence of external environmental factors that affect the family, naturalistic observation was used as a systematic method to observe and quantify the interactive behaviors of mothers and their premature infants (Holditch-Davis & Thoman, 1988; Thoman, Acebo, Dreyer, Becker, & Freese, 1979) in the social and cultural contexts in which they occur. These interactive behaviors were treated as existing structures occurring within the micro level of the ecological systems framework. Another micro level structure that was not quantitatively captured by this study includes the individual level of culture. Considerations for future studies would include measurement of culture at the individual level to assess the degree to which American Indian mothers identify with their culture. Tsethlikai, Peyton, and O’Brien (2007) conducted one of the few studies to use a structured instrument to measure culture. In this study, perception of American Indian culture was captured using a 10-item questionnaire that assessed the degree to which mothers upheld American Indian cultural practices and values in their lives and in their parenting. The items in the American Indian questionnaire asked
mothers to rate their agreement with statements regarding extended family, preservation of language, pride in American Indian heritage, and the use of traditional American Indian beliefs in parenting children (Tsethlikai et al., 2007). Use of a similar questionnaire in future studies with American Indian mothers may capture a more in-depth collection of cultural variables assumed to be responsible for observed parenting differences in comparative studies of ethnic groups (Betancourt & Lopez, 1993). Coupled with observations of mother-infant interaction, inclusion of cultural measures may provide more information and a better understanding of cultural influences that affect behaviors between American Indian mothers and their premature infants.

Use of the ecological systems framework allows for examination of the effects of variables located within the mother-infant environment. However, the effects of culture, race, and ethnicity on mother-infant interactions and parenting experiences could potentially be confounded with the effects of other factors (e.g., socioeconomic status). This is particularly important when studying ethnic groups who share similar social backgrounds, as this may result in significant overlap between culture and other variables, such as socioeconomic status (Betancourt & Lopez, 1993). Further, discrimination of social class within ethnic or cultural groups may assist in determining what variables to collect. Although it is likely that persons belonging to certain socioeconomic groups share common beliefs, norms, and values, it may also be possible for some cultural elements to remain consistent across different socioeconomic levels of a given ethnic or cultural group (Betancourt & Lopez, 1993). Therefore, identifying similarities and
differences in cultural elements across socioeconomic levels may help disentangle the effects of culture and socioeconomic status on mother-infant interactions.

Though there is the limitation of the ecological model in assessing the effects of culture within the microsystem, use of the ecological approach may be an important step in furthering the development of nursing science. It is possible that knowledge in this area can be advanced by introducing theories and related measures of culture to explain differences in mother-infant interactions across ethnic groups. Also, progress in the understanding of culture and its role in nursing would result in improved ability to provide more universally appropriate care and tailor interventions based on the cultural diversity found in parenting practices.

5.2. The Effects of Culture on American Indian Mothers’ Parenting Experiences

Culture, an individual and environmental factor, was shown to affect American Indian mothers’ parenting experiences. Culture has been determined to influence the way American Indian mothers manage their children’s needs (MacDonald-Clark & Boffman, 1995; MacPhee, Fritz, & Miller-Heyl, 1996; Nichols, 2004; Staples & Mirande, 1980; Sui, 1998). Although cultural differences exist between and within American Indian tribal groups, most findings suggest that American Indian parenting is characterized by shared parenting (MacPhee et al., 1996; Nichols, 2004; Red Horse, 1997; Rogoff, 2003; Staples & Mirande, 1980). In contrast to the Anglo-American nuclear parenting pattern, the extended
family in childrearing is important to American Indian families. In general, mothers primarily provide care; however, members of the extended family, including aunts, uncles, and grandparents may be actively involved in childrearing and serve as mentors or role models for these children (Bahr, 1994; DuBray & Sanders, 1999; Glover, 2001; Mutchler, Baker, & Lee, 2007; Nichols, 2004; Red Horse, 1980, 1997; Rogoff, 2003).

In this study, Lumbee mothers had unique perceptions of their parenting experiences, which included the utilization of multigenerational infant care while maintaining the maternal role. Lumbee mothers were more often the primary caregivers to their infants than the African American mothers. In their interviews, Lumbee mothers also elaborated on primary caregiving and the role of other family members who often assisted them with their caregiving when needed. In contrast, in African American families, extended family members are described as either serving as the primary caregiver or sharing equal responsibilities in infant care (Burton, 1996; Burton & Dilworth-Anderson, 1991; Wilson, 1989).

The multigenerational infant caregiving described in Lumbee families is comparable to those of other American Indians in which extended family members take an active, yet supportive, role in caring for infants and children (MacPhee et al., 1996; Nichols, 2004; Red Horse, 1997; Rogoff, 2003; Staples & Mirande, 1980). These findings are also consistent with Lumbee Indian culture, which emphasizes involvement of extended family and cultivation of kin relationships (Chavis, 1998; Knick, 2000). Living in close physical proximity
allows Lumbee mothers frequent contact and interaction with extended family members that results in a parenting network on which they rely (Glover, 2001), much like the coalition formed by Cherokee mothers (Nichols, 2004). The parenting network that exists within the Lumbee culture may be beneficial for infants’ social development, as it provides support and security in relationships with kin. Promoting a strong cultural identity and family involvement may be protective factors that enhance child development and health of premature infants who are at high risk for developmental delays and illnesses (Wilson, 1989).

5.3. Future Directions of Research

Although our study primarily focused on the micro-level factors affecting the mother-infant relationship, future studies could potentially build upon these findings by examining environmental factors existing within the multi-layered structures that comprise the mother and infant’s environment. For example, examining aspects of the NICU as a system in which the infant and mother are initially positioned may provide a better understanding of how the mother-infant relationship is shaped by this system over time. Given that the NICU environment was also salient in American Indian mothers’ recall of the birth and hospitalization of their premature infant, further research examining the relationship between the hospital and home environment is warranted.

Because culture was identified as an influential factor in American Indian mothers’ parenting experiences, research designs focused on further assessment of the impact of culture on parenting may provide more clarity in the
operationalization of this concept. Specifically, research further examining the role of the extended family network in infant caregiving is needed. Because many American Indians mothers and their premature infants are subjected to impoverished socioeconomic conditions, understanding how the extended family network operates to impact this environmental stressor is important. Research designs must take into account the possibility that the involvement of extended family networks in American Indian infant caregiving may be a result of historical and environmental conditions affecting this ethnic group. Finally, these studies should also be expanded to encompass the effects of cultural factors, such as involvement of extended family networks, on the development of premature American Indian infants.
Appendix A

INTERVIEW QUESTIONS AT 3 MONTHS

Tell me the story of how you and your infant came to be in the NICU?
Probes: Did you know that your baby was going to be born premature?
What was it like when you first saw your baby?

Tell me about being a mother of a premature baby in the NICU?
Probes: What was it like for you as a mother during this time?
Where you able to hold your baby? How did that feel?
Did you ever think that he/she might not make it?
Do you feel that having a premature baby that was sick and in the NICU affected your ability to develop a relationship with your baby?

How is your baby doing now?
Probe about any current and ongoing chronic problems.

How do you think being Lumbee has affected your experience?

When you look at him/her now, what memories or images do you have about the birth and NICU?
Probes: How often do you think about this period of time now?
What kinds of things do you think about the most?
What were some of the most rewarding experiences at that time?
What were the most difficult moments?
What things, events, or experiences do you wish had been handled differently by you or others?

How do you think the experience with your baby’s premature birth and hospitalization influence you now as a parent?
Probes: Describe any special sense of protection toward him/her now.
Do you think he/she get more attention than most children (or than siblings)? If so, in what ways?
What special things do you do for or with your child because of what he/she has been through?

Is there anything about being a Lumbee mother of a premature infant that affects how you parent your baby now?
Probes: Are there any special ceremonies that you and your baby participate in?
How do you care for your baby when he/she gets sick?
Who helps you the most with your role as a parent?
How do family members participate in your infant’s care?
Appendix B

INTERVIEW QUESTIONS AT 12 MONTHS

Tell me how you and your baby have been doing since the last interview.

What is it like to be a parent to (name of child)?

Now that your baby is almost a year old, do you ever think about the time he/she was born and in the NICU?
   Probes: What do you think about the most?
         Do you think that having him/her prematurely and his/her experiences in the NICU affected your parenting?

How do you think the experience with your baby’s premature birth and hospitalization influence you now as a parent?
   Probes: Describe any special sense of protection toward him/her now.
         Do you think he/she get more attention than most children (or than siblings)? If so, in what ways?
         What special things do you do for or with your child because of what he/she has been through?

Is there anything about being a Lumbee mother of a premature infant that affects how you parent your baby now?
   Probes: Are there any special ceremonies that you and your baby participate in?
         How do you care for your baby when he/she gets sick?
         Who helps you the most with your role as a parent?
         How do family members participate in your infant’s care?
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Biography

Jada Lynn Brooks was born in Lumberton, NC on June 20, 1979 to Janet Dial and Glen E. Locklear. Jada is married to John Avery Brooks and has one son, Xander Grey Brooks. Jada and her husband are expecting another son in October. Jada is a Duke Alumnus having completed a BSN from Duke University School of Nursing’s accelerated program in 2005. Jada also holds a Bachelor of Science in Biology and Chemistry with an emphasis in Biomedicine from the University of North Carolina at Pembroke (2001) and a Master of Science in Public Health in Epidemiology from the University of North Carolina at Chapel Hill (2005). Jada is the first author on three manuscripts, “SMA Notes from the field: Lumbee mothers and infant care,” which was published in 2008 in Anthropology News; “Exploring modifiable risk factors for wheezing in African American premature infants,” which was published in 2011 in the Journal of Obstetric, Gynecologic, and Neonatal Nursing; and “Effects of secondhand smoke exposure on the health and development of African American premature infants” which was published in 2011 in the International Journal of Family Medicine. In her master’s program, Jada was the recipient of a NIH Minority Graduate Assistant Research Supplemental Grant from the National Cancer Institute. Jada was awarded a second NIH Minority Graduate Assistant Research Supplemental Grant from the National Institute of Nursing Research in 2006 as a graduate student in the PhD program. In 2008, Jada was awarded a Ruth L. Kirschstein National Research Service Award (NRSA 5F31-NR010851) to conduct an exploratory dissertation study entitled “Interactions between Mothers and their Premature American Indian
Infants.” In 2008, Jada was a recipient of the Great 100, Inc. scholarship. In 2009, Jada was awarded the CANS Dissertation Award from the Southern Nursing Research Society. Jada was recently awarded a postdoctoral fellowship at the University of North Carolina at Chapel Hill to study the relationships among family management, maternal depressive symptoms, and health outcomes in Lumbee children with chronic asthma. Jada is a member of the Sigma Theta Tau International Honor Society of Nursing, North Carolina Nurses Association, American Nurses Association, and the Southern Nursing Research Society.