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INTUITIVE PARENTING REPERTOIRE UTILIZATION BY CAUCASIAN-  
AMERICAN AND MANDARIN CHINESE MOTHERS WITH  
TWO- AND FOUR-MONTH OLD INFANTS

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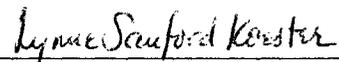
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Doctor of Philosophy

The University of Montana

December, 2005

Approved by:



Chairperson



Dean, Graduate School

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**Intuitive Parenting Repertoire Utilization by Caucasian-American and Mandarin-Chinese Mothers with Two- and Four- Month-Old Infants.**

<sup>LSK</sup> Chairperson: Lynne Koester

In this study an analysis was conducted of intuitive parenting skills utilized by Caucasian-American and Mandarin-Chinese mothers with two- and four-month-old infants. The subjects were Caucasian-American mothers and Mandarin Chinese mothers recruited from the Washington, DC area for a study by Hanuš and Mechthild Papoušek. Participants were videotaped during four experimental conditions: free play, encouraging vocalization, discouraging vocalization, and soothing. This researcher was blind to subject and condition, utilizing one-minute video segments previously randomly ordered by Hanuš Papoušek. Data were coded and analyzed for occurrence of nine intuitive parenting behaviors and four types of touch.

Hypotheses were: 1) that Chinese and American mothers do not differ in overall use of intuitive parenting behaviors; 2) that differing experimental conditions elicit differing constellations of behaviors, especially in the types of touch used; and 3) that intuitive maternal behaviors vary according to infant age and developmental status. Findings, based on mixed design, repeated measures analyses, indicated that while Chinese and American mothers utilized all of the intuitive parenting behaviors, statistical differences between the two groups were found on use of repetition and elongation behaviors, as well as in use of vestibular touch (higher frequencies in each for the Chinese mothers). Differing experimental conditions were matched with changes in maternal behaviors, particularly during the experimental condition of discouraging vocalization. Infant age corresponded with maternal behavioral differences in repetition and arousing touch, both increasing at four months, with additional trends in positioning, contingent behavior, and touch, again, all increasing at four months, and calming touch specifically, decreasing at four months.

These findings add to the growing evidence of cross-cultural use of intuitive parenting behaviors, adding strength to arguments that these behaviors are biologically based. In addition, differences in frequency by the two groups, add strength to arguments that the intuitive repertoire may represent an expression of cultural preferences and a means to reinforce cultural goals, such as social referencing. The findings may be utilized by early interventionists working with mother-infant dyads who seek to strengthen optimal infant development by supporting the expression of these non-conscious maternal behaviors.

## Acknowledgements

I would like to thank Dr. Mechthild Papoušek for allowing me to continue her work by analyzing this data set. In addition, Dr. Papoušek graciously welcomed me to her laboratory in Munich, Germany to train with her students on the coding scheme utilized in this study. I appreciate the support from the Psychology Department of the University of Montana which provided travel funds for me to visit the Munich lab. I am grateful for the assistance of Dr. Koester who facilitated this study venture, both through her long-term collegial connections with the Papoušeks and in being the Chairperson of the dissertation committee. I also thank the other members of my committee, Dr. Margaret Beebe-Frankenberger, Dr. Bryan Cochran, Dr. Rita Sommers-Flanagan, Dr. Kimberly Wallace, and Dr. Darrell Stolle who so carefully read the study and provided valuable feedback. I am appreciative also for the assistance of Caroline Haff and Anja Kahnt who provided training on the coding scheme, Yang Jian in translating the Mandarin-Chinese tapes, Dr. Meg Traci and Baine Craft who consulted in the analyses, and the undergraduate team in Dr. Koester's lab who assisted in data entry. And finally I thank the mothers and infants who took part in this study which has contributed to increasing our knowledge about parent-child interactions.

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Intuitive Parenting Repertoire Utilization by Caucasian-American and Mandarin Chinese  
Mothers with Two- and Four-Month-Old Infants

CHAPTER ONE

Introduction and Review of Literature

The parent-infant relationship is a powerful one in which the dyadic interactions form the basis for enculturation and learning of state regulation, motor skill development, balancing perception and cognition, and social understanding (Lamb, Hwang, Ketterlinus & Fracasso, 1999; Bornstein, 1995). Infants are born prepared for the intersubjectivity of dialogue, interaction, shared experience, and acculturation (Papoušek & Papoušek, 1987). Intersubjectivity is the experience of another in relation to the actions of the self or a process of co-regulating intentions which underlies the parent-infant attunement (Fogel, 2001). While these exchanges take place in the private family system, they are also influenced by their context within the broader culture and historical time (Dixon & Lerner, 1988).

In order to capture the intimacy of the dyadic interaction and the greater influences of culture, this study examines nine specific maternal behaviors, one of which is further divided into a subset of four behaviors. The interactions are mother-infant face-to-face exchanges within the context of four interaction goals and across two cultural experiences, those of Mandarin Chinese and Caucasian-American mothers. The following literature review will cover the debate over genetic versus environmental influences on infant development and parenting, the nature of early parent-child interactions and the need for intervention in some cases, the expected sequence of infant development,

particularly as it relates to social relationships, and the role of culture in shaping parent-infant behaviors. In addition, a brief history of the concept of intuitive parenting will be provided, with details of specific behaviors thought to be part of this repertoire. Finally, the rationale for using the four experimental conditions in the present study will be explained, leading to the hypotheses being tested.

### *The Role of Nature and Nurture*

The field of psychology has long been engaged in an exploration of the mutual influences of nature and nurture on children's social, emotional and cognitive development (Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000). Through the years different traditions have emphasized one part of the equation over another. The nature position was linked with preformationism, nativism, and innateness, which served as the underpinning of early developmental theories, such as Gesell's theory of motor development stages (Dixon & Lerner, 1999; Cole, 1999). According to nature theories, perinatal brain development reflected rigidly determined genetic programs (Sameroff, 2004). The nurture position was expressed in concepts of learning, conditioning, experience and socialization. It was a theoretical basis for Freudians who strongly believed in the psychological shaping of lifelong personality traits based on interactions with mother and father, and for behaviorists' beliefs in learned, conditioned responses that then formed the foundation for subsequent complex patterns (Dixon & Lerner, 1999; Bornstein, 1995). Infancy, and the infant's immature nervous system, believed to be in its most plastic state, became associated with critical windows of optimal development. In recent years, however, it has become understood that while infant experiences and later childhood experiences build neural structures, new understandings of plasticity

mean that these are not permanent; in fact, the field of psychotherapy is built on the ability to change the neural patterns (Siegel, 1999). Life span theory also states that developmental change is present across the life span in both inner-biological and outer-ecological levels (Dixon & Lerner, 1999).

Through the years a general consensus has evolved which espouses an interactionist view of nature and nurture. The contemporary view is that the expression of heritable traits depends on experience which includes parenting, non-familial influences, and the role of the broader context in which families live (Collins, et. al., 2000). Geneticists now focus on not just finding genetic markers or constellations but on understanding how genetic predispositions are made manifest by the individual's social or physical environmental factors (Rutter & McGuffin, 2004). Current goals are to determine which genes vary by heredity, environmental factors or both (Robinson, 2004). An example of this is the cross-disciplinary research being undertaken at the Social, Genetic and Developmental Psychiatry Centre in London. Researchers there have demonstrated an interaction between the promoter of the MAO-A gene and child maltreatment in relation to the development of antisocial behavior (Rutter & McGuffin, 2004)

Understanding the interplay of nature-nurture is important in terms of parental action (Lipsitt, 2005). Lipsitt writes in a commentary on the recent identification of a genetic link in crib death that it is also important for the public to remain aware of the environmental factors that contribute, such as poor sleeping positions and crib design. A similar point has been made regarding balancing the genetic knowledge of autism genes with established environmental stimulus practices that mitigate the expression (Miele,

2004). In yet another example, a study of Swedish subjects has led to a hypothesis that the intrauterine and perinatal environment, in an interaction between genes and environment, might have independent effects on future suicidal risk (Oquendo & Baca-Garcia, 2004). The authors' possible explanation for this is found in rodent studies where low-anxiety mice express significantly more anxiety if they are transplanted into uteri of anxious dams and are reared by anxious dams compared to when only one of these factors is present.

The present study focuses on the nurture part of the equation in terms of the specific behaviors the mother is utilizing in the dyadic interactions. However, it does so with an acknowledgment of the nature aspect of being a parent as well: by showing that specific behaviors occur across diverse cultures this investigation lends credence to the possibility of a species based biology of parenting. The genetic contribution to a parenting behavior is thought to be greater if consistency of the behavior can be demonstrated across contexts (McGuire, 2003). This study will therefore examine the contexts of different tasks and ages.

The Papoušek's have questioned through their observations and examination of animal literature, whether behaviors assumed to be intuitive had in fact been learned by adolescent females (M. Papoušek, personal communication, October 2003). However, even if this is learned behavior, genetic research now illustrates that a learned behavior, like the rats who change structure based on uterine and environmental stimuli, can also become genetic. For instance, it has been shown that variations in maternal care in rats is inherited; pups receiving indifferent care show profound changes in brain gene activity (Robinson, 2004). It is also possible that the learning environment for human adolescents

contains stimuli conducive to genetically linked characteristics because parents who share those genetics facilitate their presence (McGuire, 2003).

### *The Dyadic Parent-Infant Relationship*

Dyadic interactions have often been studied utilizing the still-face experimental form, pioneered by Tronick and colleagues in 1975 (Adamson & Frick, 2003). In this procedure a mother and infant are positioned face to face. A period of natural, or free play is followed by a stilling of the mother's interaction repertoire, during which the infant's responses to this perturbation are observed. Typical responses include initial smiling and looking by the infant for a few seconds and then looking away, with increasing levels of distress and withdrawal as the maternal silence continues (Fogel, 2001). During the past thirty years this procedure has been used to study specific topics, such as perception, gender and culture differences, attachment, and effects of maternal depression (Adamson & Frick, 2003). Tronick initially theorized that the still-face effects were due to a violation of the expected norms of interaction. However, in recent years he has concluded that face-to-face interactions are not rule governed or highly synchronous and attuned; rather they are a co-created, moment-to-moment dynamic process generating unique interactive exchanges and relationships (Tronick, 2003). This intuitive parenting study examines maternal behaviors in these interactive exchanges, yet also references the existence of the infant's changing states which contribute to the dynamic process. Instead of using the classic still-face disruption of the dyadic exchange, the experimental manipulations of this study utilize common variations that are likely to occur in normal parent-child interactions: the need to soothe, to excite or amplify state, or to calm down the infant for quiet periods.

Dyadic interactions have been recognized as important components in multiple domains of development, from state regulation to motor abilities to perception and cognition (Bornstein, 1995). For example, infant cognition is built within the interaction when the infant uses emerging sensory-motor skills to explore the object of mother's hands. During such explorations the infant shows signs of concentration and reduces irrelevant physical activity or distractions (Gibson, 1995; Fogel, 1991). The play experiences with mother form the basis for understanding physical and social principles (Ruff, 1997). Correlations have also been found between a mother's attentiveness during infant feeding in early infancy and language comprehension at three years of age (Bee, et al., 1982). Finally, in order for much of this early learning to occur, the infant must be in an alert and attentive state, receptive to external stimuli and contingencies (Fogel, 2001).

#### *Implications for Interventions*

Dyadic interactions are a primary focus of interventions in the field of infant mental health. This focus is based on the assumption that successful development is the outcome of the interaction between individuals and their experiences (Sameroff, 2004). The dynamic interactions between infant and the family and social context means that a given child with specific characteristics (nature) would develop differently if placed in a different family that exposes the infant to a different set of experiences (nurture). This concept also means that a given parent will respond differently to infants with different behaviors. For instance, Sameroff illustrates this dynamic interaction concept with this example. A calm mother experienced a complicated childbirth which then led to her increased anxiety and less certain or appropriate interactions during the infant's first

months. The infant may have responded with irregularities in feeding or sleeping, causing others to label the infant as having a difficult temperament. Given this temperament the mother then spent less interaction time, depriving the infant of verbal stimulation which later showed up in poor scores on preschool language tests. Interventions in the field of infant mental health are intended to identify and remedy these relational disruptions at the earliest stage before they have the opportunity to snowball in effects. One example of this type of early intervention center is Mechthild Papoušek's clinic in Munich.

This study may contribute to the work being done in early parent-infant relationship problems by further identifying specific behaviors that form the basis of *healthy* interactions. The intuitive parenting repertoire of behaviors examined in this study include components that serve regulatory functions as well as state assessment and social and cognitive stimulation. The specific set of parenting behaviors being investigated was chosen based on the assumption that if they are universal (i.e., across cultures) they have likely evolved to be so because of species specific benefits. Some benefits may be easily seen, such as learning the structure of one's native language. Other benefits may be less tangibly observed, such as learning the social rules of one's specific culture. In either case, the absence of appropriate parenting behaviors that support an infant's early learning in these areas is seen as a deficit needing to be addressed by intervention workers.

Intuitive parenting has been shown to include specific behaviors of interaction, such as use of the greeting response, a distinct melodic pitch and contour, and turn-taking interactions (Papoušek & Papoušek, 1991; 1995), all of which facilitate important aspects

of infant social development. These behaviors have been identified as activated below the level of conscious awareness and control, and in fact, they become stilted once conscious attention and effort are brought to bear. The behavioral set of intuitive parenting skills has been found across cultures, even though variations in content or frequency may occur within a specific behavioral subset, such as type of touch used or focus of attention (Bornstein, Tal & Tamis-LeMonda, 1991; Papoušek & Papoušek, 1991). For instance, US mothers focus infants on guided and independent exploration of objects, whereas Japanese mothers tend to place more emphasis on social partners. The current study continues the work of previous researchers in examining cross-cultural intuitive parenting competencies by comparing Caucasian-American mothers and Mandarin Chinese mothers living in the US. (An elaboration of the history of the intuitive parenting theory and its specific components can be found at the end of this literature review.)

*The Typical Sequence of Infant Development: Two to Four Months*

Two infant ages are included in this study in order to capture both the consistency of maternal behaviors with infants during this key developmental period and the variability due to the changing skill level of the infant. In the first two months of development infants are in a quiet phase of development with sucking, rooting and looking but little kicking or postural movement (Rovee-Collier, 2000). It has been demonstrated that during this phase, early turn-taking begins as mothers make adjustments to an infant's spontaneous sucking patterns (Kaye & Wells, 1980). However, at two months infant facial expressions become more complex and animated and begin to include smiling (Fogel, 2001). Control over habitual eye movements allows for fixation on a single object, such as long eye gazes with mother (Eliot, 1999). At the

same time, the infant begins to expend energy to learn about the environment, using newly emerging skills to elicit social interactions (Rovee-Collier, 2000). As self-regulatory skills improve, infant levels of arousal begin to vary less over the first few months and interactions with adults begin to involve play (Lamb, et. al., 1999).

Around the end of the second month, caregivers can more easily read feedback cues from the infant's facial expressions and hand gestures that indicate how the infant is processing interactional experience. The content of caregivers' comments in infant-directed speech indicates that caregivers start viewing the infant as a competent social partner at this time. Infants who had been able to imitate only oral activities and facial expressions after birth start imitating vocal sounds (Papoušek, H., Papoušek, M. & Kestermann, 2000). Mothers also begin to talk and smile at their babies more during the second month (Lavelli & Fogel, 2005). The bi-directional influence of mother-infant interactions has been demonstrated in their conversation-like pattern (Cohn & Tronick, 1987) and in the way maternal verbal and nonverbal actions are organized and reorganized in accordance with infant signals (Hsu & Fogel, 2003).

The period from three to six months is filled with a differential production of sounds by the infant rather than attention to their future linguistic meaning. It is a period of procedural learning when infants are learning how to learn, how to integrate skills and rules, and how to process and produce finely differentiated vocal symbols (H. Papoušek, Papoušek, Suomi, & Rahn, 1991).

As the infant develops there is an increase in postural control, a growing ability to grasp objects, a preference for human infant-directed speech, and an increase in auditory and cognitive processing speed (Fogel, 2001). During an infant's early months mothers

try to capture and hold an infant's attention, but as the infant grows more competent she seeks more contingent responses (Kaye & Fogel, 1980). With age the infant displays more periods of inattention to mother, but these are also shorter in duration and mothers do not increase touching or bouncing the infant to resume attention.

It is clear from this literature that two to four months of infant age is a time of dramatic developmental change; it is therefore assumed that there will be variability in the infant's behavior, and therefore in the maternal responses as well (van Geert & van Dijk, 2002). Bornstein (1995) reports a high variability in maternal behaviors even when groups are from the same culture and socio-economic status. For instance, in a study where he analyzed the rate of maternal talking to the infant during in-home, naturalistic observations, the frequency range was 3-97 %.

#### *Cultural Variations and Similarities*

Although in the last ten years there has been an increase in cross-cultural research, most information on the socio-emotional development of children has been derived from studies of White, middle-class North Americans (Lamb, et. al., 1999; Cole, 1999). Cultural transmission begins in-utero, for instance through the food the mother eats, her activity level, or her health status. Culture affects the birth experience itself and the immediate projection by parents of goals based on their own past experience (Cole, 1999). Parental expectations appear to influence phenomena as universal as learning movement patterns of sitting and walking, something developmentalists once thought was solely organism driven (Hopkins & Westra, 1990). For instance, Jamaican mothers expect infants to sit and walk early while Indian mothers expect late crawling, and in both cases infants develop in accordance with maternal expectations.

Historically the social, cultural context was viewed as being outside the individual (Sokolovsky, 1997). However, like the shifts in the nature-nurture debate, a re-conceptualization is occurring in which the individual and socially shared systems of meanings are viewed as a circular system. Cole (1999) argues that culture should not be treated as an independent variable, but rather as an organizing variable. He believes humans are biologically primed to create, acquire, and transmit culture.

Although the debate about culture as a variable continues, in this study the cross-cultural comparison approach using cultural group as an independent variable will be used. The results of the current study may illustrate the dynamic interaction between individual mother-infant characteristics with social mechanisms that are part of the culture of being human, and social mechanisms that are specific to a sub-group's specific world view.

#### *Intuitive Parenting: A Brief History*

This study examines maternal-infant exchanges from the perspective of intuitive parenting, a concept articulated by Hanuš and Mechthild Papoušek over 30 years ago and researched extensively since that time. Intuitive parenting is a concept that arose from an examination and integration of developmental psychology, biology and systems theory (Papoušek & Papoušek, 1995). The roots of this idea can be traced back to Hanuš Papoušek's early work in Prague in the 1950s (Koester & Koester, 2005). In the Koesters' biography of Hanuš Papoušek, an incident is described in which he wanted to interrupt an infant's feeding in order to gather data, so he asked the infant's mother if that was possible without causing distress. Although she said yes, reporting that she could easily do that herself, she was unable to say *how* she accomplished the task. From that

point on, Hanuš began to be intrigued by the many nonconscious ways in which parents interact with their infants, often unknowingly paving the way for the infant's optimal development.

Initially, nonconscious, intuitive behaviors were misunderstood and misinterpreted as inferior relics of animal tendencies (H. Papoušek & Papoušek, 1992). However, as the Papoušeks continued to articulate and research the concept of intuitive parenting, a change was also occurring in the field of psychology which was once again willing to look at nonconscious behaviors.

According to Kihlstrom (1994), one of the hallmarks of the cognitive revolution was a revival of interest in consciousness. Instead of a strict focus on environmental stimuli and behavioral responses there was an effort to understand the internal mental structures and processes that mediated between stimulus and response. There was a revival of interest in nonconscious mental life and what was outside the scope of conscious awareness, introspection, and voluntary control.

Cognitive psychology has evolved in the last twenty years to confirm the presence of automatic processes that allow complex cognitive activity to go on outside of conscious awareness. An object does not need to be fully represented in consciousness before information about it can influence experience, thought, and action. Unconscious procedural knowledge is automatic as opposed to controlled or effortful. Preattentive processes are not limited to perception of physical features, but meanings and implications of events can also be unconsciously analyzed (Kihlstrom, 1987).

These new understandings match the findings of the Papoušeks that intuitive behaviors function in an automatic manner outside of conscious awareness.

Neurophysiologically, intuitive behaviors are faster and less strenuous than rationally-controlled behaviors. Their time intervals are usually within 200 to 400 ms, longer than simple innate reflexes (40-60 ms), but shorter than rational decisions (500-600 ms) (H. Papoušek, Papoušek & Kestermann, 2000).

The speed and efficiency of intuitive behaviors allow parents to cope with the fast speed of interactional episodes, often around 20 per minute during parent-infant interactions (Papoušek, et al., 1991). Parents can be spontaneous which allows for emotional engagement and playful variations that are most effective (H. Papoušek & Papoušek, 1992).

An assumption of intuitive parenting is that the developing infant has a supportive counterpart for optimum development in the parental predispositions to use specific infant-directed behaviors. The bi-directional nature of early communication between infants and caretakers depends on the presence of specific elicitors in the child and adequate responsiveness in the parent. For instance, parental didactic interventions are elicited by infant babyishness and by the expressivity of infant gestures and vocalizations (H. Papoušek & Papoušek, 1992). Of course, in the early months the infant is still in a very immature state and caregivers must therefore be able to respond to many nonverbal cues that are often not easily interpretable. The intuitive nature of these responses therefore ensures that parents do not need to go through a cognitive problem-solving process in order to respond quickly and appropriately. In most cases, the intuitive behaviors being described are extremely well-matched to the immature cognitive, perceptual, and linguistic needs of the young infant. They are therefore supportive of the infant's many developmental requirements and may thus be considered to facilitate the

optimal adaptation of the newborn to the demands of life during the first few months after birth (H. Papoušek & Papoušek, 1987).

### *Intuitive Parenting: Behaviors*

The repertoire of intuitive behaviors includes the use of infant-directed speech, adjusting body and face positioning to maintain an optimum distance for communication, and immediate contingent rewards for infant looking with a “greeting response” of raised eyebrows, slight nodding and mouth opening (H. Papoušek & Papoušek, 1995). This list of intuitive behaviors utilized in this study is similar to behaviors investigated by other researchers even though not under that categorical name. For instance, a Kaye and Fogel study from 1980 included maternal behaviors of head movements, facial expressions (including those in the Papoušek category of mime - raised eyebrows, clown face), touching, and posture changes of baby. Similarly, a Field and Pawlby study analyzed the behaviors of gaze, smile, vocalize, imitate, touch, caretaking, game playing, singing, and toy play (Field & Pawlby, 1980).

The specific intuitive behaviors utilized in this study were articulated as the most current refinement of the intuitive parenting repertoire in 2002 by Haff and Kahnt, members of Mechthild Papoušek’s research team at the Institute for Social Pediatrics and Youth Medicine, University of Munich. In the next section each of these components is presented. Relevant applications of other cross-cultural studies are also included as evidence of the cross-cultural occurrence of these behaviors.

*Infant-directed speech.* Infant-directed speech, once referred to as motherese, is a mode of communication adults nonconsciously utilize when talking to babies. It captures babies’ attention and makes the structure of language clear (Gopnik, Meltzoff & Kuhl,

1999). In this study, three components of infant-directed speech will be examined: repetition, melody, and elongation of vowels and sounds. Repetition is considered to be a distinct phenomena because although it is comprised of an elongation or melody it is also unique in the duplication of the sound or phrase. However, given that it can only occur if an elongation or melody is used, there will be a correspondence between repetition and those two behaviors.

The function of the melodies in early motherese may be didactic caregiving messages that facilitate the infant's processing of contextual information (Papoušek, 1994). The unhurried cadence and volume of infant-directed speech are easier for an infant to follow because infants' hearing is less sensitive and they process auditory information twice as slowly as adults (Eliot, 1999). Infant-directed speech may guide or persuade the infant to become alert or to calm down; to respond with a positive vocal, visual, facial, or gestural turn; to engage in turn-taking, vocal imitation, or vocal play; or to refrain from unfavorable behaviors (Papoušek & Papoušek, 1991). These messages appear to be communicated by the features of the speech (particularly by exaggerated melodic contours and pitch range), regardless of the actual verbal content, and parents are rarely aware of these modifications.

Infant-directed speech is a cross-cultural phenomenon with specific adjustments being made according to the native speakers' language. For instance, Swedish, English and Russian mothers each produce different types of vowels that are essential to the structure of their own language (Gopnik, et al., 1999). Parents addressing their infants produce vowels that are acoustically more extreme, resulting in an expanded vowel space, one that is acoustically "stretched" (Kuhl et al., 1997). It is believed that the

exaggerated form more effectively separates sounds into contrasting categories and highlights the parameters on which speech categories are distinguished and imitated.

Infant-directed modifications have been found in British, Australian, and American English, Italian, French, German, Thai, and Japanese languages (Kitamura, Thanavishuth, Burnham, & Luksaneeyanawin, 2002; Fernald, et al., 1989). In a study of North American and Indian mothers singing when an infant was present, participants sang more slowly and exhibited more gliding pitch levels in both English and Hindi (Bergeson & Trehub, 1999). The content of maternal songs indicate cultural differences in that North American mothers sing arousing songs whereas mothers of Indian origin sing soothing songs (Trehub, Unyk, & Trainor, 1993).

It has been demonstrated that babies' preferences are not linked to the actual words used by mothers because they will turn their heads even if the speaker is using a foreign language (Gopnik, et al., 1999). Adults listening to an unfamiliar language can readily identify infant-directed versions (Bergeson & Trehub, 1999). Gopnik, et al., (1999) report that motherese is a comfort language even if it is listened to in a foreign tongue; for example, graduate students listening to lab tapes found it was therapeutic for end-of-semester stress.

Infants of six weeks to four months of age frequently engage in protoconversations, that is, practicing rhythmic sounds and turn-taking. Chinese, American and German mothers have been found to be similar in their tendency to talk to infants, predominantly using nonverbal utterances that promote conversation, playful interchanges or imitation (H. Papoušek & Papoušek, 1991). The infant's side of the conversation is cooing and ooing, hand or finger movements, smiles or excited facial

expressions (Eliot, 1999). The caregiver responses facilitate the infant's transition from presyllabic to syllabic utterances over the first year of life (Papoušek, M., 1994).

*Mime.* The role of imitation has been well documented as an early communication and teaching tool (Meltzoff & Moore, 2000). During engagement with infants, adults typically use exaggerated facial as well as vocal expressions. For instance, a "greeting response" of nodding, raised eyebrows, and slightly opened mouth will be made when the infant makes eye contact (H. Papoušek & Papoušek, 1995). Infant non-distress vocalizations are often responded to with maternal head movements (Hsu & Fogel, 2003). In addition, parents display exaggerations of pretend surprise as a nonverbal communication or to draw the infant's attention to objects (H. Papoušek, Papoušek, & Kestermann, 2000).

*Distance, positioning and following gaze.* Another behavior of intuitive parenting is related to parental facilitation of an optimal interactive distance in terms of infant visual acuity. Given that the display of instructive models of sound production depends on good visual availability, parents position themselves at an optimal distance of around 23 cm (H. Papoušek & Papoušek, 1991). Mothers place themselves in the center of the newborn's field of vision in order to attract the infant's visual attention and reward him or her with expressive greeting responses (H. Papoušek, Papoušek, & Kestermann, 2000). In a cross-cultural study of five communities, Keller, et al., (2004) found that positioning for face-to face interactions was one of the three most prominent parenting systems, coupled with body contact and body stimulation.

Mothers have also been shown to use positive expressions at three and six months to engage their infant and then stay positive until the infant becomes neutral or

disengaged (Cohn & Tronick, 1987). Gazing away is a common strategy the infant uses to modulate arousal and to process information or stimulation (Toda & Fogel, 1993). In order to maintain eye contact, the mother will move to place herself in the line of the infant's sight when the infant averts his or her gaze. In this study that type of maternal movement is coded as "positioning."

As the infant matures, the gaze-away behavior is also an indication of the redirection of attention. Infants become interested in watching their hands, body or the external world (Kaye & Fogel, 1980). To accommodate following the infant's interest the mother may switch her attention as well to the infant's object of interest; in this study, such behavior is coded as maternal following gaze of the infant. Babies are more likely to respond to changes in their mother's behavior if the mother is responsive to changes in their behavior (Cohn & Tronick, 1988), thus the importance of documenting these dynamics in mother-infant dyadic exchanges.

*Touch.* Diverse qualities of touch may be viewed as symbols in a language of touch similar to that of verbal and written language (Weiss, 1990). Tactile contact, kinesthetic movements, and vestibular stimulation have been shown to be part of the intuitive parenting repertoire that supports the mother-infant dyad interaction (Korner, 1990; Koester, H. Papoušek & Papoušek, 1989). Research has found that during the normal interaction phase of the still-face paradigm adults use touch 70% of the time (Muir & Lee, 2003). The location of touch is important in terms of how sensitive the body area is, the amount of the body that is touched, and the placement of touch on the trunk of the body or periphery (Weiss, 1990).

Touch can be used by a parent to assess the infant's level of alertness or mood (H. Papoušek & Papoušek, 1987). Two common investigative touches observed in parents are gently pushing the chin towards the chest to open the infant's mouth and opening the infant's palm with a finger. In addition, touch can have a positive effect on mood; for example, in a modification of the still-face method that allowed the mother to use touch, typical distress was reduced, positive affect was elicited and attention was successfully re-directed (Stack & Muir, 1990).

Vestibular stimulation has been shown to be beneficial even to young infants (Eliot, 1999). Infants in a disorganized state, with flailing limbs, tense hands and face, or crying, become organized and relaxed when picked up and jiggled. Infants comforted in this manner also show greater visual alertness (Eliot, 1999; Korner, 1990). In a study of caregiver responses to infant crying it was found that the prototypic pattern, displayed by mothers and non-mothers, was to pick the infant up, put the infant to their shoulder, and talk to the infant while using tactile and vestibular stimulation (Gustafson & Harris, 1990).

Although it has been found that Japanese, US and French mothers are alike in engagement of infants in kinesthetic play (Bornstein, 2002), American mothers hold, rock, bounce, touch and kiss their babies considerably more than do Japanese mothers (Fogel, Toda & Kawai, 1988). American mothers have also been found to comment on and encourage motor activity in infants more than do Chinese mothers (H. Papoušek & Papoušek, 1991).

*Contingency responding.* Infants who experience contingent interactions with social partners exhibit positive affect and expose themselves to subsequent higher levels

of stimulation than infants who experience predominantly noncontingent interactions (Legerstee, 1997). Infant vocalizations play a significant role in eliciting parental contingent responses, such that positive vocalizations are frequently interpreted by parents as conversational behavior and responded to with verbal-vocal behaviors (Keller & Schölmerich, 1987). Infant nondistress vocalizations also reliably elicit maternal verbalizations-vocalizations over other non-verbal response forms (Hsu & Fogel, 2003).

However, maternal responses are often multi-modal, including synchronous visual and tactile responses (Hsu & Fogel, 2003; H. Papoušek & Papoušek, 1992). Infant vocalizations are responded to as expressions of behavioral states or affect and, if distressing, parental responses attempt to change the state by tactile or vestibular behaviors (Keller & Schölmerich, 1987). Infant vocalizations may also be responded to with the introduction of rhythmical games or repetitious tactile contact (Papoušek, Papoušek, & Koester, 1999).

#### *Rationale for the Four Experimental Conditions of this Study*

This study examines the intuitive parenting repertoire within four experimental conditions while the infant is seated facing the mother. The first is a period of free play. It is assumed during this period that the infant will be in a state of quiet alertness and attentiveness that best provides the infant the opportunity to learn about people, the infant's own abilities and the object world (Bornstein, 1991). During the period of play the parent is likely to try remedies to maintain engagement if the infant becomes upset, fussy, passive or drowsy (H. Papoušek & Papoušek, 1991).

Cultural differences in play have been found with infants and older children. For instance, in a comparison of British and American mothers it was found that British

mothers and infants engage in more toy-related play where the mother directs the infant's attention and tracking and search responses. By contrast, American dyads include more social game play with elicitation of eye contact, smiling and cooing (Field & Pawlby, 1980). A study of Anglo and Korean-American cultural differences in play found that adult attitudes about play influence strategies. Anglo-Americans engage in more pretend play in the home than do Korean-Americans, in part because of the Korean view that play is a way to escape boredom or amuse children, rather than a learning and development tool (Farver, Kim & Lee, 1995).

In addition to free play, this study includes episodes of parents encouraging and discouraging vocalization. Although previous studies have consistently shown the importance of vocalizations to the dyadic relationship, there has not yet been an analysis of the specific strategies parents use when attempting to increase or decrease their infant's baseline levels of vocalization. Although this study is not specifically examining comprehensive strategies of encouragement or discouragement, by including episodes with these specific goals we have the opportunity to begin to identify ways mothers modify their intuitive repertoire during these episodes.

Infant distress is a normal part of affect, and in fact is an element that infancy researchers often need to take into account in their research design. Rather than eliminating these fussy episodes, the present study evaluates how these episodes impact utilization of the intuitive repertoire. Early crying is understood to be a reflection of physiological state rather than an intentional, communicative method. Infant crying occurs in all cultures although responses to crying are culturally influenced. For example, a study of 46 !Kung San infants in northwestern Botswana found that

caretaking differences affect crying duration but not its frequency or early peak pattern (Barr, Konner, Bakeman, & Adamson, 1991). The similarity of !Kung San infants to infants in other cultures during the first three months may be indicative of a time when biological expression of maternal behaviors predominates over cultural differences, leading credence to the importance of studies examining similarities between cultures during the early months of infancy and then contrasting them with presence or absence of differentiations in later months. This study will make an important contribution in determining such similarities in early dyadic exchanges, including those that occur during periods of mild infant distress.

This literature review has covered the history of the concept of intuitive parenting, the nature and nurture controversy as it relates to infant development, specific behaviors documented as part of the intuitive parenting repertoire, and the few existing studies comparing these behaviors across various cultures. It is apparent that many intuitive, nonconscious behaviors can be observed in typical mother-infant interactions regardless of culture or location, although much remains to be done in terms of empirically establishing the universality of these behaviors-- a task this study seeks to undertake.

Comparisons of Caucasian-American and Asian mothers have more often concerned academic achievement, cultural differences in socialization goals, and differences emanating from individualistic versus collectivistic child-rearing perspectives (Keats, 2000; Farver, et al., 1995). As a result, few studies have compared parental interactions with infants as young as those in this study. This effort will therefore fill a gap in the intuitive parenting literature and will expand our knowledge of these early

behaviors in two samples for which videotaped data have been gathered but not yet fully analyzed.

The historical nature of this data set is important for two reasons. First, by analyzing a data set which is now twenty years old with current time coding schemes, it is possible to make direct comparisons to other results reported with current populations. This allows the identification of enduring characteristics of parenting behaviors that may be independent of historical effects. Conversely, by establishing a baseline observation of behaviors, particularly in Chinese families, comparisons can be made with a current population to determine changes that may be hypothesized as due to historical effects, such as changing social policies in China, notably the one-child policy, as well as the profound social and technological changes taking place (Keats, 2000).

The mother-infant dyad is engaged in a dynamic, interactive process (Tronick, 2003; H. Papousek & Papousek, 1987). It is a fast paced process where parents utilize behaviors at a speed faster than those under deliberate attention (H. Papoušek, Papoušek, and Kestermann, 2000). The nonconscious use of these types of behaviors is in keeping with current understandings in cognitive psychology of automatic processes (Khilstrom, 1994). In the course of this dynamic interaction process the infant learns state regulation and motor, cognitive, and social skills (Lamb, et al., 1999). The infant developmental ages of two- and four-month-old are a time of rapid change which leads us to an expectation of high variability in infant behaviors and therefore a high variability in maternal behaviors (van Geert & van Dijk, 2002). Variability may also be due to cultural differences, therefore there is a need to increase cross-cultural research on socio-emotional development so that it is less based on middle class, North American families

(Lamb, et. al., 1999). The maternal, intuitive repertoire behaviors studied in this current research are those that have been observed by multiple researchers, including in some cross-cultural applications, although not in this exact systematic coding scheme. By applying a replicable coding scheme that can be used in multiple cultures, and at multiple ages, it is possible to advance developmental theorists' understanding of maternal behaviors that may be biologically based (nature) due to presence across cultures, behaviors that set optimal environmental conditions for learning (nurture) and variations in context or frequency of behaviors that express specific cultural goals (nurture). This study specifically adds to an understanding of Mandarin Chinese dyads that is currently not addressed in the literature.

### *Hypotheses*

1.) The first hypothesis is that Mandarin Chinese and Caucasian-American mothers do not statistically differ in overall use of intuitive parenting behaviors. However, cultural nuances may be embedded in the selective use of the intuitive repertoire and, where noted in the process of coding the tapes or analyses of results, these will be included in the discussion of findings.

2.) The second hypothesis is that differing experimental conditions elicit differing constellations of behaviors, especially in the types of touch used. This is likely to be most evident during the conditions of soothing and discouraging vocalization.

3.) The third hypothesis is that intuitive maternal behaviors will vary according to infant age and developmental status. It is expected that the intuitive behavior repertoire will continue to be utilized but the increased capacities of the infant will elicit modifications. (For instance, at four months the infant's increased head control and

distance vision may lead to more gazing at other places in the room which will be followed by maternal utilization of “following gaze.”)

## CHAPTER TWO

### Method

#### *Participants and Background Interviews*

Mothers and their two-month-old infants were recruited from the Washington, D.C. area by Hanuš and Mechthild Papoušek in 1985. The subjects were 15 Mandarin Chinese and 15 Caucasian-American mothers and their infants. All subjects were members of two-parent families. Gender distribution of the infants was 15 females and 14 males (Chinese: nine female, six male; American: six female, eight male). The Chinese mothers were first-generation immigrants, living in the United States for less than four years, who exclusively spoke Mandarin with their infants. The Chinese subjects were recruited with the assistance of a native Mandarin Chinese linguist. Demographic information is available in Table 1.

Table 1  
*Study Participants*

	Maternal Age					Infant Siblings			Years Schooling Mother		Years Schooling Father	
	<30	31-35	36-40	>40	unkn	0	1	2	M	SD	M	SD
Chinese	3	7	2	2	1	5	6	4	17.07	1.28	17.47	2.07
American	8	3	2	1	1	10	4	1	16.53	0.92	17.33	1.63

At the time of the first observation the mother was asked questions about the social environment of the home and about parent-infant communication. Examining the text of these comments it is clear that cultural differences are evident in the home social environment. Among the Mandarin-Chinese families, 13 share their residence with an extended family member, typically either the mother's or father's mother. In one case the dyad only participated in the two month observation because of a plan for the infant when three- months of age to return to Taiwan with the grandmother for one year. In the

Caucasian-American homes 11 mothers described themselves as the only caretaker (fathers were out of the home working in all but one family where the father had a home office), with only one family indicating that extended family lived nearby. In discussing parent-infant communication, six Chinese mothers said that talking is important for development; as one mother said “more talk equals a wiser baby.” Three other Chinese mothers referenced the importance of talk for attachment reasons, such as “it gives the baby a sense of security” and of being loved. Seven of the American mothers said that talk is important or helps to stimulate the baby. Two American mothers answered that it was important to use adult talk, not baby talk, with infants.

The mothers were also asked if they were aware of engaging in specific behaviors within the intuitive parenting repertoire. Data for half of the mothers was available to this researcher for review. Of these 15 mothers, four Mandarin Chinese and eleven Caucasian-American, all said they were aware of engaging in vocal play with their baby. Yet when asked if they were aware of specific behaviors they predominately said “no” to the following: using babytalk melody (13 no), imitating infant’s sounds (11 no), uses repetition to stimulate baby to talk (10 no), or using pauses in speech to encourage baby to talk (15 no).

### *Procedure*

The mothers were invited to play with their infant as they do at home. The infant was positioned in a baby seat, table top height, facing the mother. The videotaping included a warm-up period, spontaneous play, a segment where the mother was instructed to encourage her child to vocalize, and another segment to discourage vocalization. Toys, pacifiers or bottles were not present; however, on two occasions in the video clips

mothers were seen retrieving a pacifier or bottle to soothe an upset infant. The verbal instructions given to the parents for each episode were not available to this researcher. It appears from the documents available that each segment was three to five minutes long, depending on the state of the infant. (See Appendix A for an example of the timed episodes.) When the infant became fussy, wherever that occurred in the procedure, two minutes of videotaping occurred. It appeared to this researcher in examination of the time recording sheets that after a period of distress the video was shut off and the mother attended to her infant until such time as the taping could continue. The session ended with a minute of adult-adult conversation for use in another study on vocalizations. This protocol was repeated when the infant was four months old.

Recording infant behavior can be challenging because there is so much variability in behavior and optimum interaction rhythms. For instance, Lavelli and Fogel (2005) found that in a home taping study they would have to sometimes wait several hours and that for some infants 10-20 minutes after feeding worked and for others it was best to tape interactions after a nap, two or three hours after a feeding. In the current study the participants were on site and taping occurred mostly independent of feeding or naps unless it was impossible to continue without the infant becoming distressed. Specific information about when or if breaks were taken was not available to this coder.

### *Coding*

The subject videotape samples used for this study were selected by Hanuš Papoušek and edited into 394 separate, randomly ordered, one-minute episodes. The lack of identifying information about the infant age or instructions for the episode allowed this researcher to code the interactions “blind” to both subject and task. After the initial

coding was completed, a Chinese translator reviewed all tapes that were questionable for use of repetitions, melody or elongations in speech. This added precaution was taken because it was found during the author's training and reliability testing that coding tapes in a language not spoken by the coder can increase error in those three categories and therefore requires supplemental assistance.

The original videotapes were time-coded for accurate reading of timed intervals of observation. During each ten-second increment a behavior was coded as occurring or not occurring, but not the frequency of occurrences within each interval. For instance, if the mother repeated a phrase four times within ten seconds, this was coded as a single occurrence of repetition, not three repetitions.

One-minute videotape time samples were used in this study. Bornstein (2002) previously found in a comparison of Japanese and US maternal behaviors that frequencies coded by time-sampling were reliable representations of frequencies found in continuous sampling. Darwin Muir, a well known scholar in this field, stated during a research consultation at Dr. Koester's lab (November, 2000), that he has found a one-minute behavior sample to be as valid as the more well known two-minute interval used in the still-face procedures.

Haff and Kahnt (personal communication, October, 2003) utilized ten-second increments in their comparable German study because they believed it worked optimally for capturing the intuitive parenting behaviors while still capturing the variability within an interaction sequence. A ten-second coding interval examining parenting behaviors is also evident in the work of other cross-cultural researchers (Keller, et. al., 2004).

All coding was done by this researcher due to the necessity of being trained by the professionals who designed the system in Munich . During training on the coding scheme, conducted at the Munich lab in October, 2003, a kappa reliability score was obtained for each component of the coding scheme. The scores indicate reliability in coding tapes in German, a language not spoken by the coder. They are as follows: Repetition: .73; Melody: 1.0; Elongation: .66; Mimic: .71; Dialogic distance: 1.0; Positioning: 1.0; Follow child's gaze: 1.0; Contingent behaviors: .66. All of the kappa scores fall within the substantial to excellent range according to Landis and Koch (as cited in Portney & Watkins, 1993).

The definitions for the coding sheet are included in Appendix A. Briefly however, they are as follows: *repetition* of words or sounds; *melody*- all speaking not adult form; *elongation* of vowels or sounds; *mime* like facial expressions; *distance* of around 20 cm; *touch* that is passive or active; *positioning* by mother of herself so baby who has moved can see her face; mother *follows gaze* of the infant looking around; and *contingent* response when the infant sounds or acts.

After the coding on this data set was completed it was discovered that six one-minute samples were duplicates. Given the limitation of a single trained coder and the fact that the coding occurred over a one year time period, a check of intra-rater reliability was made by calculating a percent of agreement score. The scores were repetition: 88.89; melody: 88.89; elongation: 86.11; mime: 77.78; distance: 97.22; touch: 91.67; total of four touch types: 97.33; positioning: 97.22; follow gaze: 97.22; and contingency: 86.11. The range of percentage scores was 50-100. The samples included those coded at all time periods in the year, first month to last.

Although a single coder can be a limitation, this restriction was accepted because it allowed the opportunity to use a standardized coding scheme (trained to the specifications of the developer of the scheme) which will expand the application of the findings from this small study. It is not unusual in developmental research, particularly investigations requiring micro-analyses of observed interactions, for coding to be done by a single individual who has gone through extensive training to achieve reliability with presumed experts in the field. Studies of attachment provide numerous examples of this strategy, since certified coders of the “Strange Situation Procedure” and the “Adult Attachment Interview” are relatively scarce and the training is often expensive. Achieving reliability with the coding system trainers, and providing intra-rater reliability scores, are thought to ameliorate the disadvantages of this procedure as much as possible.

As stated previously, a complete outline of the coding scheme can be found in Appendix B. The full coding scheme includes attention to the mother, infant state, intuitive competencies, and assessment of the mother’s attunement. (Kappa scores of Visual attention: .64; Infant state: .79; Intuitive competencies: .64; Attunement: .82.) The additional data coded will be used at a future date in comparisons with a German data set coded by Haff and Kahnt. In this study the primary focus is the nine behaviors that make up the composite score of maternal intuitive competencies.

One additional refinement of the coding scheme is utilized in this study: the intuitive competency of tactile stimulation is differentiated as calming, neutral, arousing, or vestibular. Each type of touch was individually coded per ten second increment, for instance, the parent may use both neutral and vestibular touch in the same episode and therefore receive an occurrence score for each. Similar to the coding for the intuitive

behaviors the score is based on behavioral occurrence, not frequency of occurrence within each time period.

After coding the tapes the researcher grouped the observations by subject through a process of visually matching each parent-infant dyad in each experimental situation. A hard copy of the subject code sheet created by Dr. Papoušek for the selection of observations was missing from the written documentation and he is deceased; computerized records had been stored on a Lexitron system which was current at the time of the study, but no longer in use. Subject data sheets indicating videotape times for each subject's participation were available (note example in Appendix B). However, only 14 Caucasian-American subjects were identified in the samples rather than the 15 listed in the interview sheets therefore this number is reflected in the data analysis.

In all but a few cases the researcher was able to match the randomized observations selected by Dr. Papoušek to the experimental condition (e.g., encourage vocalization) listed at the time of video recording for each of the individual subjects. If a match was not evident the observation was placed in a fifth category of "unassigned." A time coded reference sheet was available for the Caucasian-American subjects at both two- and four-months, but only available for the Mandarin Chinese subjects at two-months. This problem was resolved by placing the observations of the Mandarin Chinese subjects at four months into the unassigned category except in cases where infant distress, expressed in crying or fussing for more than 50% of the one-minute interval, made it clear that this was a soothe condition.

Observations for each subject within each of the four experimental conditions were not uniform. The number of samples in a given experimental condition ranged from

0-7, with 2 or 3 the most common. In order to equalize comparisons between subjects a single score was created for each subject by condition. This was accomplished by first converting the frequency score, such as five out of six intervals coded with repetitions, into a mean percentage score, in this example 83.33% for repetition. The next step was to average the percentage scores for each experimental condition. For example, if the subject had three one-minute samples of discouraging behavior these were averaged to create a single set of discouraging behavior scores. After this conversion of scores, each of the nine intuitive behaviors and four forms of touch had a percentage score for each of the experimental conditions available for that subject.

## CHAPTER THREE

### Results

*Homogeneity of groups.* Similar to findings from other researchers, there was a high degree of variability in the scores for each of the intuitive behaviors (Bornstein, 1995). The range of scores was examined for each of the nine intuitive behaviors and the subset of four types of touch at each age. In the fifteen cases where a subject appeared to be a statistical outlier an examination was made between the mean score and the trimmed mean, a score that excludes the top and bottom 5% (Pallant, 2002). In all but one case the variation was no more than two percentage points. For example in touch at infant age four months, the mean score for Mandarin Chinese mothers was 75.76 while the trimmed mean was 77.85. More typical was only a one point difference, such as in the Caucasian-American mothers' use of distance at two months, with a mean of 97.6 and a trimmed mean of 98.7. The two Mandarin Chinese mothers who appeared to be statistical outliers for this behavior utilized optimal distance 91% or 95% of the time, a difference that appeared significant because everyone else was at 100%. The one more extreme difference was evident in the use of vestibular touch at four months. One Mandarin Chinese mother utilized this behavior 83% of the time; the top five scores for this group of mothers were 10-83% (second score of 20). This type of variability in touch occurs because of the variability in infant state that elicits the behavior, not because of a preference for the behavior independent of condition.

A greater concern in regards to statistical outliers would have been if a single mother was consistently found to be out of the range of the other mothers because this

may have signaled other problems in the dyad. This was not found. Therefore, all subjects were included in the subsequent analyses.

*Gender comparisons.* The subject data sheets provided information on the gender of each infant which allowed the opportunity to check for differences in the dependent variables based on gender. Using crosstabulations no statistically significant differences were found, therefore differences based on sex of infant were not included in subsequent analyses. A slight trend for sex differences was noted for following gaze, a generally rare behavior. A closer examination of the data indicated that the difference was caused by a single subject with a percentage score three times that of the other subjects who were evenly distributed across the limited occurrences of the behavior.

*Alpha levels.* Setting alpha levels for this analysis was challenging. In order to guard against Type 1 error, a more conservative score of .01 could be used. However, there was a likelihood of this causing a Type 2 error due to the very small sample size. For this reason a standard alpha level of .05 was used.

*Overall comparisons of cultural groups and age groups.* A t-test was utilized to determine if statistical differences existed between the two cultural groups at each age and within each experimental condition. Of the 26 t-tests only six conditions indicated a between-group difference on the independent variable of ethnicity. As indicated in Table 2, these include at age two months: repetition during free play; elongation during free play and during the encourage vocalization condition; touch during free play; and arousing touch during free play. Only one difference was found at age four months: elongation during unassigned condition. Given these results, limited as they are, ethnicity was included in the subsequent ANOVAs as a two level independent variable.

Table 2  
*Statistically Significant T-Tests*

Behavior/Condition/Infant Age	American		Chinese		t	df	p	$\eta^2$
	M	SD	M	SD				
Repetition/Free Play/2 mo	59.24	21.45	78.05	14.55	2.78	27	.01	.22
Elongation/Free Play/2 mo	63.17	23.22	84.21	16.23	2.84	27	.008	.23
Elongation/enc vocal/2 mo	51.85	30	80.92	18.7	2.93	25 <sup>a</sup>	.009	.26
Touch/Free Play/2 mo	44.44	32.1	78.17	19.48	3.45	27	.002	.31
Arousing/Free Play/2 mo	26.23	23.76	53.15	29.32	2.71	27	.01	.21
Elongation/unasgn/4 mo	66.82	10.84	87.03	16.47	2.5	15 <sup>b</sup>	.024	.29

<sup>a</sup>2 subjects without this condition; <sup>b</sup>only those subjects not able to be assigned a condition

In order to compare intuitive behaviors for the two groups as a whole, mean percentage scores across all conditions for each of the nine intuitive behaviors, and the four forms of touch, were created for each subject. The nine intuitive behaviors were then combined to form a single summary mean percentage score for each group at two and four months. Using Analysis of Variance, main effects were found for both the between-subjects independent variable of Ethnicity and the within-subjects independent variable of Age (Table 3). Chinese mothers' total mean scores (two-month  $M = 49.35$ ; four-month  $M = 56.08$ ) were significantly higher than Caucasian-American mothers' (two-month  $M = 46.95$ ; four-month  $M = 49.76$ ). In addition, mothers' overall intuitive parenting scores were lower when infants were younger than at four months of age. No significant Age by Ethnicity interaction was found.

Table 3  
*Analyses of Variance for Intuitive Behavior Summary Mean Scores*

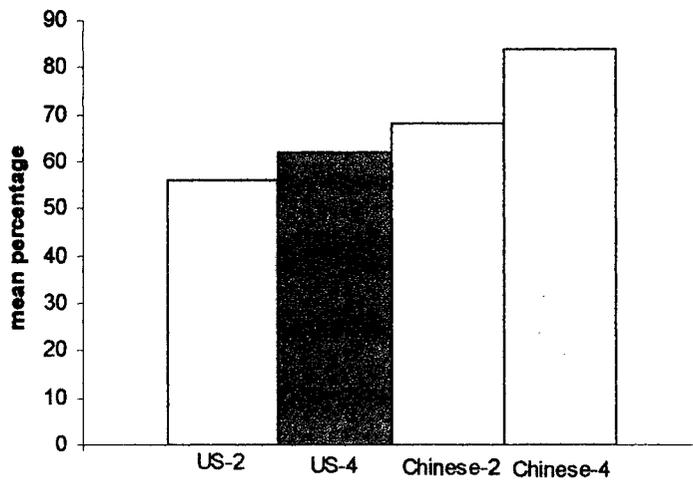
Source	df	F	$\eta$	P
Between subjects				
Ethnicity (E)	1	5.9	.20	.02
S within-group error	24	41.7		
Within subjects				
Age (A)	1	7.41	.24	.01
A x E	1	1.25	.05	.28
A within-group error	24	39.69		

*Ethnicity effects.* Analyses of Variance were then conducted for each of the dependent variables using an across all conditions mean percentage score (see Table 4). Between-subject main effects of Ethnicity were found for repetition, elongation and use of vestibular touch. In each of these three variables Mandarin Chinese mothers utilized the behavior more frequently than the Caucasian-American mothers. (For mean percentage scores at each age, for each group, see Figure 1 for illustration of repetition, Figure 2 of elongation, and Figure 3 of vestibular touch.) The mean percentage scores for vestibular touch are significantly lower because this is a behavior primarily employed during times of infant unease or distress.

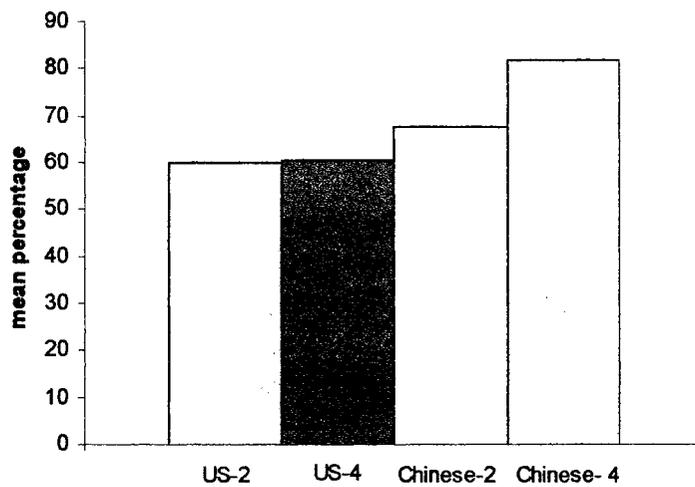
Table 4.  
*Mean Scores, Standard Deviations and Analyses of Variance for Intuitive Behaviors and Types of Touch*

Intuitive Behavior	Score						Analysis of Variance							
	Caucasian-American 2 months		Chinese 2 months		Caucasian-American 4 months		Chinese 4 months		Between Subjects-Ethnicity		Within Subjects-Age		Age x Ethnicity	
	M	SD	M	SD	M	SD	M	SD	F	$\eta^2$	F	$\eta^2$	F	$\eta^2$
Repetition	56.35	16.47	68.11	12.02	61.96	24.92	84.19	16.64	8.77**	0.27	6.07**	0.02	1.41	0.25
Melody	75.97	10.57	74.84	20.02	78.9	13.81	77.61	25.46	0.05	0.002	0.45	0.02	0	0
Elongation	59.88	18.32	67.69	10.5	60.42	20.61	81.71	15.73	7.98**	0.25	2.94	0.11	2.52	0.1
Mime	23.46	16.14	26.71	19.1	18.22	15.59	26.55	17.88	0.91	0.04	0.86	0.03	0.76	0.03
Distance	97.55	6.64	95.19	10.07	98.57	2.22	98.84	2.77	0.4	0.02	1.72	0.07	0.54	0.02
Touch	58.93	19.83	68.11	20.94	72.32	25.23	75.76	27.23	0.71	0.03	3.87	0.14	0.29	0.01
Positioning	6.01	6.32	2.01	2.83	9.36	16.6	7.94	6.5	0.88	0.04	3.23	0.12	0.25	0.01
Follow Gaze	1.12	1.93	0.5	1.27	2.76	4.7	0.69	1.73	2.81	0.11	1.41	0.06	0.88	0.04
Contingent	43.3	15.1	41.04	17.31	45.32	13.26	51.46	20.08	0.12	0.01	3.33	0.12	1.51	0.06
Types of Touch														
Calming	13.03	13.77	14.61	13.06	6.45	8.84	9.1	11.71	0.36	0.02	3.74	0.14	0.03	0.001
Neutral	33.36	21.53	31.53	12.73	32.21	23.83	24.3	15.5	0.76	0.03	0.67	0.03	0.35	0.01
Arousing	23.34	23.29	32.38	20.68	41.62	27.54	50.76	30.95	0.87	0.04	7.61*	0.24	0.06	0.003
Vestibular	6.25	10.14	12.57	16.17	2.08	5.83	13.1	24.17	5.38*	0.18	0.15	0.006	0.25	0.01

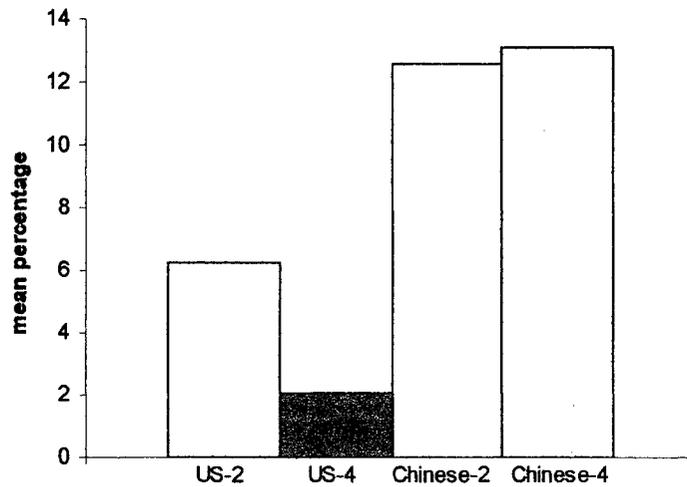
\* $p < .05$ . \*\* $p < .01$ .  $\eta^2$  = partial eta squared  
 note. Numbers represent percentage scores



*Figure 1.* Mean percentage scores for vocal repetition by Caucasian-American and Chinese mothers with two- and four-month-old infants.



*Figure 2.* Mean percentage scores for vocal elongation by Caucasian-American and Chinese mothers with two- and four-month-old infants.



*Figure 3.* Mean percentage scores for vestibular touch by Caucasian-American and Chinese mothers with two- and four-month-old infants.

It is interesting to look at the individual variability in all three language-related intuitive behaviors (refer to Table 4). In repetition at four months the Caucasian-American mothers not only have a lower mean score ( $M=61.96$ ) but a large standard deviation ( $SD=24.92$ ). The Chinese mothers, however, have a higher mean score ( $M=84.19$ ) and lower SD ( $SD=16.64$ ). The variability is also evidenced in elongation where the same pattern of lower  $M$  and higher  $SD$  for the Caucasian-American mothers is true. However, in the intuitive behavior of melody, while  $M$  scores are similar for both groups, at both two and four months the Chinese  $SD$  is almost double that of the Caucasian-American mothers. As can be seen in the following boxplots (Figures 4 and 5), the median score for Chinese mothers in melody is higher than that of the Caucasian-American mothers. The reader will note that at four months there is a single statistical outlier for the Chinese sample. When examining this subject's percentage scores for the other two vocal behaviors of repetition and elongation she scores in the top percentile,

indicating that rather than melody (words, phrases or sentences) she was interacting primarily through repetition of elongated sounds.

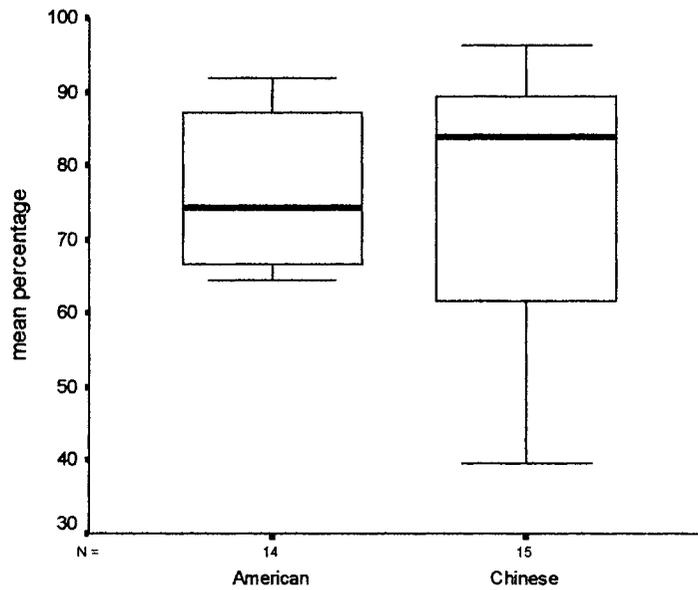


Figure 4. Box-plot depiction of mean percentages of melody showing median scores and range of scores by Caucasian-American and Chinese mothers with two-month-old infants.

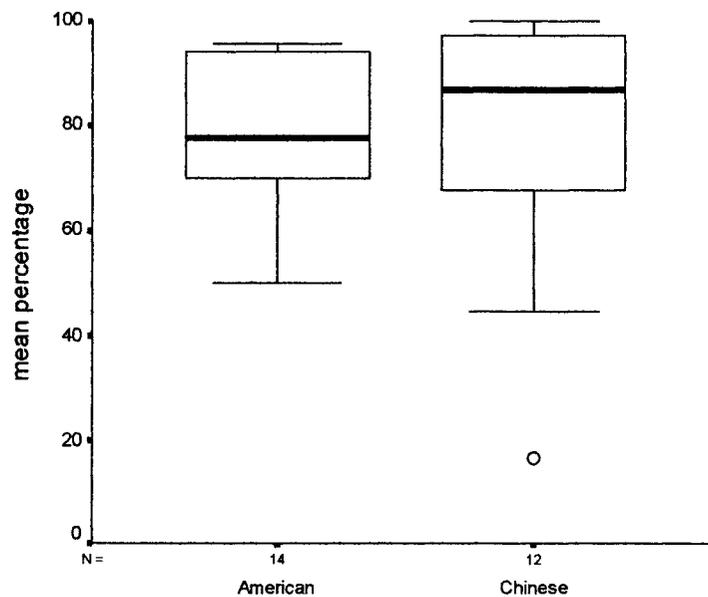
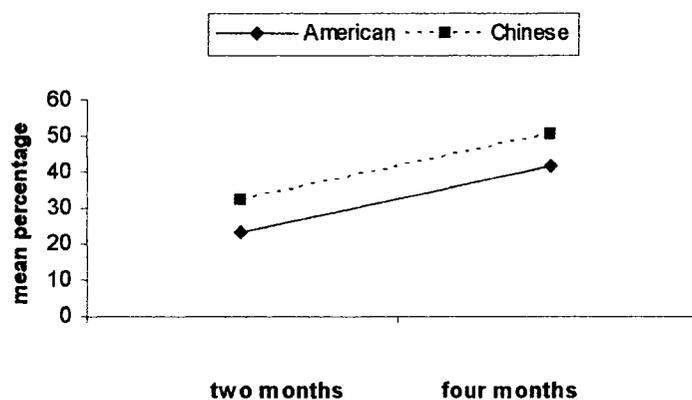


Figure 5. Box-plot depiction of mean percentages of melody showing median scores and range of scores by Caucasian-American and Chinese mothers with four-month-old infants.

*Age Effects.* Within-subject main effects of Age were found for repetition and arousing touch. For both behaviors, both Mandarin Chinese and Caucasian-American mothers increased use when the infant was four months old. (See Figure 1 for mean scores for repetition and Figure 6 for mean scores for arousing touch.) Trends were also found for increased occurrence at four months for touch ( $p = .06$ ), positioning ( $p = .09$ ), and contingent behavior ( $p = .08$ ). A trend was shown for a decrease at four months of calming touch ( $p = .07$ ). The interaction of age and ethnicity did not appear to be significant at this level of analysis.



*Figure 6.* Comparison of arousing touch by Caucasian-American and Chinese mothers with two- and four-month-old infants.

*Comparisons of experimental conditions.* Incomplete and unequal data sets for condition, as illustrated in Table 5, did not allow for clear comparisons across each of the independent variables of experimental condition. For instance, at two months the free play condition had data for all subjects while the soothe condition was missing 10 subjects (3 American, 7 Chinese), the highest of any of the four established conditions. In order to check for influence caused by the missing data, a chi-square analysis was completed for the soothe condition at two months which determined that there was not a

significant difference between the groups:  $\chi^2(1, N=19) = 2.04, p = .153$ . As previously noted, the lack of identifying information for the Chinese sample at four months places all subjects within either the soothe or unassigned condition.

Table 5  
*Number of Subjects per Experimental Condition: Two and Four Months*

Ethnic Group	Free Play		Enc. Vocal		Dis. Vocal		Soothe		Unassigned	
	2 mo	4 mo	2 mo	4 mo	2 mo	4 mo	2 mo	4 mo	2 mo	4 mo
American	14	9	12	4	11	7	11	5	2	4
Chinese	15		15		11		8	6	3	12

To accommodate the differences in data available for each condition and across ages, a two-step procedure was used to examine comparisons. First, illustrations of patterns for the four experimental conditions at two months were created for behaviors identified in the ANOVAs as significant: repetition, elongation, arousing touch, and vestibular touch, Figures 7, 8, 9 and 10 respectively. The viewer will first notice the similarity of pattern by both groups of mothers even though the mean percentage scores are different. During the condition “discourage vocalization” each of the four behaviors of interest drop to their lowest points for both groups. The high use of vestibular touch during the soothe condition, as contrasted with low usage during the other three conditions, is similar for both Chinese and Caucasian-American mothers.

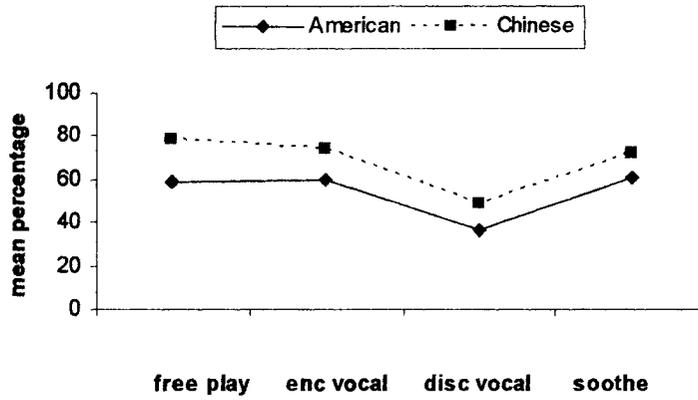


Figure 7. Mean percentage scores for vocal repetition by Caucasian-American and Chinese mothers with two-month old infants during four conditions.

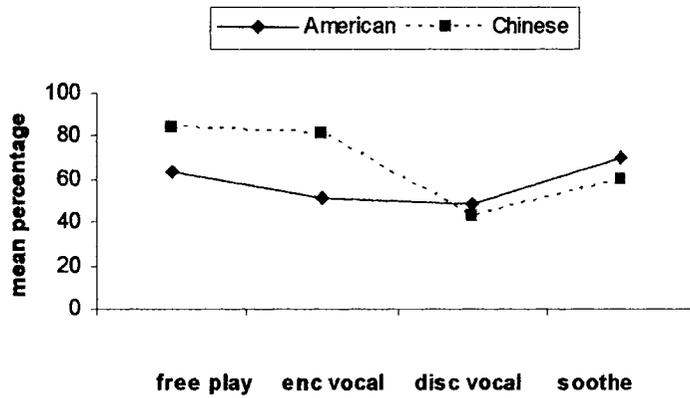


Figure 8. Mean percentage scores for vocal elongation by Caucasian-American and Chinese mothers with two-month old infants during four conditions.

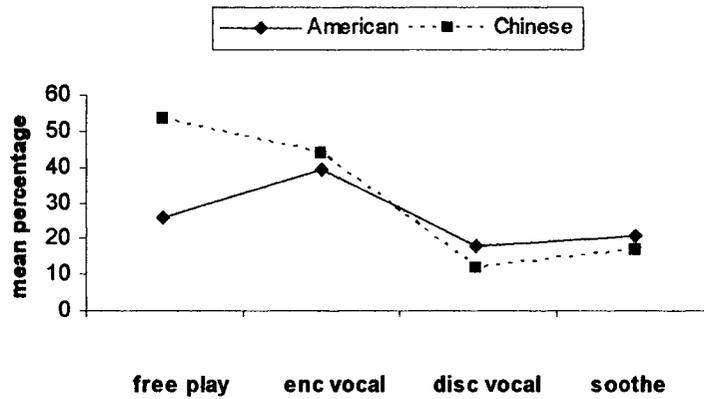


Figure 9. Mean percentage scores for arousing touch by Caucasian-American and Chinese mothers with two-month old infants during four conditions.

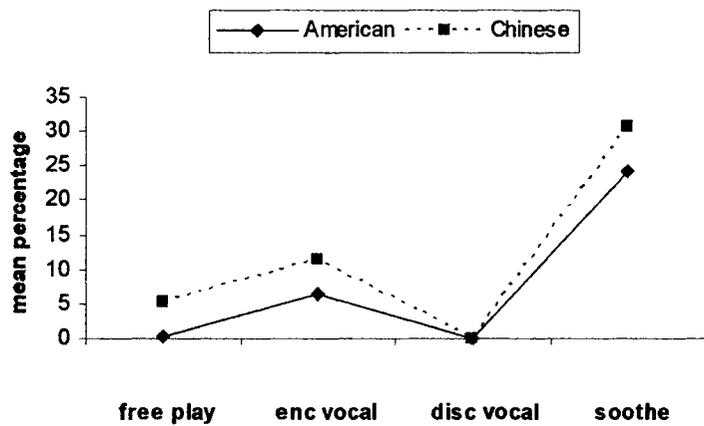


Figure 10. Mean percentage scores for vestibular touch by Caucasian-American and Chinese mothers with two-month old infants during four conditions.

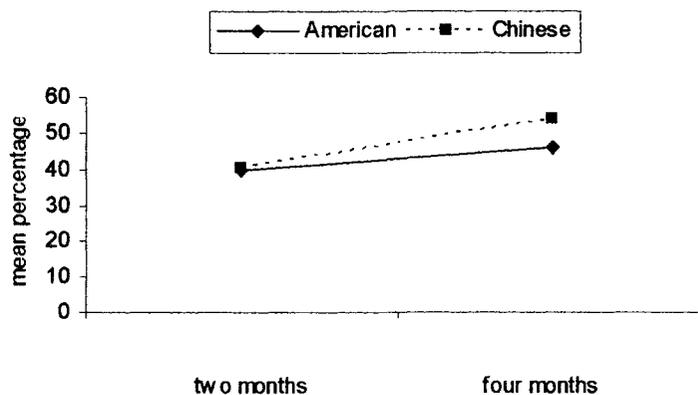
As a second step, a composite mean percentage score was created for behaviors during three similar conditions: free play, encourage vocalization, and unassigned. It was reasoned that the unassigned condition was most likely made up of time samples from the free play and encourage vocalization experimental conditions. In the majority of the discourage vocalization samples the mother gave a specific indication, such as saying “keep quiet” or “no talking” or shaking her head “no.” If any of these conditions had been in the sample this would have been noted in the data set as an assumption. Soothe conditions were already delineated in the Chinese sample at four months because the infant behavior made it evident even without knowing the experimentally assigned condition. (Experimenters working with infants are prepared to make adjustments based on the variability of infant state. The subject records indicate times when the expected order of experimental condition was changed due to state.) Creating a composite made it possible for comparisons to be made across age when previously the lack of subject condition data sheets at four months for the Chinese sample had prevented comparisons. This new three-condition composite was contrasted with the soothe condition.

Using the composite mean percentage score, an ANOVA was conducted for the intuitive repertoire dependent variables and the four types of touch variables. Analyses of repetition and elongation revealed between subject main effects (Ethnicity) during the three-condition composite episodes for behaviors of: repetition,  $F(1, 23) = 10.03, p = .004$  and elongation,  $F(1, 23) = 14.34, p = .001$ , respectively. As expected from the pre-composite analyses, the Mandarin Chinese mothers utilized these behaviors more. Within-subject main effects (Age) during the three-condition composite episodes were found for repetition,  $F(1, 23) = 10.65, p = .003$ , and contingent behavior,  $F(1, 23) = 5.67$ ,

$p = .02$ ; both variables were higher at 4 months. Mean scores and Standard Deviations are listed in Table 6. The reader will note that in repetition at both ages the Mean score for Chinese mothers is higher and the SD lower than for American mothers. It is also noteworthy that the increase in Mean score for Mandarin Chinese mothers at four months is much greater than the comparable Mean score increase for Caucasian-American mothers. A similar pattern of scores is evident in elongation. As can be seen in Figure 9, maternal contingent behavior increased as the age of the infant increased, regardless of ethnicity. No main effects were found for types of touch.

**Table 6**  
*Means and Standard Deviations for Significant Three-Condition Composite Scores*

Intuitive Behavior	Caucasian-American 2 months		Chinese 2 months		Caucasian-American 4 months		Chinese 4 months	
	M	SD	M	SD	M	SD	M	SD
Repetition	59.74	21.92	74.43	9.53	63.37	22.63	89.86	12.32
Elongation	58.52	22.85	79.84	14.01	60.95	22.64	87.03	16.48
Contingent	39.83	16.55	40.62	19.88	46.01	17.91	53.89	16.48



*Figure 11.* Mean percentage scores in a three-condition composite for contingent behavior for Caucasian-American and Chinese mothers with two- and four-month-old infants.

## CHAPTER FOUR

### Discussion

Intuitive parenting, comprising a distinct set of behaviors, operates at a nonconscious level for the individual parent or caregiver. The intersubjectivity of the relationship with the developing infant allows for a fast-paced adaptation of constellations of skills applicable to the circumstances of infant state (Papoušek & Papoušek, 1991; 1995). The developmental changes of the infant elicit complementary behaviors from the attuned parent. The purpose of this study was to examine a specific set of nine intuitive behaviors, and a subset of four types of touch, as they were utilized by Caucasian-American and Mandarin Chinese mothers with their two- and four-month old infants.

Given previous findings that there are many similarities in parenting behaviors across cultures (Keller, 2004; Fernald, et al., 1989), and the fact that this small sample size might obscure subtle differences, the first hypothesis was that Chinese and American mothers would not statistically differ in overall use of parenting behaviors. It was found that mothers in both groups consistently use the same repertoire of behaviors. Similarities of occurrence were strong for use of melody, mime behaviors, optimal distance, touch, positioning, following gaze, and contingent behavior at infant ages of two and four months. However, the hypothesis was not borne out because statistically significant differences in higher usage by Mandarin Chinese mothers of repetition and elongation were found, although both at a small effect size (.25 and .1, respectively). This finding would hold true even if a more conservative alpha score of .01 was observed. The difference in repertoire of these two populations may be similar to the

differences found in the parenting repertoire of US and Japanese mothers (Bornstein, 2002; Fogel, 2001).

The findings of the difference in vocal elongation, although surprising in its level of significance, is understandable given that it elaborates on the results of Papoušek and Hwang's (1991) analysis of a subset of the Mandarin-speaking mothers in this study. In that study it was found that these mothers, as well as a second set of Mandarin speakers engaged in a role play of speaking to an infant, modeled expanded vowels on varying pitch levels. Chinese mothers were also found to use interjections, exclamations, matches and modeling sounds rather than lexical utterances (Papoušek, et al., 1991). The mothers even violated Chinese tone rules and changed lexical tones to use caregiving melodies.

As was evident from the mothers' statements about parent-infant communication, Chinese mothers place a high value on communication for both educational and social reasons. Although one Chinese mother made the statement that "American mothers talk more to their babies than Chinese mothers do," this stereotype was not borne out in this study. Mean scores for use of melody, indications of mother's use of infant-directed speech whenever speaking to the infant, were almost identical for the two groups at both ages. And as identified earlier, the mothers stated that they were unaware of using strategies of infant-directed speech.

The higher scores for Chinese mothers in repetition and elongation may have had a direct relationship with one another. Repetition was coded if the sound was either an elongation or melody. The higher use of elongations by the Chinese mothers may have therefore provided more opportunities for a repetition to occur.

In addition, the greater frequency of elongations by Chinese mothers may be related to speaking a tonal language. Researchers have found that vowel production is a key teaching element in early parent-infant interactions (Gopnik, et al., 1999, Kuhl et al., 1997). Because of the early age of the infants in this study this language element may have been more emphasized.

It is also possible that the greater frequency by Chinese mothers of repetition, elongation, and vestibular touch was part of their cultural strategy of reinforcing bonding and social referencing. Cultural differences in values of collectivism versus individualism are known (Quoss & Zhao, 1995), as well as differing caretaking orientations leading to different agendas (Bornstein & Tamis-LeMonda, 1990). For instance, one Chinese mother clearly demonstrated a preference for the use of social referencing for soothing, rather than allowing the infant to self-soothe with finger sucking. (The translator for this study reported that self-soothing by putting hands in the mouth is still discouraged in Chinese culture, and in fact that early rules for school contain a reference to this as an unacceptable practice.) Vestibular touch is primarily used by parents during soothing, a pattern continued at four months for the Chinese mothers but decreasing by the American mothers who may have a cultural value of encouraging self-soothing. The goal of interdependence has been understood as a key element guiding child development in non-Western cultures (Keats, 2000). It is further argued by Keats that this needs to be understood in the greater context of spiritual beliefs that emphasize respect for others over expressions of self-assertiveness.

It is also possible that the higher use of repetition and elongation by the Mandarin Chinese mothers has an importance beyond language. It may be a strategy to increase the

infant's sensory processing speed which is important when living in a more crowded environment. Or language sounds may correlate with later development of spatial skills. Recent research points to brain differences in Chinese children compared to Westerners that are theorized to result from use of a pictorial written language system. This neural difference is thought to be correlated with higher mathematical ability. Repetitive sounds may be pattern builders.

The expectation of the second hypothesis, that differing experimental conditions would elicit different constellations of behavior, was met. The condition of discouraging vocalization matched a drop in both repetitions and elongations by both groups. Touch in general, and specifically arousing touch, were found to be statistically different in the condition of free play (although effect sizes were small, .31 and .21, respectively).

The third hypothesis, that differences in infant age would correspond with slight differences in maternal behavior, was also substantiated. Increases at infant age of four months were found for repetition, with a small effect size (.02), and arousing touch, also a small effect size (.24). A similar age trend was evidenced in touch, positioning, and contingent behavior, with small effect sizes of .12-.14. The one behavior that showed a decline with infant age was the maternal use of calming touch, with a small effect size of .14.

The age-related increase in use of arousing touch is perhaps explained by the emergence of rhythmic games as the child matures. Kinesthetic stimulation in such play routines is a known behavior in the parenting repertoire (Korner, 1990; Koester, Papoušek & Papoušek, 1989). The infant is also able to process greater amounts of sensory stimulation by the age of four months. Changes in the infant's attentional focus

may also correspond with maternal use of arousing touch as a stimulus for re-engagement.

#### Limitations and Future Research Directions

The author did not have the opportunity to participate in design, data collection, selection of segments to code, or coding scheme development and refinement, except for the variation of touch quality utilized. Although a limitation, it also is a benefit because it allowed for coding to be conducted completely “blind” to the subjects: no bias had been established through off-camera contact with the parent and infant; the coder was unaware of the conditions of each segment; and the coder therefore had no preconceived expectations of mother or infant behavior. This situation also provided the opportunity to utilize the coding scheme without personal bias regarding its development, and to offer feedback to the authors of the coding scheme regarding future refinements.

Although using a standardized coding scheme restricted the coding to one certified coder, it will allow more direct comparisons between groups in the future. In examining the literature in infant studies one can often compare similarities to coding schemes but can not make exact comparisons because of differences in definitions. The early attachment research has benefited from a credentialed process for coding which has allowed greater replication of studies (Sroufe, 1996). Increasing the number of coders trained to use the Papoušek’s intuitive parenting scheme could advance an understanding of behaviors that may have a strong biologically-based component.

In the future, applying current understandings of design might lead to counterbalancing the order of experimental conditions, such as discouraging vocalization and then encouraging vocalization rather than just allowing differences in order to occur

because of circumstances. Also low power could be addressed even when using a small number of subjects, by having multiple sessions during a one or two week period. This also could reduce the impact of infant state on the particular day of filming.

Differences that were found in comparisons between the Caucasian-American and Mandarin Chinese mothers may be due to cultural differences in being observed or the experience of being an immigrant instead of living in one's home country. Several of the Chinese mothers stated to their infant that some aspect of good behavior, such as not fussing, was important because the dyad was there to have "our picture taken." However, the American mothers also showed the effort of complying with research protocols when they shared statements with the infant such as, "I know you don't understand why you have to stay there" (in infant seat) and redoubled attempts at verbal and physical engagement.

Given, however, that in interviews the mothers indicated that they were not aware of performing specific behaviors of the intuitive repertoire, they may not have consciously been adapting their use of specific strategies. Haff and Kahnt (Haff, Kahnt, Wurmser, & Papoušek, 2004) previously found that parents who are stressed still demonstrate intuitive competencies the majority of the time. A future line of inquiry, however, may include examining the use of the intuitive repertoire at differing levels of arousal. It may be that a higher arousal state in the parent increases the use of nonconscious behaviors as a discharge mechanism and that cultural differences may exist in situations that cause arousal. It could also be proposed that higher levels of parental anxiety (i.e., extreme arousal) might actually hinder or block the natural expression of intuitive behaviors.

An attempt was not made in this study to examine ways that the nine intuitive behaviors co-vary. For instance, repetition can only occur if elongations or melody are used. Future studies might include touch as a repetition option, such as when a mother plays a game of touching the infant's tummy. Another variation might be to examine touch with and without sound to determine if the two behaviors typically co-occur.

Data about parental beliefs or goals were collected by researchers only in a brief form for this study, but could be elaborated on more thoroughly in future studies. This may be especially important given Keats' (2000) emphasis on the importance of examining parenting practices in light of religious beliefs.

The planned future comparison to a German population (2002-3 sample) will offer the opportunity to compare maternal behaviors and infant state cross-culturally and across two generations (i.e., mothers of different cultures and historical contexts). Findings of similarities in intuitive parenting skills will strengthen the argument that these skills may be a biological disposition independent of generation. Blending this sample with additional subject pools will also address the problem of small sample size which limited the analyses, particularly in the ability to examine all three levels (Age x Ethnicity x Condition).

Previous cross-cultural studies have found differences in adult support and activities for infant motor development, such as active stretching exercises by the Mali of Africa (Bril & Sabatier, 1986). Given the current theories that touch plays an essential role in organization of the self (Fogel, 2001; Weiss, 1990), demonstrated similarities and differences may lead to further understandings of how parental practices contribute to the infant's developing sense of self. Cultural variations in maternal behaviors may also be

considered as components of ways in which cultural information is transmitted to the infant.

Assumptions regarding the meaning of differences must be tempered by an understanding that the coding is occurring nearly 20 years after the original taping and the coder is culturally biased as a US citizen. The content of maternal vocal expressions was not examined, yet further analysis of this sample of observations could provide valuable information. This might include delineating differences in repetitions by melody or elongations, types of endearments directed toward the infant, or the use of social versus object directed language. A more detailed examination of the language components would benefit from inclusion of a Mandarin Chinese language speaker. Keats (2000) emphasizes the importance of collaborative ventures between researchers in different ethnic communities for both the cultural perspective this brings and the advancement of scholars from different ethnic groups. Future cross-cultural studies including cultural groups from this Montana based community may include researchers and subjects from the Native American, Hmong or Russian communities.

### *Implications*

This study may also assist in leading to future clinical applications. If one hypothesizes that the intuitive repertoire is innate, then the intervention goal for a troubled parent-infant dyad is to eliminate whatever is inhibiting the parent's expression of the repertoire. The goal is not to teach the skills of the intuitive behaviors, causing them to be controlled by rational decisions, because then they would not have the speed of the nonconscious (Papoušek & Papoušek, 1992). Instead, clinicians might reinforce the mother whenever one of the repertoire is used by bringing to her attention the positive

impact it had in the dyadic communication. This kind of early intervention is currently being carried out at Mechthild Papoušek's clinic in Munich with families whose infants are experiencing a variety of regulatory disorders. By further documenting the intuitive parenting skills under investigation here, it is hoped that professionals involved with such families will have a stronger basis upon which to identify and strengthen optimal caregiving behaviors with very young infants in a variety of cultures.

Research is underway in Czechoslovakia examining utilization of the intuitive parenting repertoire in cases of severe injury or illness in older children (M. Papoušek, personal communication, October, 2003). Sample video-tapes of these cases were reviewed by this researcher during training in Munich. It appears that even when an older child's behaviors become more typical of those at an earlier age (i.e., due to illness or injury), parental behaviors are elicited that again support the cognitive and relational needs of the child. That is, the intuitive repertoire is not lost just because an infant outgrows the need for many of these facilitative parenting behaviors, but can re-surface nonconsciously at a later stage if needed. If the parenting repertoire is re-engaged due to these new situations it will strengthen the argument that the behaviors have a strong nature basis. It will also expand our ability to assist families in engaging with a family member during the rehabilitation process with an older child, perhaps even an adult.

Finally, future research can take the baseline of free play and determine modifications when meeting an agenda, such as soothing the infant. In this study the researcher was limited by the one minute episodes that were placed on the comprehensive tape, since the original tapes unfortunately were not available. This limited the ability to examine modifications because the examples of each modification were not available for

all subjects or were available only in a very limited number. In the future, one could look at all instances of discouraging vocalizations compared to all instances of free play.

Much of parenting requires fulfilling certain goals, such as getting dressed and ready for school, being quiet in church or in the doctor's office. Studies of parent-infant interactions may provide valuable clues as to strategies parents spontaneously teach in early infancy to accomplish goals, strategies that may be elaborated on for older children.

Child-rearing goals are often influenced directly by cultural expectations.

Therefore experimental studies such as this can only set the stage for further, more naturalistic observations of parents interacting with infants during daily routines of feeding, diapering, putting to bed, and playing. Together such investigations can expand our understanding of how intuitive behaviors are elicited in parents as well as situations in which they may fail to appear. Both have important implications for parents, pediatricians, developmental psychologists, and early interventionists.

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## APPENDIX A

Subject Number \_\_\_\_\_

Time Sample \_\_\_\_\_

Screen Time \_\_\_\_\_

Take	Visual	Infant State	Intuitive	Attunement
1				
2				
3				
4				
5				
6				

	1	2	3	4	5	6
Repetition						
Melody						
Elongate						
Mime						
Distance						
Touch						
Positioning						
Follow gaze						
Contingent						
Score						

0=0, 1-2= 1, 3-4= 2, 5-6= 3, 7-9= 4  
4=vestibular

1=calm, 2=neutral, 3= arousing,

Definitions for coding sheet for Intuitive and Touch Behaviors in this study:

**Repetition** of single words, sounds or content with small variations; if overlaps two intervals is coded in second interval

**Melody** when mother is speaking unless using adult speech or melody completely missing

**Elongation** of vowels and sounds like hmm

**Mime**, greetings and mirroring- prototypes of wide opened eyes, raised eyebrows, frowning, pointed mouth, rhythmical head movements, sticking out tongue

**Distance** is dialogic- around 20 cm

**Touch** that is stroking of hands or feet, poking, stroking or massaging head or body; incidental touches like resting hand on the body or caretaking touches not coded in German sample comparison and are coded in this study (separate listings in data sheet)

**Calming**- slow, descending, patting strokes conveying quieting

**Neutral**- resting hand on body or caretaking, such as wiping mouth

**Arousing**- quick pats, tickling, ascending, poking, moving arms or legs

**Vestibular**- moving infant in space with rocking or sitting up

**Positioning** by the mother so the baby can look into her face, coded even if the baby doesn't look

**Follow gaze** of the infant when infant looks around the room or at objects

**Contingent** to the baby such as when the infant looks or vocalizes then responds or if responds to the baby's behavior with elaborated sound/words

## APPENDIX B

Subject code: ~~CHIN~~ US-06-M-A  
86-

1.

Recordings	Tape	Side/Channel	Counter(PV 1740; Revox; Technics)
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Faces

Profiles (US)

Profiles (G)

Revox

Audiocassette

Interview

Test-tape

Audiocassette copy

Videocopy

Videocopy

Videocopy

Missing recordings:

*Soothing only 30" in air*

Additional recordings:

*Infant sleeping in air  
REM sleep - facial expressions  
(partly without timer)*



