1999

Native American mother-infant interactions at nine months: A cross-cultural study of the still-face effect

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The University of Montana

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Native American Mother-Infant Interactions at Nine Months: 
A Cross-Cultural Study of the Still-Face Effect

by

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B. S., Portland State University at Portland, Oregon, 1996

Presented in partial fulfillment of the requirements for the

Degree of Master of Arts

The University of Montana

July 1999

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Date 9-20-99
In this study, Native American and Caucasian mother-infant pairs (dyads) were observed using the standard face-to-face paradigm and video-taped interactions were coded to examine eye gaze patterns, responses to stress and self-regulation strategies used by the infants in each ethnic group. Based on previous interactional studies, Native American infants were predicted to display a negative affect when maternal availability is contradicted by a non-responsive "still face." Analyses demonstrated that there are cultural differences in the interactional eye gaze patterns among Native American mothers and their infants including maternal responsiveness when their infants look away. Specifically, Native American infants spend more time looking at their mothers as compared to Caucasian infants during normal face-to-face interactions. Analyses revealed that Caucasian infants looked away from their caregivers for longer periods of time and more often, and were more likely to use self-comforting behaviors during the still-face procedure. Native American mothers were less overt in their attempts to re-engage their infants. The Caucasian mothers were more likely to use and appeared to be more successful with vocalization and tactile-vibratory strategies. Findings of less overt, attention-getting strategies, and apparently more willingness to allow Native American infants to gaze elsewhere, are consistent with the cultural preference for teaching by "silent observation," a parenting goal of many Native American mothers. The findings during the still-face procedure demonstrate that Native American infants are not employing eye-gaze as a self-regulating strategy to the extent that Caucasian infants are. Findings in current literature (Hains & Muir, 1998) suggest that Native American infants may not interpret the "still-faced" mother as unresponsive as long as eye contact is maintained. Future studies should examine the Native American infant’s behavior following a total break in eye contact by the mother during the still-face procedure. Other studies should include naturalistic settings and triadic interactions since the predominant context for the Native American infant may include extended family. The understanding of dysregulation and resultant psychopathology within the Native American infant population will only come about as examination of “normal” interactions and infant regulatory abilities continues to occur through future studies such as this one.
ACKNOWLEDGEMENTS

I wish to thank the following for their contributions to this study. Their thoughtful suggestions and insight contributed to the success of this project:

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I wish to thank the parents and infants who participated in this study as well as the Native American communities who allowed research to be conducted on their reservation.
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CHAPTER 1: INTRODUCTION

Overview

The purpose of this study was to investigate mother-infant interaction variability within a population often not represented in the child development literature, that of the Native American. Specifically, the study extends traditional laboratory based experiments across cultures, to examine the influences and characteristics of infant self-regulation within two culturally different populations.

Several issues were explored in the current literature including how infants learn the rules of social interactions with regard to emotion-regulation, and strategies that infants use to regulate affective states. Discussions of the dyadic system and face-to-face interactions highlight the process by which an infant may communicate affective need states as well as illustrate the emergence of the infant’s ability in mutual communication and initiation of interactions. Typical infant behavioral responses to contradictory messages, gaze, affect, and self-comforting, are considered in detail. Finally, the results of several cross-cultural mother-infant interactional studies are presented.

Social Interactions

Social interactions begin in early infancy. During face-to-face interactions young infants learn to modulate or tolerate varying levels of arousal (Carter, Mayes, & Pajer, 1990; Field, Vega-Lahr, Scafidi, & Goldstein, 1986). Infants learn the cognitive and affective rules of social interactions, including cultural information, which allows them to
interact with caregivers and cultural context appropriately (Tronick, Als, Adamson, Wise, & Brazelton, 1978). An infant's development is a cultural construction by individuals interacting with individuals, even where universal biological factors are prominent (Calkins, 1994; Thompson, 1994). The caregiver's role is one of providing adequate stimulation and socialization into cultural norms of interpersonal interactions as well as external assistance with modulation of arousal. Based on these assumptions, different parental styles should result in measurable differences in infant behaviors and interactional styles.

One important aspect of an infant's early development is the ability to regulate emotion (Campos, Campos, & Barrett, 1989; Campos, Mumme, Kermoian, & Campos, 1994; Segal, Oster, Cohen, Caspi, Myers, & Brown, 1995; Stifter, 1993; Tronick et al., 1978; Tronick, Ricks, & Cohn, 1982). Another important feature of early social, emotional and cognitive development is the infant's ability to communicate effectively to caregivers about goals, need states and affective responses to environmental stimuli (Halberstadt, 1993; Tronick, 1989). An infant's normal development is dependent on such effective communication of those goals, states or responses to such stimuli. The infant's ability to participate in a coordinated mutuality is created within the context of repeated interactions with caregivers over the course of the first few months and years of life (Gianino & Tronick, 1988).

Factors that interfere with any aspect of these interactions can impair the quality of infant-caregiver interactions and the growth of the affective communication skills in the infant (Carter, et al., 1990; Dunham & Dunham, 1990; Tronick, et al., 1982; Weinberg & Tronick, 1991). If the mother is physically unavailable as through separation
(Field, 1994; Field, et al., 1986) or emotionally unavailable, as experienced in depression, the infant is said to have lost an important source of stimulation and arousal modulation. The infant then experiences distress and disorganization.

The current consensus is that the relationship with the caregiver during the first year is the basis of later competency with emotion regulation. The majority of research leading to these conclusions, however, is primarily based on Western theories of development which point to the importance of a consistent, responsive and stimulating relationship between infant and caregiver (Gable & Isabella, 1992). Moreover, since much of the empirical support for these theories and assumptions comes from studies with subjects who are primarily Caucasian and middle class, the universality of patterns of caregiver-infant interaction can be questioned. In addition, many early cross-cultural studies may have used methods and instruments without consideration of fit with subject-in-context (Barrett, 1993; Fogel et. al, 1992). Tronick (1989) stresses that the process of interactions has to do with the mutual exchange between the infant and caretakers and is essentially a process that is social, communicative and regulatory.

**Emotional Regulation in Development**

Regulation has been defined as the "processes that serve to modulate, redirect, or cope with heightened levels of arousal" (Stifter, 1993, p. 448). A variety of definitions of emotion regulation exist and often are based on strategies used to promote successful interpersonal functioning (Kopp, 1989). Early interpersonal relations are the building blocks of later social functioning. Several components comprise these early interactions including arousal, attention and affect (Field, 1981). To understand the processes involved in development of emotion regulation, researchers have begun to examine both
the internal and external sources of regulation during infancy (Cole, Michel, & Teti, 1994; Kopp, 1989; Tronick, 1989).

Infants are not born with the ability to assimilate all stimuli, but have several behaviors available with which stimulus overload may be modulated. The infant may look away, self-comfort or self-stimulate. Emotion can thus be regulated by managing the intake of emotionally arousing information. Very early in life, for example, the infant can disengage visually from emotionally arousing events (Gianino & Tronick, 1988) and respond to visual distraction strategies by parents.

Many researchers (Barrett, 1993; Best & Ruther, 1994; Campos et al., 1989; Campos, et al., 1994; Cole, et al, 1994; Thompson, 1994; Tronick, 1989) have posited that socialization plays a crucial role in the development of emotion and emotion communication. They emphasize empirical investigation of person-environment transactions as essential in the understanding of infant development of emotion regulation. Indeed, it has been observed that distress and difficulty in the environment and in an individual's relationships influence the development of psychopathology (Cole, Michel, & Teti, 1994; Stifter & Braungart, 1994). Others have argued that the most important relationship is with the caregiver, which is an antecedent to the rise of a sense of self (Sameroff & Emde, 1989; Sroufe, 1989). Secure infant attachment has been associated with prompt and effective parental response which also best enables regulation and sharing by an infant (Kopp, 1989; Sroufe, 1989). Although the development of self-regulation is fairly predictable, important individual differences exist in the way infants learn to regulate their affective states. Moreover, the strategies that infants acquire as a
result of this learning process are really a function of the interactions of numerous factors, both internal and external.

Neuroregulatory systems, behavioral traits and cognitive components comprise the sources of internal differences in infant emotional regulation (Horowitz, 1984). Chess and Thomas (1996) suggest that "the temperamental characteristics of the individuals of a culture provide a useful additional tool to the analysis of cross-cultural programs." (189) They further found:

Individual differences take on varying significance depending on diverse factors in the environment and that these influences shift over time even for the same individual. The environmental factors...yield their meaning only when...brought into relationship with individual, constitutional characteristics such as infant temperament. Temperament brings maternal activities, the cultural plan, and environmental effects into perspective. (p. 189)

Interactive care-giving styles and explicit training contribute to the sources of external individual differences. Horowitz (1984) further notes that although the internal factors clearly play an important role in the development of emotion regulation, early interactions with caregivers and explicit training to behave according to specific cultural expectations and rules are also influential.

The nature of early interactions with caregivers can act to shape both the infant's cognitive interpretation of given affect-eliciting events and the emotions displayed in response to those events (Horowitz, 1984). For example, supportive caregiving coupled with an infant's capacity to manage a stressful situation can increase the ability to self comfort which in turn decreases the infant's need to rely on the caregiver. In addition, the
infant develops a sense of security. Conversely, the infant who does not learn these skills may become withdrawn and avoidant, or insecure and disorganized (Gianino & Tronick, 1988).

Finally, the development of regulatory skills is a process, primarily an interactive one which includes both infant and caregiver contributions. Its success is dependent on whether the goals of each partner are in agreement (Calkins, 1994; Kopp, 1989; Tronick, 1989).

The Dyadic System

Tronick (1989) and Cohn and Elmore (1988) have suggested that the mother-infant interactional dyad is a system of mutuality. Each partner uses a variety of approaches to maintain and regulate synchronous states. The exchanges are social in nature and complex wherein eye gaze direction, physical proximity and affect displays modulate and regulate sequences of interaction. Sroufe (1989) states that "...organization exists from the outset, but...the organization resides in the infant-caregiver dyadic system. The developmental account, then, traces the origins of the inner organization (self) from the dyadic organization--from dyadic behavioral regulation to self-regulation" (p. 73).

Researchers generally agree that infant social cues are comprised of characteristics such as gaze, affect display and other physical behaviors such as self-stimulation or self-comforting.

Face-to-Face Interactions and Still-Face Paradigm

Infants learn the rules of social interactions during face-to-face interactions (Tronick et al., 1978), including cultural information, both cognitive and affective, which allows identification with caregivers. Tronick et al. suggest a hierarchy of goals within
These exchanges. Many studies using face-to-face interactions have been conducted to examine an infant's communication of affective need states as well as competency in stress regulation. A variety of approaches have been used to investigate the emergence of the infant's ability in mutual communication and initiation of interactions. Field (1994) describes a study in which 4-month-old infants were observed before, during and after their mother's conference trips compared to a group whose mothers went to the hospital to have another child. The results indicated that difficulties in infant behaviors (including increased self-comforting behaviors such as thumb sucking) were greater when mother was tired and depressed (emotionally unavailable) than when she was absent (physically unavailable). A particular approach that demonstrates clearly an infant's sensitivity to maternal emotional unavailability is known as the still-face paradigm.

The still-face paradigm is an experimental perturbation of mother-infant interaction mimicking emotional unavailability of the caregiver. A variety of techniques have been investigated to demonstrate various unresponsive maternal behaviors. A large body of research has investigated the effects of mothers becoming non-responsive and non-communicative for a brief period of time with their infants (Cohn & Elmore, 1988; Field, et al., 1986; Mayes & Carter, 1990; Murray & Trevarthen, 1985; Toda & Fogel, 1993; Tronick et al., 1978). Other studies have included consideration of tactile stimulation (Stack & Muir, 1990, 1992), live versus televised interaction procedures (Gusella, Muir, & Tronick, 1988), differing caregiving environments (daycare versus homecare) (Field et al., 1986), stranger versus mother interaction (Ellsworth, Muir, & Hains, 1993), and one which looked at qualitative differences in infants' smiles (Segal et al., 1995).
Research employing the face-to-face and still-face paradigm has generally followed similar procedures. There are three conditions during which the interaction between caregiver and infant are video taped. During the first episode, the mother is asked to play with the infant in a social engagement as she would normally do at home. The second episode is the still-face episode during which the caregiver assumes a neutral or "still face" unresponsive to the infant. The caregiver is typically told to sit facing the infant, but not to respond or communicate to the infant in any way although they may continue to maintain eye contact. The final episode is a reunion episode or return to the face-to-face social interaction with the caregiver instructed to resume normal interactions. Each episode usually lasts about two to three minutes. The above paradigm or variations have been used with infants from under 2 months to 10 months.

Infant Behavioral Responses to Perturbations

Infant behaviors in response to perturbations of normal face-to-face interactions are best examined with the still-face paradigm originated by Tronick et al. (1978). Many replications of the original study have demonstrated similar results (Carter et al., 1990; Cohn & Elmore, 1988; Field et al., 1986; Smith-Gray & Koester, 1995; Gusella et al., 1988; Mayes & Carter, 1990; Segal et al., 1995; Stack & Muir, 1990, 1992; Toda & Fogel, 1993; Weinberg & Tronick, 1991a, 1994). An infant's typical response to the still-face episode includes: decreases in smiling and eye gaze, increases in self-comforting behaviors (rocking, thumb sucking, hair twirling), or rhythmic motor movements such as increased leg kicking, arm waving, and touching or grabbing infant seat or clothing. Additionally, crying and distressed affective facial or vocal displays have been observed.
A variety of explanations of the still-face (SF) effect (negative effects) generally state that the infant's expectation of a normal interaction is violated when the mother fails to respond (Carter et al., 1990; Cohn & Elmore, 1988; Field et al., 1986; Smith-Gray & Koester, 1995; Gusella et al., 1988; Mayes & Carter, 1990; Segal et al., 1995; Stack & Muir, 1990, 1992; Toda & Fogel, 1993; Weinberg & Tronick, 1991, 1994b). Tronick (1989) interprets the SF reaction as disruption of the infant's goal for social engagement. The infant then experiences a negative affect due to the inability to reinstate or regulate the exchange (Field et al., 1986). The negative reactivity is suggested to occur when the achievement of a goal is disrupted and the infant is stressed. Stack and Muir (1990) have a somewhat different interpretation. They posit that by maternal withdrawal of contact with the infant, the necessary regulatory input for maintenance of organized social and affective states is not available. However, in recent studies (Gusella et al., 1988; Stack & Muir, 1990, 1992) attenuation of the still-face effect occurred when the mother was allowed to touch the infant during the still-face episode.

The reunion episode has also received some attention. Weinberg and Tronick (1991) investigated the gaze and smiling behavior of the infant following the still-face episode. Generally there were increases in both gaze and positive affect, which were thought to represent the infant experiencing a positive reaction when mother resumes interaction.

Affect. Facial affects or displays (e.g., negative affect or anger, sadness) are often interpreted by researchers in terms of Izard's Differential Emotions Theory (Izard, 1977 as cited in Barrett, 1993), which attempts to universalize facial expressions of emotion. Templates or pictures of different affects presented out of context are judged by adults
from different cultures as to which emotion is being displayed. The results indicating that particular facial patterns may express the same emotions in many cultures have been highly reliable. Barrett (1993) questions whether the results, though, actually demonstrate infant emotional states. She states "Facial movements are only one of many forms of communications of emotion, rather than having special status as 'the' clearcut indicators of emotion." She further states that "...from birth onward, interaction with members of one's family and other members of the culture shape the communication process and add new communicative gestures" (p. 155). Much research has assumed that this theory of facial emotions is correct, but Fogel, et al. (1992) and Barrett (1993) both make a strong case for re-evaluation of infants' behavior in context. Socialization of facial behavior begins quite early in infancy. According to Barrett (1993, citing Lewis, Ramsay, & Kawakami, 1991):

Much has been written about the display rules that result from socialization. Socialization pressures, personal display rules, and/or momentary needs might cause a person to display particular facial movements. It is not clear when display rules first systematically influence facial behavior; however, there is some evidence of cultural differences in emotion-relevant responses as early as 4 months of age (p. 159).

Segal et al. (1995) summarize the findings of several studies (Carter et al., 1990; Cohn & Elmore, 1988; Ellsworth et al., 1993; Toda & Fogel, 1993; Tronick et al., 1978) regarding negative affect during the still-face and recovery episodes "...as being less consistent in part because criteria for coding negative affect in the still-face paradigm have varied from one study to another" (p. 1830). Most of these studies resulted in some
mild negative affect, but overall, infants were unlikely to cry or express extreme distress. It would seem crucial, then, that in a study of infant emotion regulation where negative affect is included, coding for negative affect should include behaviors beyond the facial expressions displayed.

**Gaze.** Another behavior that becomes incorporated into an infant's repertoire of arousal modulation is gaze. Studies of attention and arousal have suggested that the infant uses gaze aversion as a stimulation cut-off behavior, which typically occurs when the infant experiences information overload or excess stimulation levels. One of the earliest regulators of perceptual stimuli available to an infant is gaze behavior. As Field (1981) found, the relationship between the caregiver and gaze aversion produced more gaze aversions in high- and low-active interactions than moderately active interactions. The gaze aversions, studied by Stifter and Moyer (1991), functioned as efforts by the infant to remove itself from a stimulus for purposes of reducing arousal levels, thereby acting to inhibit potential intensive responses by the infant. Initially, caregivers regulate their infant's arousal levels by providing stimulation during underarousal, and reducing stimulation when the infant is overexcited. However, as development progresses, the infant begins to take over the process through a variety of behaviors, including gaze aversion.

There is some function of development that influences the way that gaze may be used by an infant. As Field (1981) found, gaze is commonly used by infants to modulate arousal and to process information about distressing events. Piaget (1954 as cited in Toda & Fogel, 1993) suggested that by 6 months gaze may be related to cognitive changes that involve an infant's interest in objects or the external world. Indeed, results of the study by
Toda & Fogel (1993) do suggest "...that developmental changes in infant cognitive and motor skills appear to be associated with developmental changes in emotional self-regulation" (p. 537). They further suggest that responses of infants in the SF paradigm must involve the whole body and the entire body patterns within a context rather than judged on the face or gaze. Stack and Muir (1990; 1992) illustrated the importance of context when they allowed mothers to touch their infants during the SF which resulted in a decrease in apparent distress within the infant. The results demonstrated that infants grimaced less, smiled more and continued to gaze at their mothers when the SF included touch. The results were interpreted to mean that touch can elicit positive affect and attenuate the distress experienced when an infant receives a contradictory message during the SF. These experiments may, however, have procedural differences which could contribute to differences in gaze patterns.

In a recent study by Hains and Muir (1996), findings supported the hypothesis that "...infants express their cognitive appreciation of the adult's eye direction by their affective behavior" (p. 1950). In other words, eye contact acts as a cue or signal to infants to engage in communication with an adult. During all SF studies previously reported, the caregiver is typically told to sit facing the infant, but not to respond or communicate to the infant in any way, although the caregiver may continue to maintain eye contact. Symons and Moran (1987) suggested that many studies are not really comparable because infant eye position was not coded the same in each procedure. For example in Field's (1981) study, infant head position was the basis for coding gaze away, whereas Symons and Moran (1987) coded for actual infant eye position. Hains and Muir (1996) have found that adult eye position does make a difference in infant response, which
supports the Symons and Moran (1987) study that suggests inconsistent gaze coding of both caregiver and infant has made it difficult to compare studies.

**Self-Comforting Behaviors.** Stifter and Braungart (1995) found that by 10 months of age self-comforting behaviors were more likely to be preferred as a means of regulation. Little is known about the effectiveness of such behaviors, but Campos et al. (1989) found that non-nutritive sucking reduced pain-elicited distress in newborns. Self-comforting behaviors (e.g., thumb- or finger-sucking, clasping or pulling on the feet, twirling the hair) have been shown to be used by infants increasingly from 5-months to 10-months of age as a means to reduce negative reactivity. In populations that are atypical, such as the deaf or infants with Downs syndrome, these behaviors have also been more likely to be used as a strategy for reduction of negative arousal (Smith-Gray & Koester, 1995).

**Cross Cultural Studies**

Although the still-face effect has been replicated in several independent studies, the generalizability of findings is limited by the fact that this paradigm has been primarily used with Caucasian, middle-class populations. In general there is a paucity of normative data on infant affective development in non-white populations. Segal et al. (1995) did replicate the SF paradigm with findings generally supportive of the SF effect with an African-American population. However, the primary behavior evaluated was negative affect, defined as smile or lack of smile, and as previously discussed, a negative affect definition should include more than facial display (Barrett, 1993; Fogel et al., 1992). This study should be viewed with caution when generalizing the SF to other non-white
populations since the only criteria for judging negative affect was the presence or absence of a smile.

**Differences in caregiver interactions.** One of the primary assumptions within the majority of studies employing the SF paradigm is that the pattern of infant-caregiver interaction is viewed as a dyadic one. Ethnographic data suggest that the aspects of early interaction vary across cultures in terms of social context, including number of caregivers and views about infant need of stimulation.

Sostek et al. (1981) compared a group of Fais (located in the Caroline Islands, Micronesian culture area) to a Caucasian, middle-class population. Differences in dyadic behaviors were striking. The infant and caregiver were *en face* (looking at each other) more frequently in the United States. The Fais, who typically are in large groups, were less likely to be looking at the infant compared to the Caucasian group. Sostek and colleagues stressed that one of the main differences between the two groups was in the predominant social context. The Caucasian mother-infants were more likely to be inside their homes and alone, whereas the Fais were likely to be outside, in groups. One of the primary consequences of cross-cultural comparisons has been the demonstration of the effects of social context on caregiver-infant interaction. In Western societies like the dominant culture of the United States, the predominant context is dyadic, whereas in minority cultures, like one would find on a Native American reservation, it is rare for a caregiver to be alone. Extended family is the common community.

Data on caregiver-infant interactions developed from Western-based dyadic laboratory paradigms imposed on another culture might be confounded by reactions to isolation from the customary others in both the adult and the infant. For a given culture,
interaction behaviors differ according to the number of people present. These findings from the Sostek et al., (1981) study underline the importance of maintaining sensitivity to social context.

Callaghan (1981) observed groups in terms of the ways in which mothers and infants interact. The three groups of mothers and infants in face-to-face interactions included an Anglo sample, a Hopi sample, and a Navajo sample. The infants in each group were different, with total behaviors less among the Hopi and Navajo infants than the Anglo; particularly, rhythmic motor movements and vocalization were lower among the two Native American groups. The Anglo mothers tended to stimulate their infants more and were less likely to respond contingently as compared to the Native American mothers. Anglo mothers were more vocal and in general more active in trying to maintain their infant's attention. Finally, the Navajo mothers and Hopi mothers were judged to be more concerned with infant state than trying to maintain attention. Anglo mothers, on the other hand, were more intent on "breaking through rather than awaiting infant states that were more conducive to mutual gaze" (p. 131). The Native American groups had fewer mutual gaze events, and longer periods of mutual gaze than the Anglo. This study appears to illustrate that the Native American mothers do not overstimulate, but allow the infant to coordinate the interaction, creating longer gaze periods. Additionally, the Anglo mothers were intrusive as compared to the other two groups.

Another more current study of cross-cultural interactions (Richman, Miller, LeVine, 1992) compared differences between the Gusii of Kenya and a suburban Caucasian sample (Boston, Massachusetts). Richman et al. (1992) proposed that maternal responsiveness is "...affected by cross-cultural differences in local conventions of
conversational interaction, particularly as specified by cultural scripts governing the mother-infant relationship" (p. 614).

Within any population, there are differences in adult conversation including mutual gaze, turn-taking, affective expression, intonation, and the organization into canonical scripts which are all regulated by the local societal context. From the traditional Western approach, there is some assumption of a universality of mother-infant conversation. Richman et al. (1992) suggested that there is no universal script and further, each mother-infant interaction is differentiated by culturally specific norms, for example, tending a crying baby and ignoring a babbling one. A micro-analysis of video tapes of the face-to-face interactions of the Gusii of Kenya compared to the Boston group showed that Boston mothers more frequently attempted to engage their infants in a reciprocal exchange than did the Gusii. Additionally, the Gusii mothers more frequently averted their gaze when their infants appeared overly stimulated. These results suggest that each group had different interactional goals and support the idea of culture-specific influences on mother-infant interaction.

A final cross-cultural study of mother-infant interactions was conducted by Fajardo and Freedman (1981). Nine Navajo mother-infant dyads were compared to nine Black mother-infant dyads and nine Caucasian mother-infant dyads, on the domain of maternal rhythmicity which was defined as vocal rhythmicity. A common assumption made by researchers is that an infant must have maternal stimulation as an essential ingredient to basic development leading to optimal self-regulation. The data suggested that the Navajo mothers do not make active vocal efforts at stimulation to get their infants to interact with them. Additionally, the differences between the Black and white groups
were not significant. Moreover, the infant behaviors were more similar for the Black and Caucasian groups in terms of infants using less gaze aversion. The Navajo dyads were different in that the more rhythmic the mother, the more gaze aversion the infant employed. Finally, Fajardo and Freedman (1981) concluded that a successful interaction for Navajo dyads (longer periods of infant attentiveness) occurred "...when both partners were silently regarding each other" (p. 143). A successful interaction for the Black and Caucasian groups occurred "...when both partners were noisy and expressing lots of emotion" (p. 144). Their study substantiates that there are biocultural differences in mother-infant interactions. Additionally, the lack of empirical evidence that is culture-specific when examining the development of infant self-regulation is cause to extend studies to non-white populations.

The Study

This study used a standard face-to-face interaction and still-face paradigm to compare two groups of mother-infant pairs (dyads), a Native American population, and a Caucasian population. The still-face paradigm was employed to evaluate infants' skill in maintaining self-regulation during mild stress. This paradigm has been used to demonstrate an infant's skill in adopting some regulatory behaviors to cope with stress as well as regulate affect.

As an independent variable, the still-face paradigm allowed introduction of a mild stressor with all interactional dyads for comparison of infant behavior and self regulation. The resultant infant behaviors during an episode of maternal non-responding within each ethnic group were compared using standard statistical procedures. Video-taped interactions were subjected to micro-analysis, and analyses were computed to examine
the eye-gaze behavior and self-regulation strategies used by the infants in each cultural group.

**General Hypotheses**

Differences were expected in Native American infants in terms of gaze aversion, affect and use of self-comforting behaviors when compared to a group of Caucasian mother-infant pairs when the two groups were confronted with contradictory messages of maternal availability. Based on previous interactional studies, including those with a cross-cultural component, it was hypothesized that Native American infants would respond more negatively when maternal availability is contradicted by a "still face," than the Caucasian infants. Increases in gaze aversion during the still-face, compared to Episode 1 were predicted within both groups.

**Specific Hypotheses**

**Face-to-Face Episode 1**

1. With respect to differences in the eye-gaze patterns of infants in the Native American dyads versus the Caucasian dyads in terms of frequency and duration, it was predicted that Native American infants would engage in fewer and shorter periods of gaze averts during normal interactions than the Caucasian infants.

2. With respect to the maternal behaviors of the Native American dyads in contrast to the Caucasian dyads in terms of touch, vocalization and visual strategies to regain their infant eye gaze, it was predicted the Native American caregivers would display less activity in terms of strategies used to re-engage their infants.

**Still Face Episode 2**
1. With respect to differences in the infant behavior during the still-face interaction (Episode 2) in terms of self regulation, it was predicted that both the Native American infants and Caucasian infants would engage in more gaze aversion during the still-face episode.

2. Based on previous research, with respect to differences between the two groups of infants in terms of gaze aversion, affect and use of self-comforting behaviors, it was predicted that the Native American infants would engage in less gaze aversion and self-comforting behaviors than the Caucasian infants.

Face-to-Face: Reunion Episode 3

1. With respect to the maternal behaviors of the Native American dyads in contrast to the Caucasian dyads in terms of touch, vocalization and visual strategies to regain their infant eye gaze, it was predicted the Native American caregivers would display less activity in terms of strategies used to re-engage their infants following the still-face episode.
CHAPTER 2: METHOD

Participants

Group 1. Mother-infant dyads (n = 15 pairs, Caucasian) were recruited from the greater Washington, D.C. area as part of a larger longitudinal study conducted at Gallaudet University, Washington, D.C. The infants ranged in age from 8.5 months to 9.5 months. The mothers ranged in age from 22 years to 40 years. The infants were from two-parent intact homes. Socio-economic status was middle-class.

Group 2. Mother-infant dyads (n = 15 pairs) of Native American culture (different tribal groups, heterogeneous mix) were recruited from the Missoula Indian Center of women who participate in the Women, Infants and Children (WIC) program and from a Montana reservation. The infants were between 8.5 months and 9.5 months in age. Caregiver ages ranged from 19 years to 30 years. Socio-economic status was lower-class.

Participants were excluded from the study if they had lived in the urban area for more than one generation. This limitation was included in order to minimize acculturation effects which could confound the results of the study. Because it is often the case that the biological mother is not the primary caregiver within the Native American culture, participants were not limited to only biological mother but the primary caregiver was required to be Native American. Additionally, only infants living Native American homes rather than Caucasian foster care homes were considered for this study.

Participants were paid $25.00 per videotaping session. Informed consent was obtained before any session began, in accordance with American Psychological Association
Ethical Guidelines. The study was approved by the Gallaudet and The University of Montana Institutional Review Boards prior to data collection.

**Materials**

Participants were asked to fill out a demographics questionnaire (see Appendix A). Permission forms were presented and signed before the session began. A standard infant seat secured to a table was used for the infant to sit in during the face-to-face interactions at the Missoula site, and a high chair without tray was used at the reservation site. An ordinary folding chair was used for the mother to sit in.

**Procedure**

**Observational Procedure—Group 1.** The following observational procedures took place at Gallaudet laboratory as part of a larger longitudinal study (Koester, 1995). Mother-infant face-to-face interactions, including a still-face paradigm, were videotaped in a standard format with the infant sitting in an infant seat on a table in front of and facing the mother. Each of the mother-infant dyads was videotaped during face-to-face interactions for 2 minutes of normal interaction, followed by 2 minutes of a still-face interaction, and then another 2 minutes of normal interaction.

The face-to-face interactions were as follows:

**Episode 1—Face-to-Face Interaction.** The mother was instructed to interact with her infant (both seated) as she would normally do at home. There were no toys or objects of any kind present during the interaction. The interaction lasted for 3 minutes with the 1st minute considered “warming up” and only the 2nd and 3rd minutes coded.

**Transition.** For transition purposes between the first episode and the second episode, the mother turned in her chair 90° so that she was no longer face-to-face with
her infant. This phase, which was to prepare for the still-face episode, lasted for 30 seconds and was not coded.

**Episode 2—Still Face.** The mother was asked to face the infant again, but was not to respond in any manner. Responding included any manner of communication, touching, speaking or smiling. This period lasted for 2 minutes.

**Episode 3.** The mother was told to resume normal interactions as in Episode 1. The interaction lasted for 2 minutes.

Each face-to-face interaction was recorded using two video cameras from behind a one-way mirror and a special effects generator to create a split screen image. Each camera was positioned to record a frontal view of either the infant or the mother. Videotapes were then observed and coded for 2 minutes per episode using a remote-controlled video cassette recorder (VCR) connected to a personal computer equipped with a data acquisition and recording program (Koester, 1995). Frequency of infant behaviors, falling into the general categories of rhythmic behaviors, self-comforting behaviors, gaze avert, and negative affect were coded. Frequency of maternal vocalizing, tactile or vibratory behaviors, waiting or visual responses were also coded. Only behaviors which lasted for at least 1 second were recorded. Coders were instructed to code each episode separately. They were to find the starting point of the first episode by running the video backwards from the moment the mother turned 90° in preparation for the still-face episode. All coders were blind to the exact hypothesis of the experiment.

**Observational Procedure—Group 2.** The observational procedures described for Group 1 were identical for Group 2. These observations were conducted either at the Clinical Psychology Center located at The University of Montana or at a Native
American reservation located in Eastern Montana. The coding equipment is currently housed at The University of Montana parent-infant laboratory and was also used for coding Group 2 videotapes. Videotapes from Group 1 and Group 2 were coded by the same coders, following the previously described procedures.

Reliability. Interobserver reliability for the Gallaudet study (Koester, 1995) had been calculated, with agreements of 80 percent or better. Agreements were based on Pearson product-moment correlation coefficients between two coders, for both durations and frequencies of each behavior category. Additionally, videotapes were randomly assigned to coders from both groups of subjects. For the current study, four tapes from both Group 1 and Group 2 were used to train two coders. An acceptable interrater reliability was set at correlation ≥ .85. Disagreements between observers about coding of particular behaviors were discussed and resolved. Practice videotapes were provided to coders until reliability of ≥ .85 was reached.

Coding System.

The behavior coding system developed by Koester (1995) was used to code Group 1 and Group 2 individual infant behaviors of interest during the face-to-face interactions and the still-face procedure, such as:

Rhythmic Activities. These activities included cycling feet, kicking, waving arms, closing/opening fists and rocking.

Negative affect. These behaviors included grimacing, frowning, furrowing of brows, crying, arching back and other facial expressions.

Self-Comforting. These behaviors included sucking thumb or fingers, twirling hair, and rocking.
Look away. This category included gaze at self or objects in the surroundings.

Additional dependent measures included the frequency with which caregivers engaged in vocalizing, touching and vibratory behaviors, waiting and visual responses during an interruption of eye contact from their infant.

Coding procedures

Each incidence when the infant looked away from the care giver was coded as the onset of a gaze aversion. Maternal responses to a break in eye contact were then coded using the following possible behaviors:

Vocal response. Vocal was defined as the mother speaking or calling to the infant, singing, humming, or some form of vocal game in an attempt to re-engage the infant.

Tactile or vibratory response. Tactile or vibratory was defined as any behavior where the mother touched the infant in any manner or rapped or knocked on the table, high chair or infant seat.

Visual response. Visual was defined as the mother using any visual or gestural activities within the infant's visual field. This included shaking or nodding the head, pointing to objects, and finger play.

Waiting response. Waiting was defined as the mother just observing the infant but not vocalizing, touching or engaging in any behavior as an effort to regain the infant's attention. Waiting needed to occur for at least 1 second to be coded.

Following the coding of the maternal behaviors, infant behavior in response to those behaviors was coded. The infant could resume eye contact or continue to look away from the caregiver. The gaze aversion episode was considered terminated when the infant looked back and an offset time was then recorded.
CHAPTER 3: RESULTS

Face-To-Face Interaction Episodes

Gaze aversion behavior of infants and maternal responsive behaviors to infant gaze avert were examined over two normal periods of face-to-face interactions using one-way (2 groups X 2 episodes) repeated measures analysis of variance.

Insert Table 1

Gaze Aversion by Group. Repeated measures analysis of variance were conducted on the durations and frequencies of infant gaze aversion during face-to-face interaction episodes. The overall frequencies and durations of interrupted eye contact with the caregiver by infants are shown in Table 1. Analyses of frequencies revealed a main effect of episode \[ F(1, 28) = 5.650, p = .025 \]. There were no episode by group interactions or group main effects. Analyses for durations revealed a main effect of group across episode \[ F(1, 28) = 4.422, p = .045 \]. There were no main effects of episode or group X episode interaction. As shown in Table 1, Caucasian infants in each episode looked away from the caregivers for longer periods of time than did the Native American infants. Moreover, in face-to-face interactions following a stressful situation, Caucasian infants decreased their frequency of gaze aversion, whereas Native American infants' eye-gaze frequency remained the same for both episodes.
Maternal responses to interruptions in eye-contact. Repeated measures analyses of variance were conducted on the frequencies of the maternal responses used in an attempt to re-engage the infant's eye contact: these included mothers' vocalization, tactile or vibratory, visual responses and waiting strategy. Table 1 summarizes the mean frequencies and standard deviations of each strategy by group and episode of interaction.

Vocalization responses. Repeated measures ANOVA of total vocalization responses (group X episode) revealed a main effect of group across episode \( [F(1,28) = 15.385, p = .001] \). The analyses did not reveal any group X episode interaction or main effect of episode. Caucasian mothers were more likely to use vocalization strategies in an attempt to re-engage their infant than were Native American mothers in both episodes.

In terms of success in regaining eye gaze of infants using vocalization strategies, analyses revealed a main effect of episode \( [F(1, 28) = 4.167, p = .051] \), a main effect of group across episodes \( [F(1, 28) = 4.663, p = .040] \) and no group X episode interaction. Using vocal strategies appeared to be more successful in regaining the infant's eye contact for the Caucasian mothers. Moreover, following a stressful situation, both groups demonstrated a decrease in success using vocalization.

Tactile-Vibratory Responses. Analyses of the total tactile-vibratory responses revealed a main effect of group across episode \( [F(1, 28) = 5.563, p = .026] \). No main effect of episode or group X episode interaction were found. Caucasian mothers were more likely to use tactile-vibratory strategies in an attempt to re-engage their infant than were Native American mothers, regardless of episode.

In terms of success in regaining eye gaze of infants using tactile or vibratory strategies, analyses revealed a main effect of group \( [F(1, 28) = 5.563, p = .026] \), no main
effect for episodes and no group X episode interaction. Using tactile strategies appeared to be more successful in regaining the infant's eye contact for the Caucasian mothers in both episodes. Moreover, following a stressful situation, both groups demonstrated a decrease in success using tactile-vibratory strategies.

**Visual Responses.** Analyses of the total visual responses revealed a main effect of episode \( [F(1, 28) = 4.485, \ p = .044] \). No main effect of group or group X episode interaction were found. Both groups increased the use of these strategies following a stressful situation.

In terms of success in regaining eye gaze of infants using visual strategies, analyses revealed no main effect of episode, no main effect for group and no group X episode interaction. Using visual strategies appeared to be more successful in regaining the infant's eye contact for the Native American mothers in both episodes. Moreover, following a stressful situation, Native American mothers continued to be successful using visual strategies, whereas Caucasian mothers demonstrated a decrease in success in regaining their infant's eye gaze.

**Waiting (passively observing) Responses.** There were too few responses in this category to make analyses meaningful (see Table 1).

"Success" ratios. Analyses were conducted on "success ratios" (frequency of maternal behavior regaining infant eye gaze/frequency of gaze avert). When the number of "opportunities" were controlled for, similar patterns of "success" continued to be found (see appendix E).

Still-Face
Gaze aversion behaviors of infants was examined during the standard still-face procedure, and compared to those observed during interactions using a repeated measures analysis of variance (2 groups X 3 episodes).

Gaze Aversion by Group. Repeated measures of analysis of variance were conducted on the durations and frequencies of infant gaze aversion during face-to-face interaction episodes and the still-face episode. The overall frequencies and durations of interrupted eye contact with the caregiver by infants during the Still Face episode are shown in Table 2. Analyses of frequencies revealed a main effect of episode \([F(1, 28) = 5.650, \ p = .025]\). There were no episode by group interaction or group main effects. As shown in Tables 1 and 2, during the still face interaction, Caucasian infants were more likely to decrease their frequency of gaze aversion, whereas Native American infants increased theirs. Although the frequency of gaze avert decreased for the Caucasian infants, their duration of aversion increased significantly during the still-face episode. Analyses for durations revealed a main effect of group across episode \([F (1, 28) = 14.976, \ p = .001]\). There were no main effects of episode or group X episode interaction.
As shown in Table 2, Caucasian infants in each episode were more likely look away from the caregivers for longer periods of time than the Native American infants.

**Self-comforting behaviors.** A one-way analysis of variance was conducted on the frequencies of the infant behaviors used during a period of maternal non-responding (still-face episode): these included rhythmic behaviors, negative affect and self-comforting behaviors. Table 2 summarizes the mean frequencies and standard deviations of each strategy used by the infants in each group. Analyses revealed no group difference in terms of rhythmic behaviors or negative affect. However, significant group differences were found with respect to infant self-comforting behaviors \(F(1, 28) = 4.247, p = .049\). Caucasian infants were more likely to use self-comforting behaviors than Native American infants when experiencing a stressful situation.

**Maternal Age Effects**

An analysis of variance was conducted on the mean maternal ages of the two groups. The results revealed that Native American mothers were significantly younger \((M = 23.17\, \text{yrs.})\) than the Caucasian mothers \((M = 33.73\, \text{yrs.})\). An analysis of covariance controlling for maternal age was conducted and revealed no changes in previous findings.
Despite a large body of literature regarding parent-infant interactions, few have examined cultural comparisons with Native American families. The infant learns to interact with others within the context of repeated interactions with caregivers over the first few months of life (Gianino & Tronick, 1988). This process between infant and caretaker is one that is social, communicative and regulatory. The current study investigates possible cultural differences in the interactional styles of Native American and Caucasian mothers and their 9-month-old-infants. The rules of social interactions of their culture are learned by infants during face-to-face interactions including expectations about appropriate displays, which Barrett (1993) suggests can influence infant behavior by as early as four months. Incorporated in the role of emotion communication is eye gaze. While most research suggest that gaze contributes to arousal modulation, others (Hains & Muir, 1996) suggest that desire for communication is also signaled by eye gaze.

Communication styles are very different within Caucasian and traditional Native American cultures. In most Western societies, the predominant context is dyadic, whereas caregivers in Native American cultures are rarely alone with their infants, relying more on large extended families. Additionally Native American children are taught to learn through observance.

A few cross-cultural studies have examined mother-infant interactions with a Native American group, finding that there were cultural differences (Callaghan, 1981) in terms of the ways in which mothers and infants interact. The infants in each group were responded to differently by their mothers, with the Caucasian mothers stimulating their
infants more, being more vocal and in general more active in trying to maintain their infant's attention. Concern with infant state rather than trying to maintain attention appeared to be primary to the Navajo and Hopi mothers. The Native American infants interrupted eye-gaze less often and engaged in longer durations of gaze than the Caucasian infants. This study appeared to show that Native American mothers allowed their infant to coordinate the interaction, creating longer gaze periods.

A second study conducted by Fajardo and Freedman (1981) suggested that the Navajo mothers do not make active vocal efforts at stimulation to get their infants to interact with them. Within Navajo dyads the infant increased gaze aversion when the mother became more rhythmic, whereas, the Caucasian group was characterized as noisy and emotional. This study pointed out that mutual silent regard marked a successful interaction for the Native American mothers and their infants, whereas, noisy interactions were deemed the most successful for the Caucasian dyads.

In the present study, the findings of previous studies have been replicated. The data analyses demonstrated that there are cultural differences in the interactional eye gaze patterns among Native American mothers and their infants including maternal responsiveness when their infants look away. Specifically, Native American infants spend time more time looking at their mothers as compared to Caucasian infants during normal face-to-face interactions. Reciprocally, Native American infants look away from their mothers less frequently. Additionally, there were cultural differences in terms of maternal preferences for responsiveness to an infant's gaze averts. In general, Native American mothers were less overt in their attempts to re-engage their infants. They used vocalization and tactile strategies significantly less often than the Caucasian mothers.
Findings of less overt, attention-getting strategies, and apparently more willingness to allow Native American infants to gaze elsewhere, are consistent with the cultural preference for teaching "silent observation," a parenting goal of many Native American mothers.

The findings during the still-face procedure demonstrate that Native American infants are not employing eye-gaze as a self-regulating strategy to the extent that Caucasian infants are. Although there were no vocal, tactile or visual behaviors from the mother during the still face episode, Native American infants may perceive the mother as maintaining eye contact and communication. According to findings by Hains and Muir (1996) eye contact acts as a cue or signal to infants to engage in communication with an adult. It may be that Native American infants do not interpret the "still-faced" mother as unresponsive as long as eye contact is maintained.

The Caucasian infants employed more self-comforting behaviors than did the Native American infants during the still-face procedure. It may be that the Caucasian infants were more disturbed because they have greater expectations in terms of maternal touch and vocalization than do the Native American infants, whose mothers typically do not use high levels of vocalization and tactile stimulation during normal face-to-face interactions. Additionally, if the Native American infants did not perceive the still-face interaction as "non-responding" by the mother they may have not been as distressed as the Caucasian infants. It would be important in a future study to examine the Native American infant’s behavior following a break in eye-contact by the mother. That is, during the still-face procedure, the mother would not be allowed to look directly at the infant.
These results demonstrate the differences of cultural aspects in infant-caregiver interactions. For example, gaze may not necessarily be used as a regulatory behavior in the Native American culture. Because the Native American infants looked away less often and for shorter periods of time than the Caucasian infants, it may demonstrate that Native American infants do not use gaze as regulator to the extent that Caucasian infants do. Indeed, the results of this study demonstrated that Caucasian infants employed gaze aversion significantly more during a period of maternal nonresponding.

These results might also demonstrate temperamental differences in the infants in that the Native American infants were less reactive temperamentally as a group than the Caucasian infants. Chess and Thomas (1996) and others have argued that while there may be cultural differences in interactions, unless temperament is a considered factor, the results could be due to individual temperamental differences. For example, several studies have found lower reactivity to stress or pain for infants of some cultures when compared to Caucasian infants (Kagan, et al. 1994; Chisholm, 1989); clearly this could also be the case for the results reported here.

A possible mediating factor may be maternal age. Native American mothers were significantly younger ($M = 23.17$ yrs.) than the Caucasian mothers ($M = 33.73$ yrs.), although, when analyses controlling for maternal age were conducted, there were no significant changes to the findings. A follow-up study should further investigate these interactions, matching participants on the maternal age.

The cultural differences in the interactional styles of the Native American mother and infant may be due to many factors, including suggestions by Hains and Muir (1996) that eye gaze is a cue for communication. Because some cross-cultural studies have
demonstrated that infant-caregiver interactions are highly influenced by societal context, it would be important to investigate Native American infants in natural interactions which generally include much extended family. Such investigations would examine the triad instead of the dyad.

Consideration to the sample from Washington, D. C. should be given. It is possible that the results may not reflect intergroup differences at all, but instead might be due to geographical location. The study is comparing a large metropolitan sample to a small, western, rural sample. In other words, this same study might result in significant findings if both groups were Caucasian simply because there are differences in the way mother and infants interact due to rural-urban influences. A follow-up study might explore this possibility by sampling a Caucasian population from the same location as a Native American population.

It is important to note that the results are limited in that they are generalizable primarily to Montana Native American tribes. Because Native Americans may not be a homogenous group, the results are specific to this region. A future investigation should include Native American mother-infant dyads from other reservations including Canada, Alaska, the Pacific Northwest and others, allowing for testing of homogeneity and potentially greater generalizability of these results.

Other interpretations to these results could include possible influences of socio-economic status, educational levels of the mothers, and acculturation of the Native American mothers. It would be important to analyze those factors before generalizing results.
Understanding of interactional behaviors and how they contribute to an infant’s repertoire of self-regulatory behaviors is crucial for advancing knowledge to service providers. Application of interventions based on normal baselines of Caucasian infant behaviors may be inappropriate for the Native American infant. The understanding of dysregulation and resultant psychopathology within the Native American infant population will only come about as examination of “normal” interactions and infant regulatory abilities continues to occur through future studies such as this one.
References


Table 1

Mean frequencies of infant gaze averts and maternal responses to interrupted eye contact during face-to-face interactions

<table>
<thead>
<tr>
<th>Group</th>
<th>Native American (N=14)</th>
<th>Caucasian (N=15)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infant Behaviors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Frequency of Gaze aversions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Episode I</td>
<td>4.47 (1.55)*</td>
<td>5.93 (2.52)</td>
</tr>
<tr>
<td>Episode III</td>
<td>4.47 (2.03)</td>
<td>3.93 (1.54)</td>
</tr>
<tr>
<td><strong>Duration of Gaze Aversions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Episode I</td>
<td>59.78 (26.18)</td>
<td>77.30 (26.02)</td>
</tr>
<tr>
<td>Episode III</td>
<td>59.08 (27.34)</td>
<td>78.82 (31.67)</td>
</tr>
<tr>
<td><strong>Maternal Responses (Frequencies)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Vocalization</strong></td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>Episode I</td>
<td>10.00 (6.68)</td>
<td>20.93 (7.98)</td>
</tr>
<tr>
<td>Episode III</td>
<td>11.07 (5.25)</td>
<td>19.53 (11.11)</td>
</tr>
<tr>
<td><strong>Vocalization/Baby looks back</strong></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Episode I</td>
<td>3.07 (2.40)</td>
<td>5.27 (2.31)</td>
</tr>
<tr>
<td>Episode III</td>
<td>2.86 (1.99)</td>
<td>3.40 (2.06)</td>
</tr>
<tr>
<td><strong>Total Tactile/Vibratory</strong></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Episode I</td>
<td>10.93 (6.04)</td>
<td>18.67 (8.80)</td>
</tr>
<tr>
<td>Episode III</td>
<td>11.21 (6.89)</td>
<td>17.33 (13.89)</td>
</tr>
<tr>
<td><strong>Tactile or Vibratory/Baby looks back</strong></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Episode I</td>
<td>2.60 (1.84)</td>
<td>4.33 (2.89)</td>
</tr>
<tr>
<td>Episode III</td>
<td>2.29 (1.59)</td>
<td>2.73 (1.91)</td>
</tr>
<tr>
<td><strong>Total Visual</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Episode I</td>
<td>5.20 (2.70)</td>
<td>5.87 (5.24)</td>
</tr>
<tr>
<td>Episode III</td>
<td>7.79 (6.19)</td>
<td>7.20 (7.05)</td>
</tr>
<tr>
<td><strong>Visual/Baby looks back</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Episode I</td>
<td>2.07 (1.44)</td>
<td>1.47 (1.36)</td>
</tr>
<tr>
<td>Episode III</td>
<td>2.07 (1.59)</td>
<td>1.27 (1.49)</td>
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<tr>
<td><strong>Total Waiting</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Episode I</td>
<td>.53 (0.83)</td>
<td>.2000 (.56)</td>
</tr>
<tr>
<td>Episode III</td>
<td>.14 (0.53)</td>
<td>.0067 (.26)</td>
</tr>
<tr>
<td><strong>Waiting/Baby looks back</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Episode I</td>
<td>.0067 (.26)</td>
<td>.0067 (.26)</td>
</tr>
<tr>
<td>Episode III</td>
<td>.0000 (.00)</td>
<td>.0067 (.26)</td>
</tr>
</tbody>
</table>

* Numbers in parentheses indicate standard deviations.

b Durations in seconds

Group effects: * p < .05; *** p < .001.
Table 2

**Infant behaviors during still-face episode**

<table>
<thead>
<tr>
<th>Gaze Behaviors</th>
<th>Group</th>
<th>Native American (N= 14)</th>
<th>Caucasian (N= 15)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency of Gaze aversions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Still-Face</td>
<td>5.67(2.55)</td>
<td>5.87 (2.39)</td>
<td></td>
</tr>
<tr>
<td><strong>Duration of Gaze Aversions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Still-Face</td>
<td>63.18 (27.13)</td>
<td>93.81 (19.78)</td>
<td></td>
</tr>
<tr>
<td><strong>Other Infant Behaviors (Frequencies)</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Rhythmic</td>
<td>8.00(4.39)</td>
<td>9.33 (5.37)</td>
<td></td>
</tr>
<tr>
<td>Negative Affect</td>
<td>13.93 (8.27)</td>
<td>14.80 (7.62)</td>
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</tr>
<tr>
<td>Self-Comforting*</td>
<td>6.53 (3.48)</td>
<td>9.47 (4.27)</td>
<td></td>
</tr>
</tbody>
</table>

^a Numbers in parentheses indicate standard deviations.

^b Durations in Seconds

Group effects:  * p < .05;   *** p < .001.
Mean Gaze Avert Time by Native American & Caucasian Infants

Duration (seconds)

Episode 1  Still Face  Episode 3

Native American  Caucasian
APPENDIX A

Demographic Questionnaire

Infant's Name *(First Name Only)* __________________________ Date of Birth __________________________

Address __________________________ How Long in Area? _______ (Years)

________________________________________ Contact Phone (_____)___________

PARENT INFORMATION *(First Name Only):*

Mother

Name_________________________Tribe________________________________

Enrolled? Yes[ ] No[ ] Age ____ Years school completed (1-20) ____

Living in same household as infant? Yes[ ] No[ ]

Father

Name_________________________Tribe________________________________

Enrolled? Yes[ ] No[ ] Age ____ Years school completed (1-20) ____

Living in same household as infant? Yes[ ] No[ ]

Infant Caretaking and Household Information *(First Names, Only):*

Primary Caregiver(s) - Please list any who give care during the week and indicate tribal affiliation (any except parents). Approximately how many hours per week caring for this child? *(Circle approximate amount)*

• Biological Mother (Name)_________________________

   Age: __________________ # hours / week [0-10] [11-20] [21-30] [31-40] [40+]

• Maternal Grandparent(s) (Name)_________________________

   Age: __________________ # hours / week [0-10] [11-20] [21-30] [31-40] [40+]

• Biological Father (Name)_________________________

   Age: __________________ # hours / week [0-10] [11-20] [21-30] [31-40] [40+]

• Paternal Grandparent(s) (Name)_________________________

   Age: __________________ # hours / week [0-10] [11-20] [21-30] [31-40] [40+]

   Tribe __________________ Non-Indian?[ ]

• Brothers/Sisters (If more than 3, attach a separate sheet)

   (Name)_________________________ Age: __________________

   # hours / week [0-10] [11-20] [21-30] [31-40] [40+]

   (Name)_________________________ Age: __________________

   # hours / week [0-10] [11-20] [21-30] [31-40] [40+]

   (Name)_________________________ Age: __________________

   # hours / week [0-10] [11-20] [21-30] [31-40] [40+]
- Other Relative/Family/Friend (Name) ________________________________
  Age: ____________________ # hours / week [0-10] [11-20] [21-30] [31-40] [40+]
  Tribe___________________ Non-Indian[ ____ ]

- Day Care or Baby Sitter (Name) _________________________________
  Age: ____________________ # hours / week [0-5] [6-15] [20-30] [over 40]
  Tribe___________________ Non-Indian[ ____ ]

Household members
Number of members in household (Include all who live in home during the week) ____________
Number with tribal affiliation______________________________
Number of non-Indian members_____________________________

Number by age group. Please indicate total numbers of all people who live in the house by age, sex and relationship to infant. (not names)

- [age 1-5 yrs] ___________ # girls________ # boys________

- [age 6-10 years] ___________ # girls________ # boys________

- [age 11-14 years] ___________ # girls________ # boys________

- [age 15-18 years] ___________ # girls________ # boys________

- [18-25 years] ___________ # Women _______ # Men______

- [26-40] ___________ # Women _______ # Men______
  Grandmother [ ____ ] non-relative [ ____ ]

- [41-55] ___________ # Women _______ #Men______
  Grandmother [ ____ ] non-relative [ ____ ]

- [56-65] ___________ # Women _______ #Men______

- [over 65] ___________ # Women _______ #Men______

Does infant reside in Missoula full time? Yes [ ____ ] No[ ____ ]
If no, where else does infant reside? With other parent [ ____ ] With grandparent [ ____ ]
Aunt or other relative [ ____ ] Reservation[ ____ ]
**Infant Health Questions**

Birth weight of Infant ______________________

Delivery: Normal [ ] Difficult[ ] Premature [ ]

Delivered at: home[ ] hospital [ ] midwife[ ]

Any Health problems:

a) In first few weeks: Yes[ ] No[ ] (if yes, indicate problems below)

b) Since 1 month of age? (Breathing problems, jaundice, feeding patterns, sleeping etc.): Yes[ ] No[ ] (if yes, indicate problems below)

Mother's health:

Any problems with "baby blues" or post partum depression?

Yes [ ] No [ ] If yes, under any treatment or taking medication?

Any other health problems? Yes [ ] No[ ]. If yes, please list:

Other information:

Is there any other information that you feel that we should know regarding your infant that may be important in understanding his/her development?

Do you have any concerns about your infant's development that you would like to be able to talk to someone about?
APPENDIX B

Statement Of Consent
To Participate in Research

STATEMENT OF CONSENT TO PARTICIPATE IN RESEARCH

I, __________________________(parent/legal guardian), have read the description of the research project entitled “Native American Mother-Infant Interactions at Nine Months: A Cross-Cultural Study,” to be run under the direction Dr. Lynne Sanford Koester who can be reached at 243-4521. I consent to participate with my infant_________________ (infant’s name) in the study. You may contact me at the following phone number to arrange for appointments:

Phone:_______________________; Preferred days or times to telephone______________

Parent’s/Guardian’s Signature________________________________________ Date____________

Address__________________________________________________________

____________________________________________________________________

The university requires that the following statement be included in the description of all research that uses a consent form:

In the event that you (or your child) are injured as a result of this research you should individually seek appropriate medical treatment. If the injury is caused by the negligence of the University or any of its employees, you may be entitled to reimbursement or compensation pursuant to the Comprehensive State Insurance Plan established by the Department of Administration under the authority of M. C. A., Title 2, Chapter 9. In the event of a claim for such injury, further information may be obtained from the University’s Claims Representative or University Legal Counsel.
APPENDIX C

Statement of Consent to Show Videotaped Infant Behaviors and Parent Child Interactions

STATEMENT OF CONSENT TO SHOW VIDEOTAPED INFANT BEHAVIORS AND PARENT-CHILD INTERACTIONS

The information collected as part of the research project entitled “Native American Mother-Infant Interactions at Nine Months: A Cross-Cultural Study” includes videotaped records of infant behaviors and parent-child interactions. In order to train other researchers, instruct students, and disseminate results of the study we request your permission to allow students, faculty and researchers to observe these videotapes. Neither you nor your child will be identified by name on these tapes or by the researchers who show them. Please sign below, indicating whether you do or do not give your permission to researchers to show the videotaped records of you and your infant.

I. _________________________________(parent/legal guardian). DO / DO NOT (circle one) give my permission for researchers involved in the above project to use videotaped records of myself and my infant _____________________(infant’s name) for educational and training purposes.

Parent’s/Guardian’s Signature __________________________________Date____________

Participation and gratuity does not require consent to use video tapes for educational purposes. Any tapes not receiving consent will be destroyed after data has been analyzed.
February 9, 1998

Dear Parent or Guardian:

You and your baby are respectfully invited to be part of a study to help us understand how our babies develop and how Native American parenting is different from other cultures. We need your help so that Native American babies' needs can be better understood and met. You are being invited to participate because community involvement is valued and appreciated. The study has been approved by The University of Montana, the Missoula Indian Center and the Missoula County Health Department WIC program.

We will need to meet with you and your baby at the University for about 1 hour when the baby is 8 1/2 to 9 1/2 months old. We want to film you playing with your baby. There will be two brief play sessions where you and your baby will just play together. Then there will be another short time when we'll ask you just to watch your baby, but not play with him or her. There should be very little risk to you or your baby, but if he or she becomes upset for longer than 30 seconds, we will stop the session.

We will protect your privacy by giving each family a number; this way, everything you tell us about you and your baby is listed by that number—not your name. We will keep a list of names and telephone numbers only to contact you if we need more information. We will also not use any name when we report results.

Of course, we hope you will participate for the entire session, but you are free to quit at any time. To thank you for your time, we will pay each family $25.00, even if you must end the session early. If you agree to be in this study, please fill out enclosed postcard and mail to me so I can contact you by phone. If you would like to talk to someone about this study first, please call Linda Terwilliger at 721-5587. Babysitting, if needed, will be provided.

We hope you will help us in this effort to gain a better understanding of Native American parenting styles. Thank you for your help!

Sincerely,

Linda R. Terwilliger, Eastern Band Cherokee Graduate Student Psychology Telephone: 721-5587

Prof. Lynne Sanford Koester Department of Psychology Telephone: 243-4521
APPENDIX E
Success Ratios of Maternal Behaviors in Response to Infant Gaze Avert

Ratio Visual Successfulness by Number of Gaze Averts

Ratio Vocal Successfulness by Number of Gaze Averts

Ratio Tactile Successfulness by Number of Gaze Averts