A Comparison of Hmong and Mien newborn infants and American caucasian newborns with the Brazelton Neonatal Behavioral Assessment Scale : a thesis

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"The childhood shows the man

as morning shows the day"

Milton, Paradise Regained

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CHAPTER I

INTRODUCTION

As a pediatric nurse working in an acute care hospital and clinic setting, this researcher was impressed with the cultural differences observed in the mother-infant interaction of a group of recently immigrated Southeast Asian refugees, particularly the Hmong and Mien ethnic groups. Not only did there appear to be a difference in general style or temperament in the mothers and infants, but their particular child care practices seemed to reflect this style. Although most of the infants and sometimes the mothers were ill and very unfamiliar in this setting, there appeared to be a quality of calmness and passivity in their social behavior. Mothers responded to their infants with frequent nursing, holding, sleeping with and lulling with rhythmic songs. Mothers usually placed their infants on their backs when not held, with rolled blankets all around, and the infants generally would lie quietly, asleep or awake. When held, the babies seemed malleable and quiet with little activity but displaying wide-eyed alertness. This seemed in contrast with the impression of liveliness and activity encountered with most American mothers and infants.

Equally impressive, especially in a health care setting, was the importance of trying to understand their culture as it contributed to their beliefs and child care practices. The association of "soul loss" with illness was reflected in their adornment of charms, often simply tied string, around the infant's arms and legs and their almost fearful hesitation to uncover a febrile child.

These observations led the researcher to question the nature of these distinct cultural differences. Are there innate differences among cultural groups from birth in their style of behavior which contribute to differences in development, child care practices, relationships and ultimately general ideology and culture? Or are infants universally born into a culture that will mold them into certain patterns of socialization and personality style and characteristics? The questions relate to the issue of nature versus nurture or heredity versus environment, a primary theoretical controversy in psychological literature, perhaps especially in child development. Brazelton (1972) asserts that understanding this issue is basic to any study concerned with early development.

Historically, the two disparate views have typified the infant as a "homunculus" or adult miniature with connotations of a predetermined personality, intelligence and mental illness, or as a "tabula rasa" or clean slate, completely malleable to environmental influences (Thomas & Chess, 1980). The advent of psychoanalysis and behaviorism heightened the importance of environmental influences, especially the parent, in a child's development, but many studies failed to recognize the child's contribution to the environment. Researchers began to focus on infancy, the beginning of psychological growth when environmental influences are relatively new, in an effort to clarify the age-old dispute. Improved methods of observation revealed a surprising wealth of information about the newborn's perceptual and social abilities and a growing appreciation of the uniqueness of each infant. Many studies have now shown that

newborns influence the parent-infant relationship in powerful ways (Bell, 1974). Brazelton (1976) describes the interdependence of rhythms in parent-infant communication as "reciprocity," which he feels is essential to parent-infant attachment. Bowlby's (1969) attachment theory was inspirational in relating this important affective bond to an evolutionary perspective and helped to balance the nature side of the issue. He theorizes that the innate behavioral responses of the infant, such as crying, sucking, smiling, clinging, and reaching, trigger instinctive responses in the mother that promote proximity. Infant-mother attachment has adaptive value in assuring infant survival, as the human infant needs protection during this rather long, helpless period as well as the security to explore and learn about the world. Bowlby's (1969) ethological theory implies universal genetic determinants of early social behavior, the outcome of a phylogenetic process in which attachment was necessary to protect infants from predators. Although one may disagree with the biological emphasis or the stressed importance of this early bond to later relationships and emotional well-being, the evolutionary view offers insights into the newborn's social capacities which cannot be explained by experience or positive reinforcement.

Many researchers today have adopted an "interactionist" or "transactional" position, recognizing the interdependence of both nature and nurture factors in the complex reality of human development. Brazelton formulates this view as simply "behavioral phenotype = genotype x environment" (1972, p. 91). Sameroff (1978) states:

> In a transactional view, the behavior of both infant and caretaker are modulated by their experience with each other. The infant and especially the newborn are seen as being in a dynamic state of development. Newborns cannot be viewed as independent of their caretaking context because without it they would not survive. To appreciate this early period of development, one must see the newborn in a social context, and the predictions of outcome for the child must be based on the caretaking dyad or triad and not on the characteristics of the infant alone. (p. 112)

Although this holistic approach appears to solve the dispute, it has been criticized as "interactionism," contributing to the old reluctance to identify genetic aspects of behavior with its implicit inseparability of heredity and environment (Plomin, 1982). Despite past politics of "biological determinism," a current trend for more meaningful research on the nature side is evident. Wolff (1977) cautions against equating biological identity with social equality and presents an ethical argument for identifying cultural differences "so that children can grow up with a genuine acceptance of biological variations without drawing the traditional conclusion that some groups are better than others . . ." (p. 359). He asserts that the denial of genetically based temperament differences among people constitutes a kind of denial of individuality. Perhaps an appropriate summation of the nature versus nurture issue is a quote from the Zen scholar Suzuki, who describes it as "a man-made problem and that man, having divided

life into two parts, is now harassed with the problem of fitting them together again" (Freedman, 1974, p. 6).

The theoretical debate over why infant behavior and development differs and what determines these differences or similarities may be interesting but futile. A more meaningful inquiry is how different infant behavior may affect development and the developing parent-child relationship (Lester & Brazelton, 1982). As a first step in understanding the cultural differences apparent in a group of Southeast Asian immigrants, this study will focus attention on how Hmong and Mien newborn social behavior compares to an American Caucasian sample. Specifically, the purpose of this descriptive study is to assess the behavioral similarities and differences between two culturally and genetically distinct groups of newborns using the Brazelton Neonatal Behavioral Assessment Scale (NBAS), a tool which describes the interactive behavior of the infant thought to be meaningful to the parent-infant relationship.

Inherent assumptions in this study are that newborns as individuals shape parental responses just as they are influenced by their social environment and that this is influential in the attachment process between parent and child. Thus, the infant's behavior may contribute to childrearing practices and the cultural diversity among different peoples. Although this study is limited to the infant's behavior and can only speculate on the meaning to the parent-infant relationship, similarities and differences among newborns should contribute to our

knowledge of child development. Cross-cultural studies provide a natural experiment for this purpose.

It is important for nurses to understand how cultural differences affect child care and parent-child relationships. The newborn period is an optimum time for nurses to support the emerging attachment process between parent and child. An appreciation and respect for individuality and cultural identity is essential if nurses are to be effective caregivers.

Review of the Literature

In the review of the literature, the nature versus nurture issue will be examined in more depth as it relates to the concepts of infant temperament and behavior and cross-cultural comparisons of infants. The following review will address the concept of infant individuality and temperament followed by a discussion of the relevant studies using the Brazelton NBAS. Pertinent cross-cultural research on infants and the cultural heritage of the Hmong and Mien will also be considered. This chapter will conclude with a description of the conceptual framework used in this study and the relevance to the nursing profession.

Infant Individuality and Temperament

A pioneer in the field of infant individuality, Gesell (1937) exposed a constitutionalist viewpoint in his longitudinal study depicting similarities and differences in child development, emphasizing inheritance and maturation over environmental conditions. Although criticized at the time as detailed portraits of children, this original study spurred interest into more scientific inquiry. Followers of

Freud's psychoanalytic theory described infant individuality as "primary ego endowment" and concentrated on explicit characteristics of the infant in relation to mother-infant interaction and later personality development (Korner, 1971). Korner and Grobstein (1967) used film to record the behavior of 32 newborns and found significant differences in irritability, soothability and visual and auditory sensitivity. Korner (1971) hypothesized that these differences originate in neurophysiological and genetic makeup and may be preserved in memory traces contributing to differences in personality, especially the "style" with which developmental tasks are approached. A longitudinal study of 37 mother-infant pairs over the first 18 months of life classified babies into "cuddlers," "non-cuddlers" and intermediate groups on the basis of their positive or negative responses to physical contact in a variety of common situations (Schaffer & Emerson, 1964). "Cuddlers" were portrayed as more placid, slept more and showed more intense attachment behavior, while "non-cuddlers" were more active and intolerant of physical restraint and displayed higher motor development quotients. As the authors were unable to differentiate consistent differences in mothering style, they concluded that the need for close physical contact is an expression of the infant's personality related to activity drive rather than a reactive social phenomenon.

The New York Longitudinal Study (NYLS) initiated in 1956 by Thomas and Chess (1977) contributed immensely to the concept of infant individuality and its relationship to child development and parent-child interaction. Skeptical of the predominate emphasis on environmental

approaches in understanding child behavior problems, these clinicians maintained that an essential "missing ingredient" was the temperament of the child. They defined temperament operationally as the "behavioral style . . . the characteristic tempo, energy expenditure, focus, mood and rhythmicity that typify the behaviors of an individual child independently of their content" (Thomas & Chess, 1973, p. 84). They proposed that temperament is evident in early infancy but does not imply permanence or genetic origin. The following nine categories of temperament identified at 2 months were seen at all subsequent ages in their study: Activity level (motor component), rhythmicity (biological regularity), approach-withdrawal (positive-negative initial responses), adaptability, threshold of responsiveness, quality of mood, distractibility, attention span, and persistence (Thomas & Chess, 1977).

Utilizing detailed parental reports of objective behaviors in relation to daily living activities such as eating, sleeping and playing every 3 months for the first year then twice yearly to age 5, the nine categories of temperament were scored on a 3-point scale. As the study has progressed, other sources of information such as teacher reports and observations have supplemented the primary data and have added reliability to parental reports. Through qualitative and quantitative analysis, three constellations of temperament emerged. The "easy child" comprising 40% of the sample is characterized by "regularity, positive approach responses to new stimuli, high adaptability to change and mild or moderately intense mood which is predominantly positive." The opposite group comprising 10% of the sample, the "difficult child,"

displays "irregularity in biological functions, negative withdrawal responses to new stimuli, non-adaptability or slow adaptability to change, and intense mood expressions which are frequently negative." The last constellation is titled the "slow-to-warm-up child," comprising 15% of the sample. These children show a "combination of negative responses of mild intensity to new stimuli with slow adaptability after repeated contact . . . and less tendency to show irregularity of biological functions" when contrasted with the difficult child (Thomas & Chess, 1977, pp. 22-23). The remaining 35% of the sample were a mixed combination of the three constellations.

The researchers chose a homogeneous group of 136 predominately Jewish middle-class subjects in order to minimize sociocultural variability; however, subgroups of Puerto Rican working class children, Israeli kibbutz children, children with congenital rubella, mental retardation and premature infants with suspect neurological damage have shown similar categories of temperament identified in the NYLS. In comparing the Puerto Rican infants with the primary sample, significant differences were found in rhythmicity and intensity at 2- to 3-months, but overall differences were not dramatic (Thomas & Chess, 1977). Although the groups differed appreciatively in parental attitudes and childrearing practices, the lack of striking differences between the children may support the intrinsic aspect of a person's temperament which is less influenced by parental handling. Another explanation lies in the cultural bias of the tool and relying on parental perceptions which reveal cultural differences (Thomas & Chess, 1977).

The major findings of the NYLS have important predictive and therapeutic value. Temperament styles can be identified as early as 2 months, appear independent of parenting style or personality and remain relatively stable over time, especially the first 2 years. The authors provide many descriptive examples that support the view that infant temperament characteristics affect maternal responsiveness. Their classification of temperament provides a comprehensive description that can be reliably related to aspects of the child's development. Certain clusters of temperament such as the "difficult child" may be predictive of later behavioral problems when related to the interplay of environmental demands and parenting techniques. In the study, 70% of the "difficult" children developed behavior problems associated with socialization demands such as peers and school, compared with 18% of the "easy" children (Thomas & Chess, 1977). Thus, potential problems can be anticipated and resolved with a recognition of the concept of "goodness of fit." This concept means that when environmental demands and expectations are in harmony with the person's capacities and "style of behaving," optimal development is more possible. Although this does not imply absence of stress, poorness of fit does suggest excess stress when behavior problems arise (Thomas & Chess, 1977). A highly active, distractible child may need a less restrictive, stimulating environment just as a shy child may need gentle encouragement and repeated exposure. Understanding the temperament of a child dispels labels such as lazy, insecure, lacking interest, and alleviates parental feelings of guilt and frustration and potential lowered self-esteem in the child.

Carey (1970) has demonstrated the clinical usefulness of the temperament concept by adapting the NYLS interview data into a valid, simplified three-point questionnaire of 70 items. In a study of 204 8-month-old infants, primarily Caucasian, firstborn from middle-class American families, he correlates temperament with the incidence of colic, frequency of injuries, and development at 1 year (Carey, 1972). Colic was significantly related to low sensory threshold with a higher occurrence in infants with "difficult" temperament. More active infants walked earlier, and persistence related to earlier talking. Carey asserts that the chief value of the questionnaire to pediatric practice is the identification of the "difficult baby" syndrome. He also points out discrepancies between the mother's overall impression of the baby and the more objective rating scale which highlights the importance of obtaining an objective description of the infant. The implications for childrearing are evident. Parents need to trust their intuition and treat each child as an individual just as clinicians should be flexible in providing guidelines for child care practices.

Throughout the NYLS, the authors have maintained an interactionist conceptualization of temperament. Temperament and environmental factors are always understood in relation to each other and have variable importance in specific developmental tasks. Similarly, they do not view development as a linear process with early experiences determining later, as change and maturation are a fact of life. Although the early appearance of temperament may support a genetic role, they realize that other factors influence the infant's behavior such as the prenatal

environment, labor and delivery course, and early parenting. Additionally, genetic traits can be manifest later in life, such as the physical changes connected with puberty. In response to the nature versus nurture issue, Thomas and Chess (1980) propose that a more relevant question is whether psychological development begins at birth or in uterine life. The initial work of Thomas and Chess (1977) was influential in stimulating the study of temperament; however, Rothbart (1981) delineates a few limitations of the study. The behavior scales are criticized as lacking discriminant validity and are limited in the 3-point scale scoring system; subjects were not all the same age during all phases of the study; and the sample was restricted in socioeconomic status and ethnic group with nearly half of the families contributing more than one subject to the study.

Rothbart (1981) designed an internally reliable infant temperament scale utilizing caretaker reports, based partially on the work of Thomas and Chess (1977), but also influenced by other early pioneers in infant individuality. Rothbart (1981) defines temperament as "individual differences in reactivity and self-regulation" and acknowledges the "constitutional basis" as the "relatively enduring biological makeup of the individual influenced over time by the interaction of heredity, life experience, and maturation" (p. 569). The Rothbart Infant Behavior Questionnaire (IBQ) includes six scales or dimensions of temperament which are: activity level, smiling and laughter, fear, distress to limitations, soothability, and duration of orienting. Item analysis and conceptual analysis were carried out on

463 IBQs for 3-, 6-, 9-, and 12-month-old subjects. The longitudinal analysis revealed greatest stability from 3 to 12 months on the activity level and smiling and laughter scales, followed by the duration of orienting and soothability scales. She concludes that though parent report measures provide an assessment of temperament that is not independent of the child's current environment, this dependence on the "interacting system" may show more stability than an assessment in a "laboratory environment" (p. 567).

The concept of temperament, originating in Hippocrates' humoral theory of mental disposition, has traditionally implied a constitutional, emotional "style" of behavior which is manifested early in life and persists over time. Evidence from twin studies has shown same-sexed monozygotic twins to be significantly more similar in certain temperamental traits than dizygotic twins (Goldsmith & Gottesman, 1981; Plomin & Rowe, 1977; Thomas & Chess, 1977; Torgersen & Kringlen, 1978). This classical twin method lends support to a genetic etiology for temperament, but the studies are not consistent in their interpretation and identification of temperament components or methodology. Rutter (1982) points out the inherent bias of the relative comparison measurement techniques which are based on a set of norms. The expectation that a genetic basis implies temporal stability has also been misleading. As development may modify the expression of temperament characteristics, confusion arises as how to best measure temperament, as dissimilar behaviors may reflect the same temperament trait.

In general, longitudinal studies have not shown high correlations between early temperament and later personality style (Rutter, 1982; Thomas & Chess, 1977). In the NYLS, the stability of temperament traits was most pronounced in the first 2 years. In their study of 53 twins, Torgersen and Kringlen (1978) found more continuity between newborn temperamental attributes and those expressed at 9 months rather than 2 months of age, concluding that a genetic influence is more revealing after the variable recovery from birth. Adding to the confusion of genetic origin is the finding that some aspects of temperament, such as activity level, appear relatively stable over time while others, such as mood, do not show statistical differences in twin studies (Goldsmith & Gottesman, 1981; Torgersen & Kringlen, 1978). Thomas and Chess (1980) state that separating heredity from environment in an individual is a fruitless task, but feel it is possible to identify group trends in a population of similar sociocultural background.

In conclusion, the literature supports the ideation of temperament as an intrinsic aspect of individuality in infants and children without settling the issue of genetic origin. Though the origin of temperament is of theoretical interest, the value of the concept does not depend on this notion. Understanding temperament is useful in assessing parent-child interactions, the development of behavior problems and later personality characteristics, and similarities and differences among cultures, especially regarding childrearing practices. The fact that newborns by their individuality affect parental responses and the

attachment process, though self-evident to many a parent, is becoming increasingly appreciated in the professional literature.

Neonatal Behavioral Assessment Scale (NBAS)

Through the collaborative effort of psychology and medicine, a significant development in the assessment of infant individuality arose in 1973 with the publication of the Neonatal Behavioral Assessment Scale (NBAS) developed by T. Berry Brazelton (1973) and associates. Prior to this, newborns were often excluded from studies, as in the NYLS, or isolated; specific behaviors such as crying, activity level or cuddliness were the main focus. The original intention was to design a psychological tool to evaluate and highlight behavioral individuality and sociability which may influence the immediate parent-infant interaction and relate to later personality development (Brazelton, 1973). From a clinical pediatric perspective, Brazelton was impressed with the powerful contribution the newborn has on the developing parent-infant relationship in eliciting different caretaking responses. Evidence from research describing the natural "bonding" process of mothers and infants and possible risk to this bond when the mother is depressed or has a sick or premature infant added to his conviction of the importance of understanding this early interaction (Brazelton, 1976). He writes:

> If Bowlby's (1969) thesis of attachment behavior is as powerful as it seems to be, observations of the neonate and the reactions he engenders in his parents in the early weeks may become the best

> predictors of the outcome of the mother-father-infant interaction. (Brazelton, 1973, p. 1).

An inherent assumption in this statement is the importance of the early parent-infant relationship for the child's future psychological growth. Brazelton views the valuable role of the pediatrician during this neonatal period as helping to strengthen the attachment process by personifying the infant to the parents as they "learn how to interact with these inborn constellations of behaviors" (Brazelton, 1976, p. 38). In this sense inborn does not mean purely genetic in origin, as many prenatal influences are already affecting behavior at birth. Evaluating individual traits of psychological importance for predictive value is also difficult due to the many physiologic and adaptive changes during the newborn period (Brazelton, 1976).

Implicit in the exam is the conception of the neonate as a complexly organized being, able to control internal and external stimuli in an effort to adapt to his social world (Als, Tronick, Lester & Brazelton, 1979). The comprehensive scale, standardized on a group of full-term, 7+ pound, 3-day-old, "normal" Caucasian infants with normal vaginal deliveries, whose mothers received not more than 100 mg. of barbiturate and 50 mg. of other sedative drugs prior to delivery, is designed for use in the first month of life and takes approximately 30 minutes to administer. The exam consists of 28 behavioral items rated on a 9-point scale, 18 neurologic reflex items rated on a 3-point scale and two global observations, infant attractiveness and need for stimulation (Brazelton, 1984). The behavioral items focus on the

interactive capabilities of the newborn similar to experiences a parent would encounter and thus "become a measure of prediction to the environment's response to the infant" (Als et al., 1979, p. 187).

> In the exam, there is a graded series of procedures--talking, hand on belly, restraint, holding, and rocking--designed to soothe and alert the infant. His responsiveness to animate stimuli--e.g., rattle, bell, red ball, white light, temperature change--are assessed. Estimates of vigor and attentional excitement are measured as well as assessment of motor activity and tone, and autonomic responsiveness as he changes state. (Als & Brazelton, 1975, p. 5)

In this sense the examiner plays the role of caregiver and tries to elicit the "best" performance on an item by sensitively adapting procedures to the infant's state of consciousness, such as light or deep sleep, alert, active, drowsy and crying. Attention to the infant's state is a critical aspect of the exam, as behavioral responses are only meaningful in terms of state, and state variability reflects the infant's capacity for self-organization (Brazelton, 1973). Since state depends on many physiological variables such as hunger and cyclic rhythms, comparisons between groups of infants and in an individual infant over time should try to control for many extraneous variables. The reflex items, based on Prechtl and Beintema's (1964) assessment, are necessary to determine neurologic integrity but also serve as a technique for evaluating the infant's ability to deal with stress (Brazelton, 1973). Brazelton stresses that repeated examinations are

more predictive of behavior patterns as the infant is powerfully influenced by temporal events as recovery from the birth process (Als et al., 1979; Brazelton, 1973).

Interater reliability utilizing the NBAS for research is achieved through standard training sessions at which examiners are required to agree on at least 90% of the items. The carefully defined item descriptions facilitate establishing interater reliability at this level. However, because the test measures the "best" rather than "modal" performance of the infant, and an individual researcher's style may affect how successfully he or she elicits the "best" behavior, a cautious measure of unreliability among studies is probable. Horowitz, Sullivan and Linn (1978) argue that "modal" behavior may be more typical of social interaction, but Brazelton (1978) maintains that the "best" performance ensures against sampling behavior at less than optimal times.

Additionally, DeVries and Super (1978) illustrate how using the tool in different cultural and home settings can influence scores on items. They found the least affected items to be alertness, orientation to voice and face and ball, consolability, cuddliness, hand-to-mouth, and tonus. They conclude from their study of several African groups of infants in Kenya that the physical context (amount of light), social context (who is present) and patterns of care (swaddling, feeding rhythms) all affect the newborn's behavior on the exam but also reflect the way the infant and family are adapting to each other.

Although generally considered a reliable measure of newborn behavior in relation to the concepts of individuality and sociability and demonstrating wide applicability in distinguishing groups of newborns, the initial optimistic predictive value of the NBAS has shown only minimal to moderate results in a traditional sense (Sameroff, 1978). Studies concerned with stable correlations in behavior from day-to-day reveal greatest test-retest performance in motor behavior (Horowitz et al., 1978; Kestermann, 1981; Sameroff, Kratchuk, & Bakow, 1978), with state control and orientating items the least stable (Kaye, 1978). This finding coincides with a transactional, dynamic model of development which would expect relative instability of characteristics subject to environmental impact.

Brazelton (1978) feels that looking at the "recovery curve" and "fluctuations in performance . . . how the neonate organizes around changing environmental demands . . . may be more meaningful than stability in performance" (p. 8). He further points out that infants may show individualized "patterns of recovery" which may be more meaningful to parents than characteristics on any one day. This notion appears particularly useful when making "at risk" judgments about infants, as reflected in a longitudinal study by Tronick and Brazelton (1975). In comparing a standard neurological exam with the NBAS in predicting "normal" from "abnormal" infants, the Brazelton exam revealed a much lower "false alarm" rate while being equally sensitive in identifying abnormal infants. The NBAS was performed twice on the 53 subjects between Days 2 and 6 and the children followed regularly until

age 7. The prediction was made on individual items as well as the "curve of recovery" implied in the two exams. Brazelton (1978) asserts that this reflects the tool's capacity to measure a higher central nervous system (CNS) integrity than a standard neurological exam.

Studies concerned with the predictive validity of the Brazelton exam have generally related NBAS scores to later developmental tests, mother-infant interaction and temperament ratings. In a longitudinal study of 243 predominantly Caucasian infants from lower socioeconomic families, Vaughn, Taraldson, Crichton and Egeland (1980) found significant correlations between NBAS scores and Bayley Scales of Infant Development (Bayley scales) mental scores at 9 months of age. Additionally, using observational data from a feeding and play situation at 6 months of age, infants who were classified as "worrisome" on the NBAS also were seen as "less optimal" in their interactions, suggesting the usefulness of the tool in the formulation of a cumulative "risk index." Using the same sample, Vaughn, Crichton, and Egeland (1982) found that adding nurses' ratings of maternal behavior in the newborn nursery to the NBAS scores of the infants increased the prediction of the quality of maternal caregiving at 6 months of life.

In a random sample of 51 nonwhite, lower socioeconomic mother-infant pairs, Osofsky and Danzger (1974) correlated NBAS performance of 2- to 4-day-old infants with an observational mother-infant feeding situation. Consistency in the infants' state and behavior characteristics, especially auditory, visual and tactile responsivity across situations, provided validation of the NBAS.

Maternal stimulation of the infant responded similarly to these infant characteristics, as the more alert or responsive baby received more visual, tactile and auditory responses from the mother. An interesting example is that tactile responsivity in the infant during the feeding situation related to the neonatal assessment items of cuddliness, peak of excitement, startle and rapidity of buildup. Similar results reflecting sensitive interrelationships between mother-infant pairs were demonstrated by Osofsky (1976) in a larger sample with two observational periods, a feeding and a stimulation situation. Infants with less motor tone and maturity were handled more during a feeding, more alert infants received more overall stimulation, and more irritable infants received less auditory stimulation. The data supports the notion that styles of mother-infant interaction are established early and that both infant and mother contribute to the patterns in a generally similar and responsive style. Horowitz and Linn (1984) state that "if NBAS measures were combined with some measures of the infant's environment, prediction to later measures of infant functioning might be enhanced" (p. 100).

Although the Brazelton exam does not measure temperament per se, many of the items appear similar to categories of temperament identified in the NYLS, such as motoric functioning and activity, habituation to stimuli and distractibility, and irritability and consolability and quality of mood. Lester, Emory, Hoffman and Eitzman (1976) identified a temperament-arousal factor in a study of the differential effects of high-risk variables on NBAS performance, which included the items of

consolability, peak of excitement, rapidity of buildup, irritability, lability of skin color, lability of state and self-quieting.

Few studies have focused on the relationship between behavior of newborns on the NBAS and later temperament measures. Sostek and Anders (1977) investigated whether Brazelton scores would predict performance on the Bayley scales and whether early temperament as measured by a modified Carey Infant Temperament Questionnaire relates to performance on both scales. Four a priori cluster scores adapted to a 5-point rating scale were calculated for NBAS performance of 18 normal, full-term infants from a foundling nursery at a mean age of 8 days. These findings were correlated with 2-week infant temperament ratings made by nursery caretakers in a smaller sample and 10-week developmental quotients. Results showed that total Brazelton clusters and state control were predictive of Bayley Scales mental quotients at 10 weeks. Temperamental characteristics of intensity and distractibility correlated with the total Bayley scales and NBAS dimensions, though the results are described as "suggestive" due to limitations in the study. The authors suggest that an 8-day Brazelton exam may be more stable than the more common 3-day exam.

A recent, well-controlled study by Worobey (1986) of temperament in the first month of life with a sample of 48 Caucasian mother-infant pairs utilized the NBAS at 2- to 4-days and 1 month, the Rothbart Infant Behavior Questionnaire (IBQ) at 2 weeks and NYLS interview guidelines (NYLSCI) at 1 month. The temperament measures were modified for use with younger infants. NBAS data was analyzed with six of the seven

clusters, excluding habituation for state control reasons, and the 1-month scores as well as the average scores for the two exams were correlated with IBQ and NYLSCI data. Significant correlations between NBAS and NYLSCI data centered on the approach and mood components of temperament. "Approachable" infants scored higher in social responsivity, physiological integrity and motor maturity, and lower in irritability and excitability; infants described as "positive in mood" rated higher scores in social responsivity and were also more consolable; "adaptable and distractible" infants scored higher in visual and auditory responsivity. Using the averaged scores revealed fewer of the above correlations but also exhibited two other correlations, as "rhythmicity" was associated with motor maturity and "intensity" with regulation of state. Similar relationships were found with IBQ and NBAS correlations. Infants judged "higher in activity level" were less cuddly and consolable; "soothable" infants scored higher on physiological integrity; and infants showing "distress reactions" to new stimuli displayed decreased interest in visual and auditory objects on the Brazelton exam. The IBQ and NYLSCI correlated on activity, approach-withdrawal and mood components of temperament. The researcher contends that the results support the emergence of temperament in the newborn period and the predictive relationships between temperament measures, while admitting that the lack of significant correlations in areas such as sensory threshold and attention span may indicate incongruence among measures or their inappropriate use in the newborn period. An interesting finding was the lack of test-retest stability on

the NBAS clusters despite the meaningful correlations with the temperament measures.

In a study by Bakow et al. (1973, cited in Als et al., 1979) "factors of alertness, motor maturity, tremulousness, habituation, and self-quieting were correlated with infant temperament at four months" (p. 205).

A final study by Meares, Penman, Milgram-Friedman, and Baker (1983) involving 32 primiparous mothers and their newborns sought to identify how a mother attributes personality traits to her infant in the first days of life. Utilizing data from the NBAS, semi-structured interviews, perinatal circumstances and a Neonatal Perception Inventory, the investigators found that the mother's assessment of her infant was influenced by the actual behavior of the baby as well as her own temperament. Babies judged not likely to be difficult scored higher for state control, and mothers who did not expect a difficult baby showed a "general flexibility" in coping style. Through content analysis of the interview data, the researchers identified a process of "projective identification" by which the mother attributes personality traits to her infant, generally characteristics found in herself or her husband.

Although infant temperament is an attractive area of research, the studies point to difficulties in interpreting Brazelton data as indicative of temperament, especially with the lack of test-retest stability. Sameroff et al. (1978) point out that state variables, especially predominant state during the exam, may account for the lack of behavioral stability. State is also dependent on many physiological

variables at a time when major changes characterize the newborn period. More longitudinal and correlational studies exploring the concept of temperament in the newborn period would help increase our understanding of this important aspect of individuality.

Despite some problems with the Brazelton tool, it has become the most widely used newborn assessment measure in research, reflecting its broad applicability. Some of the areas of research include cross-cultural studies, identifying infants "at risk," the influence of perinatal variables such as phototherapy and obstetrical medication, assessing parent-infant interaction, and the effectiveness of the tool in teaching parents about their infant. The following review of studies will highlight the most relevant ones to this research project especially regarding control variables. Cross-cultural studies will be included in the subsequent cultural review of the literature.

Intervening Variables in Neonatal Assessment

The largest number of studies utilizing the Brazelton exam have concentrated on the clinical usefulness of the tool in assessing "at risk" infants and the effects of obstetrical medication on the newborn. As early as 1961, Brazelton demonstrated the depressant effects of obstetrical analgesic medication on infant behavior. Trying to account for the many variables affecting newborn behavior, Brazelton revealed how the relatively normal 24- to 48-hour disorganized state of infants recovering from the birth process may be prolonged by 1 to 2 days with the use of heavy premedication with barbiturates. The implications for maternal-infant interaction was demonstrated in the slower nursing

ability of the "medicated" infants as measured by the maternal perceptions of multiparas (Brazelton, 1961).

A study by Standley, Soule, Copans, and Duchowny (1974) investigated the effects of local anesthesia and analgesic medication on the behavior of 60 first-born healthy 1- to 3-day-old babies with the NBAS divided into alertness, irritability and motor-maturity clusters. While not able to single out the effects of certain drugs or routes of administration, the infants delivered with anesthetic were more irritable, tremulous and motorically immature than a smaller control "unmedicated" group. In contrast, Tronick et al. (1976) found minimal drug effects on the behavior of 54 Caucasian infants measured with the NBAS during the first 10 days of life compared with another small (n = 6) control sample. Classifying eight obstetrical medications into three groups (i.e., minimal, analgesia, and epidural anesthesia), early depressant effects on muscle tone were found with epidural anesthesia but diminished by 12 hours of age. A recent reanalysis of the data suggests that more subtle effects of low levels of maternal obstetrical medication may be found when other factors which can potentiate drug effects are added into the analysis (Lester et al., 1982). Five predictor variables--length of labor, parity, ponderal index, drug group score, and drug factor score (time of first and last drug to delivery and number of different drugs and amount of drugs administered)--were correlated with the slope of Brazelton exams and accounted for significant variation in five of the seven clusters. Although the sample had an unexpectedly high number of underweight-for-length

infants, the authors feel the data helps explain how other perinatal factors can influence drug effects resulting in behavioral manifestations past the physiological functioning of the drug.

Woodson and Da Costa-Woodson (1980) report similar findings in a mixed ethnic sample of 109 infants from Malaysia. Parity, ethnic group, duration of second stage of labor, and maternal blood pressure during labor influenced the relationship between analgesia and infant irritability on the Brazelton exam. When controlling for these factors with a multivariate procedure, analgesic medication was associated with significantly decreased infant irritability. However, the combined influence of the other co-variables was comparable to the exposure to medication, with less irritable infants being of Tamil ethnicity rather than Chinese or Malay, exposed to lower blood pressure during labor, delivered after a shorter second stage, and born following shorter gestation.

Due to the widespread use of obstetrical medication in America, many of the previously mentioned studies had very small comparative control samples. A study by Horowitz et al. (1977) employing Israeli and Uruguayan newborns with larger control samples revealed no significant medication effects on the NBAS performance or the Bayley scores at 3 months. The authors concluded that while light to moderate levels of medication did not influence behavior in these groups of infants, population differences involving genetic, biological and attitudinal factors may combine to determine the overall effect of medication on infant behavior.

Although the studies reveal inconsistencies in results, it is apparent that obstetrical medication can affect newborn behavior and is a major variable that must be accounted for when comparing groups of infants. A final study that perhaps best illustrates the importance of this influence in understanding the newborn's effect upon the parent was done by Murray, Dolby, Nation, and Thomas (1981). Limiting the blind study to the effects of epidural anesthesia, generally considered to have a lesser depressant effect on the infant, newborns were divided into three groups of nonmedicated (n = 15), epidural (n = 20), and epidural and oxytocin stimulation (n = 20). Analyzing the data from the NBAS from Days 1, 5, and 30 with the four a priori clusters expanded to a 5-point scale, the medicated newborns showed poorer responses in motor, state control and physiological response clusters as well as their total score on Day 1 and continued to show poor state control by Day 5. Differences between the epidural (E) group and epidural-oxytocin (EO) group were interesting in that the E infants tended to be tense and hypertonic in motor behavior and more labile in state with increased crying while the EO infants were more hypotonic and flat in state pattern. As the oxytocin effect would have worn off by Day 5, part of the difference in states was attributed to the increased incidence of jaundice in this group. This is contrasted with the quiet, alert states of the unmedicated group. Although no difference in the separate group's Brazelton scores were found at 1 month, other data from the study which included diaries of crying and feeding patterns kept by the mother and questionnaires to assess the mother's perception of her

baby's capabilities and temperament did reveal significant differences in the newborn period and at 1 month of age. Mothers of infants in the medicated group reported the infants as more intense, more bothersome, less adaptable with poor interactive ability, state control and overall performance in comparison with the more favorable reports by the unmedicated group of mothers. The mothers did not differ significantly in socioeconomic status or in an initial Maternal Attitude Scale, but the medicated group did experience more difficult deliveries with consequent increased initial separation from the infants. The researchers hypothesize in agreement with Brazelton (1961) that while the drug effects had worn off in the first few days, the baby's initial "drugged" and disorganized behavior may have a lasting impression on maternal expectations and influence the way she responds to her baby. The authors state that the lack of significant differences in the 1-month Brazelton scores may be due to the "best" versus "modal" argument, as the mother may be more influenced by the typical behavior of the infant (Murray et al., 1981).

Other studies using the Brazelton exam have concentrated on groups of infants "at risk" for prematurity, undernourishment and maternal addiction. Als, Tronick, Adamson and Brazelton (1976) compared individual assessment items and a priori clusters for two groups of healthy Caucasian full-term infants, 10 small for gestational age (SGA), and 10 appropriate for gestational age (AGA), at 1, 3, 5, and 10 days of life, and found significant differences in interactive and motoric clusters as well as reflexive responses, attractiveness and need for

stimulation. Parents described their SGA infants as "undemanding," and some felt "uneasy" due to the "general lack of vigor." The 10 SGA infants were followed up at later ages ranging from 6 weeks to 9 months, assessed with the Denver Developmental Screening Test (DDST), and the mothers were interviewed about their infant's sleeping and eating patterns and general temperamental characteristics. Although the infants appeared normal and performed within normal range on the DDST, "eight of the ten babies were characterized by their parents as difficult, easily over-stimulated, unpredictable in their sleeping and eating patterns, intense and generally highly reactive" (p. 600). The investigators surmise that the early difficulties in interaction may trigger maternal anxiety which in turn may contribute to the infant's inability for self-organization. Although the follow-up is not statistically relevant, the study does portray the "subtle" ways "normal" healthy infants behave to make parenting more stressful. In addition, the behavioral differences in the SGA babies reflect the effects of nutritional insult on the developing central nervous system.

Ten years later, Lester, Garcia-Coll, Valcarcel, Hoffman and Brazelton (1986) reveal similar results using expanded anthropometric measures in detecting "atypical fetal growth" in a sample of 33 infants from Puerto Rican primiparous mothers separated into teenage and older age groups. Infants who were underweight or "short" for age scored lower on the NBAS orientation, motor and reflex clusters compared to infants with appropriate growth. Additionally, when the ponderal index was held constant, differential effects on measures of autonomic and

state function in the "undernourished" group were found, suggesting possible effects of early versus late prenatal nutritional insult reflected in neonatal behavior. No differences were found regarding age of the mother, though the teenage mothers in this sample had a lower obstetrical risk score than comparable American teenagers.

Poor social interaction and neuromotor function were also demonstrated in a study by Brazelton, Tronick, Lechtig, Lasky, and Klein (1977) of nutritionally stressed Latino infants in rural Guatemala (N = 154) followed for the first month of life with the NBAS. Although the groups varied in gestational age, birth weight, age of testing and number of hypoxic episodes, lower socioeconomic status was also associated with poorer performance. Regarding this last finding, Chandler and Roe (1977) also found some differences in infants from parents of "high risk" social environments as compared to an equal group of infants from middle SES, while controlling for physiological variables such as medication, birth weight, Apgar scores, gestational age and presence of labor and delivery complications. The differences in the babies centered around items considered important for social interaction such as cuddliness and consolability.

Brazelton, Tryphonopoulou, and Lester (1979) compared Greek infants from lower and middle social classes with a group of adoptive infants using an earlier version of the NBAS on Days 1, 5, and 10 (N = 90). While all the infants improved in performance with time, the adoptive group continued to show the worst performance especially in social interaction which was attributed to the poorer prenatal and early

postnatal environments of these infants. The Greek cultural taboo of an illegitimate pregnancy resulted in poor nutrition and attempted abortions early in the mothers' pregnancies while the orphanage environment provided little stimulation. The lower-class infants scored higher on motor processes and state regulation than the middle-class group which was thought to reflect the use of obstetrical medication in the middle-class group.

While this section has highlighted the more obvious factors affecting newborn behavior such as medication, birth weight and nutrition, some of the studies also point out the importance of the social environment and infant's ethnicity as equally significant variables. The influence the newborn's behavior has on the developing parent-infant relationship is also evident.

Cross-Cultural Studies

Cross-cultural comparisons provide an opportunity to observe naturally occurring variations and similarities in human behavior and development and enlarge our perspective of human potential in our understanding of different peoples. In the area of child development, cross-cultural research has revealed the universality and diversity of development as well as depicting the many variations in childrearing practices and psychology of peoples. Appreciating the larger sociohistorical and cultural context in development, researchers can realize their ethnocentric bias in many "folk theories" of child development. The Western emphasis on autonomy in development influences our view of the parent-infant relationship as evolving from a symbiotic

phase to separation and individuation, while many Eastern cultures emphasize interdependence, and children may not show similar development patterns (LeVine, 1980).

Researchers stress the "integrative power of culture, connecting and structuring all aspects of human behavior . . ." (Super, 1981a, p. 19), while differing in their emphasis on psychoanalytic, learning, attachment, evolutionary or developmental perspectives. As in traditional psychological theory, the link between infancy and adulthood is an important part of anthropological theory, as "adult personality is seen in psychological anthropology to contribute to the culture's projective-expressive systems, including religious and magical beliefs, rituals, art, recreation, and elements of folk theories of child development" (Super, 1981a, p. 20).

Whiting (1977) developed a global model for looking at child development which relates the physical, environmental and historical circumstances as determinants of a society's "maintenance systems" (i.e., social structure, economy, household type, etc.). The maintenance system influences the types of childrearing practices such as the number of caretakers, developmental tasks, discipline, and so forth. This "learning environment" interacts with the innate nature of the child to produce the personality and skills of the adult. LeVine (1977) emphasizes the adaptive significance of childrearing customs and parental values in encouraging the child to assimilate into a particular culture. In this sense, adaptation is not limited to natural selection

acting on the gene pool, but is a process that occurs in the daily lives of individuals.

Perhaps a reflection of a Western bias in establishing normative data, the earliest and a substantial portion of cross-cultural research in infancy focuses on motor development. Geber and Dean's (1957) initial study of "precocious" motor development in Ugandan infants led to a series of studies in Africa between Black and Caucasian infants, generally reporting Black infants to have greater muscle tone and coordination at birth and during the first year of life (Super, 1981a; Warren, 1972; Werner, 1972). Warren (1972) criticizes many of the studies which lack appropriate control samples and argues against the relative "precocity" of African newborns in his review. However, despite some problems in methodology, the majority of the studies reveal consistent differences in motor behavior between Black and Caucasian infants.

In the United States, Bayley's (1965) large sample standardization study found significantly higher mean scores for Black infants on psychomotor items at 3, 4, 5, 7, 9, and 12 months. Other studies in the U.S. reporting higher motor scores in Black infants have shown conflicting variability in scores of Black babies relating to socioeconomic status (Walters, 1967; Williams & Scott, 1953) while some have found no difference based on social level (Warren & Parkin, 1974).

Similarly, in Africa, contradictory results are demonstrated regarding social level. Super (1976) found greater motor advancement in African infants from rural "traditional" families than in "modern"

families and attributes the differences to the traditional African mothers' common practice of "teaching" the babies to sit and walk and the routine carrying of the infants on the back with little trunk or head support. The infants' delay in crawling was attributed to the limited practice the babies had in this area, as they were seldom in the prone position. Leiderman, Babu, Kagia, Kraemer, and Leiderman (1973) present data using the Bayley scales to the opposite effect with higher motor scores in the less traditional families; however, deliberate practice in sitting and walking was more common in the wealthier families. Zelazo, Zelazo, and Kolb (1972) provide experimental support for an environmental explanation in motor development in their study of American newborns who had practice with the walking reflex, resulting in a longer than usual maintenance of this reflex as well as earlier walking. While a possible racial genetic difference in motor development seems plausible from the consistent results reported in the majority of studies, most researchers have favored an environmental explanation such as childrearing style.

Some of the clearest reports of Black and Caucasian newborn differences in motor behavior are by Brazelton and associates, who explain the cross-cultural differences using a "transactional model" as the interaction of genetic and environmental factors in the shaping of behavior. Brazelton, Koslowski, and Tronick (1976) studied 10 Zambian and 10 American Caucasian infants on Days 1, 5, and 10 using the NBAS. Although the Zambian infants scored lower on motor items on all 3 days, the most notable contrast was the dramatic increase in all the scores

the African infants showed from Day 1 to 10, while the American infants remained consistently average. The most significant improvement was related to social attentiveness measures such as consolability and alertness. Brazelton attributes the behavioral differences to cultural differences, reflecting a combination of genetic and environmental factors. Although all the infants were "normal," the Zambian infants were clinically dysmature and had a lower mean birth weight and birth length, evidenced in their poor responses on the first day. Recent urbanization of this group and the resultant breakdown in traditional birth control practices contributed to a multiparous group of mothers who had closely spaced pregnancies and a low protein diet. This is in contrast to the American group of primiparas from middle-class background. Although the differences on Day 1 were thought to reflect a stressed intrauterine environment, the recovery from Day 1 to 10 was not seen as solely physiologic but as a reflection of childrearing practices. Brazelton describes the Zambian mothers' handling of their infants as putting a "premium on developing muscle tone." The mothers bounced and tossed their infants into the air and carried the babies in a "dashica," a piece of cloth which supports the infants on the hips and provides no head support. As well as encouraging muscle tone, the close physical contact and upright position helped facilitate social responsiveness, as did the frequent nursing and family interaction. Brazelton also asserts that the rapid recovery of these infants points to genetic capacities to respond to the vigorous child care practices after an intrauterine deprivation. The stable behavior of the American

infants also points to a different cultural inheritance as the notion of a "prolonged and protected infancy" is reflected in the common practice of quieting the infant.

Keefer, Tronick, Dixon, and Brazelton (1982) compared the behavior of 24 Kenyan Gusii newborn babies with 24 American Caucasian infants using the NBAS during the first 10 days of life and found significant differences in motor performance. In both groups, 15 of the infants had three Brazelton exams and 9 infants had two exams. The groups were similar in maternal age, gestational age, birth weight, length and ponderal index (weight for length ratio) but differed in parity, the African mothers averaging much higher, and obstetrical medication, with 14 of the American mothers receiving local or spinal medication. The Gusii infants differed strikingly in motor maturity on all the exams, necessitating a modification of the scoring system on motor tone. Although the American infants rated good in motor maturity, the Gusii infants displayed "superior" motor maturity with better control of motor tone and smooth movements with fewer tremors or startles but without evidence of hypertonicity. Other motor performance items such as pull to sit, defensive movements and activity level and the reflex cluster score did not reveal significant differences between the groups. The Gusii mothers handled their infants in the same vigorous manner as the Zambian mothers, thus reinforcing their babies' responsive motor behavior. The authors conclude that the differences revealed in the first few days of life supports an "alternative hypothesis of both genetic and environmental effects and their interaction to explain later

differences in performance . . ." (p. 758). Thus, while motor development is dependent on maturational processes, it also relates to the cultural context in which the child develops. The researchers emphasize the need for "culture-specific models of development" (p. 754). Dixon, Keefer, Tronick, and Brazelton (1982), in their study of these same Gusii infants in relation to perinatal risk factors, provide further evidence on how culture may differentially affect biosocial variables. Despite chronic parasitic infection and anemia, multiparity, inadequate diet, low maternal weight gain and many unaided deliveries, "the infant outcome compares favorably to that of a very low risk American sample" (p. 27).

Garcia-Coll, Sepkoski, and Lester (1981) also relate ethnic differences in regard to biomedical variables in their study of 72 Puerto Rican, Black and Caucasian 2-day-old infants using the NBAS. Gestational age, Apgar score, ponderal index and four obstetric risk conditions were analyzed with a multiple regression on each of the seven clusters to determine how the synergistic effects of these variables may account for behavioral variability in different populations with similar obstetric histories. While none of the correlations were significant for the Black infants and only one was significant for the Caucasian group, the Puerto Rican infants' performance was related to the four predictor variables on six of the clusters. The authors conclude that the risk variables may vary across different populations. Although only one exam was performed and all the mothers had received similar medication but varying dosages and times, behavioral differences were

also demonstrated. Black infants scored significantly higher on the motor cluster, and Puerto Rican infants scored higher on the orientation items reflected in their alert responses to stimuli.

The findings of variability in obstetric conditions across populations point to difficulties in interpreting cross-cultural differences. The traditional method for comparing cross-cultural groups of newborns has been to control for obstetric criteria, but as Lester and Brazelton (1982) point out, "to control for obstetric risk factors and then compare mean differences between groups ignores the effects of at-risk factors on individual differences" (p. 23). They maintain that cross-cultural differences must be studied in terms of group and individual differences since behavioral phenotype may be differentially affected by the control variables. Super (1981b) emphasizes the monument of this task in listing 11 factors that are influential in infant behavior, especially when comparing different ethnic groups as the main independent variable. These include gestational and postnatal age of the infant, parity, conditions of pregnancy and delivery (i.e., diet, spacing of pregnancy, maternal age, complications, psychological state of the mother), medication, method of feeding, child care practices (i.e., swaddling, circumcision), state of arousal, physical and social setting, tester differences, tester expectations, and sampling methods.

Brazelton's initial impetus to study cross-cultural differences in newborn behavior relates to social development rather than simply motor development. As Super (1981a) states, understanding the meaning of

newborn social responses and how these influence the caretaking environment is more complex than documenting similarities and differences in performance.

In the initial cross-cultural study by Brazelton, Robey, and Collier (1969) of the Zinacanteco Indians of Mexico, the researchers sought to elucidate how the newborn's behavior contributes to the initial caregiving environment and to investigate the maturational and interactional influences on infant behavior. They chose the relatively isolated and culturally distinct mountainous Mayan people in order to maximize the genetic and cultural differences from an American Caucasian comparison sample. The study consisted of three parts: The Brazelton scale administered twice on 5 infants during the first week of life; unstructured four 1-hour observation periods of 12 infants of various ages under 9 months and their mothers in the home using a modified Rheingold scale; and assessment of developmental milestones of 93 infants during the first 9 months using the Bayley and Knobloch-Pasamanick scales. Although the small sample size of the Mayan and control group newborns did not allow for statistical analysis, interesting descriptive distinctions were apparent. The Mayan infants displayed more "fluid and freer" motor behavior with few startles and little spontaneous movement and maintained quiet, alert states for long periods resulting in high responses to stimuli. This is contrasted with the Caucasian infants who were more labile in states with periods of intense crying, sucking, deep sleep and showed more tremulous, spontaneous movements. The groups had both experienced normal vaginal

unmedicated deliveries, but the immediate postnatal environments were remarkably different, and testing of the Indian infants was done in the dark, quiet homes. Although the Mayan infants were proportionately smaller than the American infants, they were healthy full-term babies who did not appear dysmature despite the prenatal effects of limited protein intake, parasitic infection and the relative hypoxia of the high altitude.

The significance of these differences becomes clearer when related to the early childrearing practices of the mothers. The Mayan mothers maintain close physical contact with their infants, swaddling them or carrying them in a restraining "rebozo" or shawl on their back. The baby's face is covered much of the time for the first 3 months of life, a protective practice resulting from "evil eye" beliefs associated with soul loss. The mother responds immediately to any crying or motor behavior of the infant by frequent nursing. In sharp contrast to typical American practices, the baby is rarely talked to, played with or put down on the floor to explore. While the overall development of these infants corresponds to American norms with a 1-month lag in motor behavior, the infants continued to exhibit nonexploratory behavior and little vocalization. While this was partly due to "observer effects" causing some stranger anxiety in the infants and mothers, the infants responded to novel test objects with successful manipulation and no further interest. Brazelton (1969) suggests that the culturally valued emphasis on uniformity and imitative learning is well-suited to these childrearing practices by reinforcing alert, quiet states and decreased

motor activity. By the age of 4, the Mayan child imitates adult tasks in play, and by 6 has a responsible role in the household. The fact that the babies typified this behavior at birth points to possible genetic determinants that are adaptive to the cultural environment as well as different intrauterine effects in shaping newborn behavior. Brazelton (1977) notes the intrauterine effects of relative hypoxia, infection, and undernutrition as well as more subtler effects such as the cold climate, the constant activity of the mother, and the quiet, nonaggressive behavior of the culture. Despite the remarkable differences in infant behavior and childrearing practices, the similar developmental results reflects the universality in development and the powerful influence of the maturing nervous system.

Brazelton (1977) concludes that the qualitative differences in infant development across cultures must take into account the perinatal environment, mothering practices and the larger cultural context as well as the infant's inborn characteristics. He states that the infant's characteristics help to shape the environment by "setting" the mother's attachment behavior in such a powerful way that the "behavior of her infant may become the basis for the characteristics that dominate a whole culture" (p. 153).

The final study using the Brazelton scale in a cross-cultural context is significant to the present study as part of the original inspiration. Freedman and Freedman (1969) compared 24 Cantonese Chinese-American and 24 Caucasian European-American 2-day-old infants with an early version of the NBAS. The groups were of middle-class

background obtained from a hospital setting in San Francisco and were similar in mean age of testing, initial state, birth weight, Apgar scores, hours of labor, age of mother, gravida, distribution of sex, and amount and type of obstetrical medication. The Brazelton scale items were divided into five categories: temperament, sensory development, autonomic and CNS maturity, motor development, and social interest. Using a multivariate analysis of variance on the basis of total performance, the groups were significantly different, with the main area of difference centering on items measuring "excitability/ imperturbability" in the temperament category. The Chinese-American newborns had a less rapid buildup to an excited state, showed fewer state changes, tended to habituate more readily to visual stimuli, showed less facial and body reddening, and tended to calm themselves or be consoled more readily when crying. When placed in the prone position with their faces against the bed, the Oriental infants did not try to lift or turn their heads as the Caucasian infants did, but there was no difference in motor tone between the groups. Freedman (1974) acknowledges that the smaller nasal bone structure of the Oriental babies may be a possible explanation for this finding, but he interprets it as passivity to external stimuli. In the defensive movements item when a cloth is placed over the infant's face, the typical Chinese baby lay quietly, while the Caucasian infant struggled to remove the cloth with increased motor activity.

Freedman (1974) replicated the same "temperamental" differences in a group of Japanese-American and Navajo newborns with a few differences

unique to these groups. He appeals to a theory of gene pool differences to explain his findings of relative "imperturbability" in the combined Oriental group (n = 101) compared to an expanded European-American group (n = 65). It is thought that the Navajo descended from an Asian people, exemplified in the similarities in their language with Chinese and primitive Sino-Tibetan languages (Freedman, 1974). Simply, the gene pool theory suggests different "founding populations" between East and West thousands of years ago, resulting in partial genetic isolation. Taking an evolutionary approach to the study of behavior, Freedman maintains that the forces of continuous variation and natural selection act on the gene pool simultaneously to foster adaptation. Thus, while individual variation is necessary for survival of a species, so too are the universal traits which have adaptive value and the principle of natural selection operates toward conformity in a mating population. Behavior reflecting temperament is viewed as adaptive rather than "innate" or "acquired." He also maintains that using a "population" approach to study human development provides a clearer understanding of the interaction of biology and culture in shaping behavior and is a necessary complement to understanding the behavior of individuals. However, Freedman does not support the notion of genetic determinism, realizing that all behavior "is based on a marriage of cultural practices and biological predisposition" (p. 6), but he does question explanations for differences based solely on cultural determinism. Freedman suggests that the temperamental qualities observed in the newborns are the biological or genetic predispositions which may affect

the cultural childrearing practices and contribute to broader cultural diversity.

An example of the "marriage" of culture and biology can be seen in the Navajo practice of cradleboarding. The Navajo infants in Freedman's (1974) study rated lowest on vigor, irritability and muscle tone, notable in their absence of any leg support, walking or stepping reflexs and less resistance to passive movements of their limbs. While some have proposed that the restrictive practice of cradleboarding has resulted in the subdued, stoic disposition seen in Navajo children, Freedman suggests that the babies are physically and temperamentally suited to accept the cradleboard more readily than a highly active, irritable infant.

Other studies comparing Oriental and Caucasian infants have reported related temperamental differences beyond the newborn period. Kagan, Kearsley, and Zelazo (1978) found Chinese infants to have more stable heartbeats than Caucasian infants while looking at visual stimuli and even, quieter dispositions during laboratory testing. Freedman (1974) summarizes the observations by Kuchner (1973) in a study which focused on mother-infant interaction in the first 5 months of life in a sample of 10 Chinese-American and 10 Caucasian families of middle-class background. Although there was little difference in mothers' attitudes toward the infants, the Chinese mothers interacted less with their infants and the babies were less labile, active and irritable than the Caucasian infants from the newborn period on. Observations of Chinese and American children in Chicago preschools by

Green (1969, cited in Freedman, 1979) found the Chinese-Americans to be more emotionally controlled than the other children.

Hsu, Soong, Stigler, and Liang (1982) used Carey's Revised Infant Temperament Questionnaire on a sample of 349 Chinese mothers of 4- to 8-month-old infants in Taiwan. Although the general pattern of results was similar to Carey's American sample, Chinese infants were rated as more intense, less active, less rhythmic, less likely to approach the new, less adaptable, more negative in mood, and less distractible with a lower threshold of responsiveness than American infants. The authors conclude that response bias or racial differences or a combination of these factors may account for the differences and recommend the complementary use of observational studies of infant behavior to illuminate the conception of temperament in a cultural context. Cultures may respond differently to the same temperament characteristic.

Caudill and Weinstein's (1969) comprehensive, longitudinal study of Japanese and Caucasian American mothers and infants' social interaction found culture to be the main variable in the difference in infant behavior and maternal caretaking style. Using a time-sampling procedure to observe the matched sample of 30 Japanese and 30 American first-time mothers and their 3- to 4-month-old infants in their homes, the researchers predicted significant differences relating to mothering style and infant behavior. The American mother displayed an active, stimulating approach, often chatting to the infant when he was in a happy state, while the Japanese mother was calming and soothing, physically present with the baby more often, especially in sleep, and

lulling and chatting more when the infant was in an unhappy state. Not surprisingly, the American infants were more active, happily vocal and exploratory of their body and environment, while the Japanese infants were quieter and greater in unhappy vocalization. The differing maternal styles are consonant with broader folk theories characterizing each culture. The Japanese are considered to be more passive, intuitive, group-oriented and sensitive to nonverbal communication, while Americans are contrasted as assertive, rational, verbal and individual-oriented. The authors conclude that the mothers are responding to their infants along culturally appropriate socialization patterns and that cultural learning occurs in the infants as early as 3 months due to these differences in maternal styles. Japanese mothers foster a quiet, dependent infant just as American mothers encourage an active, independent baby. The longitudinal part of the original study has shown that these early patterns of socialization continue in later years (Caudill & Schooler, 1973).

The authors admit that a group genetic or physiological difference in the infants cannot be denied, but prefer to explain their findings with environmental hypotheses of cultural learning and conditioning. In support of their cultural learning hypothesis, Caudill and Frost (1973) found a sample of 23 third-generation Japanese-American mothers and their infants (who were culturally more like Americans than the Japanese) to behave more like Americans, especially in vocalization. However, some similarities between these mother-infant pairs and the Japanese sample remained, as the Japanese-American babies were less

playful than Caucasian infants, and the mothers carried and lulled their infants more than Caucasian mothers did.

Freedman (1974) again proposes a reverse causal relationship. The quiet, accepting Japanese infant and the active, demanding Caucasian infant elicit different caretaking from their mothers who in turn reinforce the infant's behavior, and a general social pattern fashioned by like-tempered individuals emerges. In response to the seemingly contradictory results presented by Caudill and Frost (1973), Freedman (1974) maintains that behavioral traits which are genetically influenced may change with the changing environment in variable degrees. He uses height as a model for this concept, a polygenic trait which is open to environmental influences.

In summary, it is apparent from the previous review that cultural differences in newborn behavior exist and are important in understanding the parental responses and methods of care and perhaps the culture as a whole. Freedman's hypothesis that there are innate and stable dispositions or temperaments, of genetic or prenatal cause, which vary with ethnic identity appears valid just as the environment plays a critical role in shaping behavior is evident.

Hmong and Mien Culture

In cross-cultural comparisons, Super (1981) stresses the need for integrating research on infant development and care with ethnographic data about the larger culture. In this section the cultural heritage and recent history of the Hmong and Mien people will be reviewed with particular emphasis on childbirth and childrearing practices. However,

there is little available written information on these people, and most of the recent professional literature focuses on physical or mental illness in the refugees as a homogeneous group. Much of the following description of Hmong culture is derived from Barney (1967), a missionary, linguist, and anthropologist who lived with them in the 1950s in Xieng Khouang Province, Laos, before the long war disrupted their lifestyle.

With the end of the Vietnam War in 1975 and the Communist takeover of the governments of Vietnam, Cambodia and Laos, thousands of Southeast Asian refugees crossed the borders into Thailand and Malaysia where they live in refugee camps until they can immigrate to various Western nations. A 1983 census survey in Oregon estimated 18,000 total Southeast Asian refugees in the state, 12,000 of these living in Portland, 5% of whom are Hmong and 7% Mien. In the fiscal year 1985-86, 568 new refugees arrived in Multnomah County, though very few were Hmong or Mien (D. Greely, Refugee Health Care Program, Oregon State Health Division, personal communication, January 8, 1987). Portland was once ranked fourth in the nation on a per capita basis as a location of resettlement for Southeast Asian refugees (Godine, 1981), but adverse economic conditions have contributed to a decrease, especially in the Hmong population. Vang (no date) states that most of the Hmong in the United States came from Laos.

Although the Hmong and Mien represent distinct cultural groups, the existing literature often classifies them together, describing them as "remotely related" (Roberts et al., 1967) with many similarities in

customs and lifestyle (Lebar, Hickey, & Musgrave, 1964). Lebar et al. (1964) also states that these two groups coexist in many settlements in Southeast Asia, speaking different but related languages classified as a separate branch of Sino-Tibetan very similar to Chinese. Although the Hmong are often described as preliterate, their written language based on Chinese script is limited to religious books (Roberts et al., 1967), while the Mien are distinguished among other tribal peoples for their literacy (Kandre, 1967).

It is believed that both the Hmong and Mien originated in China, where many still live today (Kandre, 1967; Lebar et al., 1964; Vang, no date). The earliest reference to the Hmong appears in a Chinese text dating 42 centuries ago (Garrett, 1974; Vang, no date). The name Hmong means "free men" which is their own name for themselves, but they are also referred to as "Miao," a Chinese term translating as "rice shoot," and "Meo" derived from the Vietnamese term "man," which is commonly used in Laos (Barney, 1967; Lebar et al., 1964; Vang, no date; Yang See, 1978). The Mien are referred to in the literature as "Yao," a Chinese term, or "Man," the term used in Laos (Roberts et al., 1967). The Hmong divide themselves into a number of groups or tribes named according to the color or design of the women's finely decorated costumes, such as White, Black, Red, Striped, Flowered, or Blue. Associated with these groupings are minor dialectical differences and variations in customs (Roberts et al., 1967). Both the Hmong and Mien's traditional social organization consists of a patrilinear clan system, identified with similar myths of origin. The Hmong folklore describes a first creation

followed by a great flood with two survivors in a barrel and a series of conflicts and exploits (Barney, 1967). The 12 clans of the Mien relate to original ancestors who set off to cross the sea in boats because of drought in their country "Nanking" (Kandre, 1967).

From China the Hmong and Mien migrated into Southeast Asia, appearing in Laos approximately 150 years ago (Barney, 1967; Roberts et al., 1967; Yang See, 1978). Estimates of the number of Hmong living in Laos in the 1960s vary from 500,000 (Hamilton-Merritt, 1980), 350,000 (Garrett, 1974; Yang See, 1978) to 50,000-100,000 (Barney, 1967). Their population has been reduced by the war as well as the continuing genocide with chemicals in Laos today (Hamilton-Merritt, 1980; Vang, no date; White & Garrett, 1968; Yang See, 1978). The greatest concentration of Hmong and Mien in Laos was in the Xieng Khouang Province, a plateau surrounded by mountains with an elevation of 4,000 feet (Barney, 1967; Kandre, 1967). These "hill" people's preference to live high in the remote mountains "where the climate is cool and malaria is rare" (Vang, no date) is a distinguishing characteristic which has probably contributed to their strong cultural identity and social solidarity. Both are stated to be more closely related to the Chinese in most aspects of their culture than to any other people (Barney, 1967; Lebar et al., 1964; Roberts et al., 1967; Vang, no date; Yang See, 1978).

Prior to the great disruption in their lifestyle brought on by the Vietnam War in the late 1950s, these people practiced a slash and burn type of agriculture which necessitated moving villages frequently in

search of more fertile land (Barney, 1967; Kandre, 1967; Roberts et al., 1967). The main crop was dry rice, though corn and other vegetables and fruits were grown, as well as opium as a cash crop (Barney, 1967; Kandre, 1967; Lebar et al., 1967; Roberts et al., 1967; Vang, no date; Yang See, 1978). Opium was legalized and encouraged under the French and Royal Laotian governments until 1971 (Garrett, 1974) and was cultivated by the women (Barney, 1967; Yang See, 1978). The opium cultivation contributed to a relatively prosperous life in comparison with other tribal minorities in Laos, and wealth was customarily measured in opium, silver, livestock and fine cloth upon which to embroider (Barney, 1967). Addiction to opium was acceptable only in the aged or dying and was used medicinally to treat pain and diarrhea (Barney, 1967; Garrett, 1974; Yang See, 1978). They also raised domestic animals such as chickens, pigs and horses; however, meat was usually only eaten in conjunction with a ritual or religious sacrifice (Barney, 1967; Lebar et al., 1964). Their diet consisted mainly of rice and vegetables often cooked in pork fat with virtually no dairy products (Barney, 1967; Garrett, 1974).

A typical Hmong village consisted of many households, usually of one or two clans. The household included the extended family within the senior male as leader, and the village was represented by the head of the clan who arbitrated in disputes and community decisions (Barney, 1967; Roberts et al., 1967). The Hmong were unique among tribal minorities in Laos because of their long-standing political representation by a prominent Hmong leader named Touby Lyfoung, who held

a position in the Royal Laotian Government (Barney, 1967; Roberts et al., 1967; Yang See, 1978). Several authors comment on the Hmongs' propensity for organization both politically and militarily, which is also evident in their cohesive unity with the crowded refugee camps (Barney, 1967; Lebar et al., 1964; Roberts et al., 1967; Vang, no date; Yang See, 1978). The Hmong developed a reputation as guerrilla fighters during the Japanese occupation of Laos in World War II, mobilized by the French. Due to their reputation and strategic location along the invasion route from North Vietnam, the Hmong and Mien continued to fight the "secret war" against the Communist-supported Pathet Lao with the aid and advice of the Americans (Vang, no date; Yang See, 1978).

The clan system is important in marriage, as customary law forbids marriage within a clan. Traditionally villages and clans intermingle at the lunar New Year festival and other festivals where free choice courtships begin a process of "trial marriage," setting a "bride price" and arrangements between clan leaders and family heads (Barney, 1967; Garrett, 1974). Both polygamy and divorce are permitted, and with the war resulting in many men dying, the practice of polygamy was increasing (Garrett, 1974; Yang See, 1978). Vang (no date), a Hmong himself, writes:

> By tradition the Hmong usually have big families, averaging between five and six people. In a world where people have not learned to trust police, banks, or insurance, the happiness, prosperity and security of the individuals are centered in the family. Thus, the larger the family, the better and more secure it is. (p. 3)

He describes the role of the wife as "devotion and respect for the husband" and maintains that family line succession is very important, and the birth of a son is very much desired. The bride leaves her father's house to live with her husband's family, but she keeps her clan name (Barney, 1967). Both Barney (1967) and Kandre (1967) state that there is very little intermarriage with other tribal groups among the Hmong and Mien people. Doutrich and Metje (1988), in their descriptive, ethnographic study of the Hmong and Yiu-Mien in Portland, Oregon, used an interview technique to validate perceptions of cultural values and beliefs that may influence prenatal care. Both the Hmong and Yiu-Mien describe an appropriate marriage age as 18-19 years and recognize "cultural marriage" as valid, that is, a marriage that occurs within a culture but often is not registered with the state.

The birth of an infant is a major event in the life cycle of the Hmong. Traditionally, the husband helps his wife during birth, cutting the cord and bathing the baby, and cares for her for a period afterward (Barney, 1967). Hmong women are noted to have easy and rapid labors and deliveries, often in the squatting position (La Du, 1982; Lebar et al., 1964). Lebar et al. (1964) mentions the taking of an herb to make labor easier, and La Du (1982) also reports the variable use of herbs in Laos but not in the United States in her interview study of the birthing practices of Hmong women. Shortly after a birth, the village shaman places fetishes on the infant's neck and limbs to guard against evil spirits and to encourage the soul to remain in the body (Barney, 1967; Garrett, 1974). Barney (1967), La Du (1982) and Doutrich and Metje

(1988) also state that some Hmong believe that the soul of a deceased family member may remain in the house and inhabit the body of the next newborn infant. This belief in reincarnation also relates to the Hmong belief that every woman has a certain number of babies to bear in each lifetime. Miscarriage and stillbirth may be attributed to past sins, and abortion is abhorrent to the Hmong, as the soul of a deceased relative may be in the baby (Doutrich & Metje, 1988). In Laos the placenta of a boy baby was buried before the entrance to the house, as he will eventually take the role of father and head of the house; the placenta of a girl baby was buried underneath the bed, symbolizing her eventual departure upon marriage (La Du, 1982). The infant is named at 33 days, and friends would bring gifts at that time (Lebar et al., 1964).

La Du (1982) interviewed 21 Hmong women in Portland, Oregon, regarding their traditional birth practices and preferences for giving birth in the United States. Most of the women had given birth in Laos as well as in the United States. A summary of their comments include: (a) use of the squatting position for delivery with little interference during labor, especially no artificial rupture of membranes or many people in the room; (b) husband as the main support person in labor or at least available; (c) postpartum diet of eggs, chicken, broth, rice, black pepper and only warm liquids; (d) ritual necklaces placed on the infant 3 days after birth or sooner if the baby had a nuchal cord; (e) combining bottle and breastfeeding or allowing another woman to nurse the infant until the mother's milk was in; (f) not allowing the

baby to cry for prolonged periods in the nursery; and (g) incineration of the placenta was preferable to taking it home, as there was no place to bury it at home. These preferences can be incorporated into hospital routine without difficulty.

Doutrich and Metje (1988) report that both Hmong and Yiu-Mien culture members state that bottle feeding is currently preferred over breastfeeding, especially in the younger mothers. One Hmong culture member described the use of a "green herb" to prevent pregnancy, but breastfeeding was also thought to help in 2-year birth spacing. Just as early marriage and fertility are valued in these cultures, education is becoming valuable, so the mother's needs in this area are considered when choosing a method of feeding.

There is virtually no written information regarding childrearing customs in these people. Barney (1967) states that the whole household is involved in childrearing and that "corporal punishment" is never used. Respect and obedience for elders is an expected and valued characteristic in the child (Barney, 1967; Kandre, 1967; Vang, no date). It is apparent from Barney's (1967) description of the Hmong lifestyle that the self-sufficient and peaceful functioning of the household and village was dependent on the cooperation of everyone, including children who often cared for younger siblings and helped in traditional role tasks. Barney (1967) and Kandre (1967) stress that open conflict in social relations is unusual, and a household may split to maintain good relations. Vang (no date) describes the Hmong people as "industrious, independent, and peaceful" and stresses the family's needs over the

individual. Doutrich and Metje (1988) report both Hmong and Yiu-Mien culture members noting "obedience" as a favorable quality in a child. Parents also expressed some anxiety over the "free" atmosphere in the United States. Kandre (1967) describes the common Mien practice of adoption from other ethnic groups or within their ethnic group as relating to social need. Doutrich and Metje (1988) report the Yiu-Mien adoption custom as still common today in the United States, and culture members described the "adopted" child as equal in all aspects of family life, including love.

The Hmong and Mien religion is animistic, the belief in numerous spirits, (called "tlan" by the Hmong and "mien" by the Mien), who influence aspects of daily life and behavior (Barney, 19767; Kandre, 1967; Lebar et al., 1964; Roberts et al., 1967; Yang See, 1978). The "tlan" are classified according to their function such as fertility, rice field, household, and may bring good or bad fortune including health and illness (Barney, 1967; Garrett, 1974). The traditional Hmong home had a special altar for honoring ancestors as well as a second door used in religious ceremonies (Barney, 1967; Yang See, 1978). Some Hmong believe that a person's spirit will live in the land of the tlan after death while others believe the spirit lives in the house (Barney, 1967). Illness may be attributed to the action of malevolent tlan, departure from the body of one or more souls, sorcerers or pathological causes (Barney, 1967). In his description of Hmong religious ceremonies, Lyman (1962) characterizes the newborn as having no souls and therefore especially vulnerable to illness and evil spirits. Religious ceremonies

are conducted by a shaman, the "txi neng," who may be male or female and is chosen by the spirits (Barney, 1967; Lyman, 1962). Vang (no date) comments that many of the Hmong refugees have converted to Christianity since arrival in the United States, but may still incorporate traditional beliefs.

In summary, there has been much cultural change for the Hmong and Mien refugees living in the United States. Vang (no date) and Yang See (1978) describe the many stresses the Southeast Asian refugee has faced, the nightmare of war and death, separation and loss of loved ones, mental and physical illness and adjusting to a very modern, unfamiliar world without knowing the language. The Hmong, like many Southeast Asian refugees, cope with the stress by relying on the extended family for support (Vang, no date). Both Vang (no date) and Yang See (1978) stress the need for education and employment as well as the importance for Americans to accept and understand their culture to help them in their new life.

Conceptual Framework

From the review of the literature it is apparent that newborns differ individually as well as culturally. In regard to the nature/nurture issue, while some researchers stress heredity over environment and vice versa, the reality of life is that the two are inseparable in any individual. Comparing differing ethnic groups of newborns may enlighten our understanding of the biology of behavior, but we must still see the infant as a whole in order to appreciate the significance of the behavior. Thus, while activity level appears to be

an inherited temperamental trait, an infant's activity at any point in time is also influenced by the environment. Similarly, the finding that Oriental infants may be calmer in mood and influence parental caretaking respectively, points to the significance of heredity as well as the environmental rhythmicity in parent-infant interactions. Temperament may be one way of conceptualizing the importance of the newborn's influence on the developing relationship. The Brazelton scale touches on the temperament issue but expands the meaning of early social behavior to include physiological, adaptive, environmental, and interactive variables.

The following conceptual framework is derived from the psychobiological model proposed by Lester and Brazelton (1982). They describe the infant as a "biological-psychological system that proceeds developmentally from less complex to increasingly higher and more differentiated levels of organization. Organization refers to the biological tendency to coordinate and integrate processes into systems or structures that are both biological and behavioral . . ." (p. 50). The system analogy stresses the dynamic quality of infant development so that infant behavior is best understood in the context of the caretaking environment. Although this study does not include a parent-infant interaction assessment, the NBAS encompasses interactive behavior measures thought to be meaningful to a parent. This holistic approach also emphasizes the need to assess infant behavior "serially," as development is not a "simple summation of previous systems and

structures" but a process that forms a "novel synthesis" at any point in time (p. 51).

Infant behavior is viewed as adaptive, reflecting both the "evolutionary, or phylogenetic, history of the species and the particular, or ontogenetic, history of the individual's development" (Lester & Brazelton, 1982, p. 52). Thus, the infant's social behavior is "designed to maximize the survival of the individual and of the species" (p. 52). While infants may universally develop through certain organizational processes such as increasing motor and social skills, the quality of their adaptive skills reflect the particular demands of the culture. Lester and Brazelton (1982) describe the "parent-infant dyad as a microcosm of the culture," with the infant shaping practices and expectations of the culture as well as being molded by environmental forces in a "dynamic feedback system" (p. 53). Cultural variations are in part due to infant behavioral differences. By looking at infant behavior as adaptive and exploring the cultural differences among infants and caretakers, our concept of "normality" is expanded. We can appreciate the wide range of human behavior and the particular needs of a certain culture.

The newborn's behavior is "phenotypic, the expression of genetic endowment in a particular environment" (Lester & Brazelton, 1982, p. 52). The intrauterine environment, conditions of labor and delivery, and possibly maternal psychological state are already affecting the infant at birth. The postnatal environment, including the specific methods of care, familial and physical settings, and larger cultural

expectations, continues to influence the newborn. But the infant also brings into the environment an inherent uniqueness that will affect the environment. The present study attempts to understand that uniqueness from a cultural perspective by comparing newborns from different ethnic groups in their social behavior. It is hoped that this study will aid our understanding of newborns as well as our knowledge of the Hmong and Mien cultural groups.

Perhaps especially important to the nursing profession is a perceptive understanding of child development. Nurses and nurse practitioners are often confronted with guiding and educating parents in their child's development in matters of health and illness. To be influential, nurses must first understand the concepts of individuality and parent-infant interaction. As nurses help people of different cultures, it is important to accept and try to understand differences in childrearing practices. Nurses working with newborns can be particularly helpful to parents as the attachment process begins.

Research Question

The exploratory question in this study is: How do Hmong and Mien newborn infants compare to American Caucasian newborns in their social behavior?

Operational Definitions

Cross-cultural differences in this study is defined as the behavioral differences observed among the Hmong and Mien newborns and a sample of American Caucasian newborns as measured with the Brazelton Neonatal Behavioral Assessment Scale (NBAS).

Social behavior is defined as the interactive behavior of the newborn as well as the temperamental qualities manifested during the examination with the Brazelton NBAS.

CHAPTER II

METHODS

This chapter will describe the setting, subjects, and research and design, including data collection and analysis, of the proposed study.

Setting

All data for the study were collected between November 1987 and February 1989. The settings for the study included the newborn nursery at Emanuel Hospital and at Oregon Health Sciences University (OHSU) and the infants' home environments. Emanuel Hospital is a 550-bed private health care facility located in the northern area of Portland, Oregon. The postpartum unit has 30 beds, and the number of deliveries averages approximately 220 per month, 20% of which are termed high risk. The Level III neonatal nursery is comprised of 34 beds. Nurses practice mother-baby care in the postpartum unit, one nurse caring for the mother and her infant. Husbands or other support persons are allowed to be with the mother during labor and delivery, and family, including siblings, and friends may visit in the postpartum unit. The average time of discharge is 24 to 72 hours. As most of the Hmong and Mien population originally settled in the north and northeast areas of Portland, Emanuel Hospital became a familiar hospital for births of this cultural group and its outpatient clinic for their maternal-child care. The outpatient clinic provides care by nurse practitioners, resident physicians and medical doctors and, until recently, employed a Hmong interpreter.

OHSU is a state-supported teaching hospital with 509 beds located in the southwest area of Portland. The postpartum unit has 32 beds; the number of deliveries averages approximately 225 per month, 25% of which are considered high risk. The Level III nursery has 51 beds. Mother-baby care as well as family participation is also practiced at this facility. The average time of discharge is similarly 24 to 72 hours. A major difference between the two postpartum settings is the lack of a newborn nursery at OHSU so that the newborns always "room-in" beside their mothers' beds. However, this difference is not significant since all the subjects recruited from Emanuel chose to have their infants room-in with them also. Another difference was that all the subjects from Emanuel had private rooms, while the subjects from OHSU shared a room with another mother and infant.

Originally, Emanuel Hospital was chosen as the setting for initial recruitment, but due to the infrequent number of Hmong and Mien women having babies, OHSU was added to increase subject availability. Eight of the Hmong and Mien mothers delivered at Emanuel Hospital, and 2 in this group delivered at OHSU. Caucasian mothers were matched to Hmong and Mien mothers by their place of delivery.

The home settings between the two groups were generally different. Because the Hmong and Mien group were relatively homogeneous in economic status, they lived in similar houses or apartments. There was more variety among the Caucasian sample in economic level and home setting. All the Hmong subjects lived in North Portland, and the 2 Mien subjects

lived in a large Southeast Portland apartment complex, Halsey Square. The Caucasian sample was spread out over the greater Portland area.

Sample

The sample included 8 Hmong and 2 Mien newborn infants and 10 American Caucasian newborns. Infants met the following criteria in order to be included in the study: (a) full-term gestation (37-42 weeks); (b) "normal" healthy infants by physical examination; (c) "normal" prenatal, perinatal and postnatal course, that is, mothers without systemic disease such as toxemia, no complications of labor and delivery, and no neonatal jaundice requiring phototherapy; (d) vaginal delivery with local or epidural medication and not more than 50 mg. of sedative medication prior to delivery; (e) Apgar scores of no less than 7 at 1 minute and 8 at 5 minutes after birth; (f) appropriate for gestational age in weight, height and head circumference measurements; and (g) maternal age between 15 and 40 years. In addition, subjects were matched according to sex of the infant, parity of the mother (multipara or primipara), place of delivery, and maternal age divided into the following four groups: 15-20 years, 21-26 years, 27-32 years, and 33-40 years. Descriptive data of the subjects included education level of parents, socioeconomic status, marital status, occupation, number and age of other children, and for the refugee group, the number of years in the United States was also included. Appendix A contains the descriptive data form used to collect this data. A decision not to match for SES was based on the fact that this group of Southeast Asian

refugees are not really comparable to a group of Americans, as there is a tremendous difference in lifestyle.

Design and Procedure

The research design in this study was ex post facto or correlational, because the independent variable, newborn's ethnicity, could not be manipulated. The purpose of the study was not to determine a cause and effect relationship among variables but to examine the relationship between ethnicity and early behavior. The dependent variable in this study was the behavior of the newborn infant with particular emphasis on interactive, psychosocial behaviors. The instrument used to measure this variable was the Brazelton Neonatal Behavior Assessment Scale (Brazelton, 1984) (see Appendix B). Permission to conduct the study was obtained from OHSU Human Subjects Research Committee in July 1987 and from the Institutional Review Board at Emanuel Hospital in September 1987 (see Appendix C).

Parents of newborn infants were asked to participate in the study by the investigator while in either Emanuel Hospital's or OHSU's postpartum unit. A Hmong or Mien interpreter accompanied the investigator if the parents in this group did not speak English. After describing the study to the parents, they were asked to sign an informed consent form written in English (see Appendix D). As stated in the literature review, many of the Hmong and Mien refugees are not literate in their own language; thus, the interpreter helped facilitate communication. Parents were assured of confidentiality and told they could discontinue participation in the study at any time. Caucasian

parents were told they were chosen for the study based on the necessary matching criteria with the Hmong and Mien group. None of the Hmong and Mien parents approached refused to participate in the study, while five of the Caucasian parents declined, usually stating "privacy" as a concern. The presence of the Hmong or Mien interpreter who was usually familiar with the family appeared to increase the parents' trust in the investigator. Six of the Hmong and Mien mothers did not speak or understand English, while 4 in this group spoke English very well. Three Caucasian infants were dropped from the study and replaced with others subjects, as only one Brazelton exam was performed on these three. One of these three could not be contacted for follow-up, and the other two infants were admitted to the hospital for possible sepsis.

The Brazelton Neonatal Behavior Assessment Scale (NBAS) was administered twice on each newborn, the first exam in the hospital setting when the infant was 1-3 days old and the second exam in the home setting at 10-15 days postpartum. A Hmong or Mien interpreter also accompanied the researcher in the home setting on three occasions and helped set up the other three home visits by phone. All parents were contacted by phone approximately 1 week after discharge from the hospital and again on the scheduled day of the exam to ensure a convenient time for the family. Interpreters were paid the usual rate for their services, though they stated they did not feel it was necessary to pay them.

Reliability training and certification to use the Brazelton NBAS in research was obtained at OHSU in June 1987 under the guidance of Sheryl

Boyd, RN, PhD, a qualified instructor. Scoring of the examination for each infant was done immediately after the scale was completed in each instance. The infants were examined in a quiet, warm, dimly lit room in the hospital, midway between feedings. Parents were offered the choice of watching the examination in both settings if they felt apprehensive, but were asked not to interrupt or ask questions until the exam was completed. The majority of Hmong and Mien parents did not watch the exam in the hospital setting, but in the home setting almost all watched with interest. The situation was almost the reverse with the Caucasian sample. Most of these parents chose to watch the exam in the hospital, often displaying very protective feelings, while they appeared much more relaxed and trusting in the home setting and often did not watch but were curious about the results. Duplicating the quiet, warm, dimly lit hospital setting in the home was attempted, but occasionally this was not possible.

Background information regarding descriptive and demographic information was gathered from the infants' and mothers' charts with parental permission as well as by direct questioning of the parent if the written information was not available. Confidentiality was assured participants by coding all data with an identification number so that only the informed consent and a separate card available only to the investigator indicated the parents' and infants' names.

Data Collection

The research instrument used in this study was the Brazelton Neonatal Behavioral Assessment Scale (NBAS), a tool used to measure

newborn interactive behavior (Brazelton, 1984) (see Appendix B). As the infant is manipulated by the examiner from sleep to alert to crying and then quiet states and presented with stimulation similar to a parent-infant interaction, the scale tries to capture the baby's social behavior and adaptive capacities as he makes the physiological adjustment to his new environment. Brazelton (1984) stresses that the examination is "intended as an assessment of the infant in an interactional process, not a simple assessment of the baby alone" (p. 3). Thus, the infant as well as the examiner become active participants in a dynamic situation.

The NBAS consists of 18 elicited responses or reflexes to measure neurological integrity, scored on a 3-point scale, and 28 behavioral items scored on a 9-point scale.

> Most of the scales are set so that the mid-point is the norm. The mean is related to the expected behavior of an "average" 7+ lb. (3175g), full-term (40 weeks gestation), normal Caucasian infant, whose mother has not had more than 100 mg. of barbiturates and 50 mg. of other sedative drugs prior to delivery, whose Apgar scores were no less than 7 at 1, 8 at 5, and 8 at 15 minutes after delivery, who needed no special care after delivery, and who had an apparently normal intra-uterine experience (i.e., normal hydration, nutrition, color and physiological responses). Since many infants are poorly coordinated for 48 hours after delivery, the behavior of the third day must be taken as the expected mean. (Brazelton, 1984, pp. 7-8)

Two important features of the examination include concepts of infant "state" of consciousness and "best" performance. Brazelton (1984) emphasizes that the pattern of the infant's state may be the "best predictor of the infant's receptivity and ability to respond to stimuli in a cognitive sense" (p. 8). Items in the scale are evaluated in terms of the infant's state, and the ability of the examiner to facilitate the infant through different states is a critical aspect of the exam. Related to this ability is the sensitivity of the examiner to elicit the newborn's best performance on an item. Scoring the best performance is an attempt to overcome many temporal and extraneous variables in this adjustment period.

A major difference between the Brazelton NBAS and other assessment tools lies in the scoring of the tool; it does not allow for a simple label or numerical quotient. Due to the large number of qualitative interdependent descriptors of behavior which are not all set at equal interval score ratings and the tool's emphasis on processes rather than simple responses to stimuli, statistical analysis has been problematic and varied among studies. Most of the earlier studies used item-by-item comparisons using _t_ tests and explained significant differences in mean performance without first stating which differences are anticipated. Brazelton (1978) points out difficulties with this approach that lie in the nature of the tool, as many items which are related are treated as independent in the analysis, and the large number of comparisons generated increases the probability that differences may be due to chance, especially as reliability training among examiners allows for a

1-point difference in scoring behavioral items. Many studies have used a form of factor analysis to reduce the number of scores in the scale and determine common underlying structures reflected in the items, such as orientation and arousal factors. Although the studies have varied in the number of factors identified and the clustering of items in factors, Sameroff (1978) summarizes the factors from various studies into six predominant factors: orientation, arousal, tonus, quieting, motor maturity and response decrement. However, as some of the items do not appear in any factor, important dimensions of behavior may be lost in the analysis (Als et al., 1979). Another approach has been to group items into meaningful summary scores or subscales, but the nonlinear nature of the scale does not lend itself to group comparable items (Als et al., 1979). The last type of analysis recommended by Brazelton is a typological a priori clustering of the scale items into seven specified dimensions which are conceptually inherent in the tool (Lester, Als & Brazelton, 1982) (see Table 1).

> This system combines the 28 behavioral items into six behavioral clusters and uses the 18 reflexes to generate a seventh cluster. To derive the six behavioral clusters, the curvilinear scale items are rescored as linear. The cluster score is the mean of the rescored items used to define the cluster, with higher scores indicating "better" performance. (Lester et al., 1982, p. 688)

The seven behavioral clusters are: "habituation, the ability to respond to and then inhibit responses to a stimulus during sleep; orientation, the quality of alert states and the ability to attend to

Table 1

Brazelton Neonatal Behavioral Assessment Scale Items And Recoding Arranged by Seven Clusters

Clusters	Recoding
Habituation	
Light	Raw score
Rattle	Raw score
Bell	Raw score
Pinprick	Raw score
Orientation	
Inanimate visual	Raw score
Inanimate auditory	Raw score
Inanimate visual and auditory	Raw score
Animate visual	Raw score
Animate auditory	Raw score
Animate visual and auditory	Raw score
Visual auditory	Raw score
Alertness	Raw score
Motor	
Tonus	9/1 = 1; 8/2 = 2; 7/3 = 3; 4 = 4; 5 = 5; 6 = 6
Maturity	Raw score
Pull to sit	Raw score
Defense	Raw score
Activity	9/1 = 1; 8/2 = 2; 7/3 = 3; 4/6 = 4; 5 = 5

Table 1 (Continued)

Clusters	Recoding
Range of state	
Peak of excitement	9/1 = 1; 8/2 = 2; 4/3 = 3; 7/5 = 4; 6 = 5
Rapidity of buildup	9/1 = 1; 8/2 = 2; 7/3 = 3; 4 = 4; 5 = 5; 6 = 6
Irritability	9/1 = 1; 8 = 2; 7 = 3; 6 = 4; 5 = 5; 2,3,4 = 6
Lability of state	1,7,8,9 = 1; 5,6 = 2; 4 = 3; 3 = 4; 2 = 5
Regulation of state	
Cuddliness	Raw score
Consolability	Raw score
Self-quieting	Raw score
Hand to mouth	Raw score
Autonomic stability	
Tremors	Invert: 9 = 1 (1 = 9); 8 = 2 (2 = 8); etc.
Startles	If 1, drop; otherwise invert 2-9 on 8-point scale
Skin color	9,1 = 1; 8 = 2; 7 = 3; 6 = 4; 5 = 5; 3,4 = 6; 2 = 7
Reflexes[a]	

Note. From "Regional Obstetric Anesthesia and Newborn Behavior: A Reanalysis Toward Synergistic Effects" by B.M. Lester, H. Als, and T.B. Brazelton, 1982, Child Development, 53, 687.

[a]Reflex score = total number of abnormal reflex scores.

visual and auditory stimuli when alert; motor performance, integrated motor acts and overall muscle tone; range of state, a measure of general arousal level or arousability of the infant; regulation of state, how the infant responds when aroused; autonomic, which records signs of stress related to homeostatic adjustments of the nervous system; and reflex, a simple count of the number of abnormal elicited responses" (Brazelton, 1984, pp. 88-89). The item pinprick in the habituation cluster was not included, as the investigator felt this would be distressing for parents to observe. This is a recent revision of the four original clusters of interactive, motoric processes, organization processes as related to state control, and organizational processes as related to physiologic responses to stress (Als, Tronick, Lester, & Brazelton, 1977). The advantages of this approach provide meaningful descriptors of an infant or groups of infants over time including all the data from the scale while simplifying the use of statistical measures (Als et al., 1979). Als (1978) describes the cluster analysis as an "attempt at synthesis of the components guided by the goal to preserve some of the system-based conceptualization of the organism . . ." (p. 18). The seven clusters can be scaled along 3 points: (a) superior, (b) average, and (c) worrisome. Judgments as to cut-off points and rules for establishing the relative importance of items within a cluster are based on the clinical experience of the researchers rather than a "normative" sample which facilitates a creative role in analyzing the data (Sameroff, 1978). However, Als (1978) has criticized the technique as "post hoc analysis" applicable to other forms of

analysis and cautions against summarizing the interactive behavioral dimensions into a total score which may be meaningless. In summary, the type of analysis will depend primarily on the research question and strategy.

The NBAS is a widely used tool in newborn assessment research, and is generally considered the best instrument available for evaluating the newborn's interactive behavior. Reliability and validity of the scale is discussed in the literature review.

Analysis

Analysis of variance was used as the parametric measure for comparing the two groups of newborns. The NBAS items were scored individually for each infant on the two exams and then the mean of the exam scores were obtained to reveal one set of scores. These scores were then recorded into appropriate cluster scores (see Table 1). The mean of the two groups' performance with the cluster scores was assessed with analysis of variance. This statistic includes a measure of time, allowing the investigator to look at how each group changed from one exam to the second exam as well as how both groups combined changed over time. Brazelton emphasizes that change over time is expected with the infant's increasing maturation, and looking at patterns and recovery curves may be as significant as overall performance.

In addition, individual items on the NBAS between the groups were compared using a *t* test. This was done to allow comparison with early Brazelton studies using this method and to exemplify how infants may be similar and different.

CHAPTER III

RESULTS AND DISCUSSION

The results of the data analysis and the interpretation will be presented in this chapter. The findings will be reported in the following manner: data describing the sample characteristics, data relating the results from the Brazelton NBAS, and additional data regarding variables relating to the NBAS. Comparisons with relevant studies using the NBAS will also be discussed. This chapter will conclude with limitations of this study.

Sample Characteristics

The sample consisted of two groups, 10 Caucasian infants and 8 Hmong and 2 Mien infants. All infants were between 1 and 15 days old, products of full-term, normal, vaginal deliveries with normal physical examinations. As the two groups were matched according to sex, 60% of the babies were male, 40% were female.

Eight of the Hmong and Mien newborns had Apgar scores of more than 7 at 1 minute, and 9 of the Caucasian group had Apgar scores of more than 7 at 1 minute. One Hmong infant was born at home and brought immediately to the hospital after the birth which was attended by the father of the baby, so no Apgar rating was available. However, the infant cried spontaneously and had good color according to the father who had attended other births, and was normal on physical examination. Another Hmong baby had a 1 minute Apgar score of 5 followed by a 5 minute Apgar score of 9 which the researcher felt reflected normal birth recovery. Because of the relative shortage of Hmong and Mien babies,

these two subjects were included. One Caucasian newborn had a 1 minute Apgar score of 6 and a 5 minute score of 8, which also reflects a normal birth recovery. All the Hmong and Mien infants, with the exception of the one home delivery, had 5 minute Apgar scores of 9. Two of the Caucasian group had 5 minute Apgar ratings of 8, the remainder being 9 or 10.

As presented in Table 2, there was no significant difference between the two groups in birth weight, age at first and second exam, or time of last feeding before each examination. One major difference between the two groups was the method of feeding. All the Hmong and Mien infants were bottle fed, while 80% of the Caucasian infants were initially breast fed, decreasing to 60% by the time of the second exam (see Table 3).

The mothers of the infants were 70% multiparas and 30% primiparas. However, the number of births in the Hmong and Mien group was much higher than the Caucasian group (see Table 4). As with the method of feeding, this reflects a cultural pattern or preference which is difficult to control when comparing samples of a population. Large families and many children are important to the Hmong and Mien people, while more than three children is generally considered large in a Caucasian family in the United States today. The Hmong and Mien have adopted bottle feeding as their preferred method, while breastfeeding is very much encouraged in American culture today. Doutrich and Metje (1988) identified birth spacing as one reason culture members reported breastfeeding was discontinued. They reported that breastfeeding was

Table 2

Range, Mean, Standard Deviation and T-Test Values on Variables Comparing Hmong/Mien and Caucasian Infants

	Hmong/Mien (n = 10)	Caucasian (n = 10)	t	p
Birth weight (in grams)				
Range	3065 - 3856	3062 - 4068	1.94	0.068
M	3362	3635		
SD	264.6	357.9		
Age at first exam (in hours)				
Range	13 - 72	13 - 52	0.40	0.69
M	29.6	32.3		
SD	16.61	13.45		
Age at second exam (in days)				
Range	10 - 15	10 - 15	-1.0	0.33
M	13.4	12.7		
SD	1.71	1.41		
Last feeding before first exam (in minutes)				
Range			1.0	0.32
M	105	133.5		
SD	60.8	66.1		
Last feeding before second exam (in minutes)				
Range			0.90	0.37
M	85.5	68.0		
SD	51.0	34.2		

Table 3

Comparison of Mother's Feeding Method at Exam 1 and Exam 2 by Ethnic Groups

	Exam 1		Exam 2	
Ethnic group	Breast	Bottle	Breast	Bottle
Hmong/Mien	0	10	0	10
Caucasian	8	2	6	4

a form of birth control in Laos, and birth spacing for the Hmong was generally 24-36 months. One culture member reported that today many of the Hmong and Mien women want to have their children quickly in order to continue their own education or employment.

All the Caucasian mothers were married, while 50% of the Hmong and Mien mothers were married. It was difficult to assess whether some of these women were "culturally" married, as they seemed reluctant to relate the father's age, education or occupation. However, all the Hmong and Mien mothers did state that the father of the baby was also Hmong or Mien, respectively. Because the demographic data regarding the father was not critical to the study and much of the data was missing in the Hmong and Mien group, analysis of the fathers' age, education, and occupation was excluded.

Occupation for the largest percentage of mothers in the two groups was listed as housewife, including 7 of the Hmong and Mien group and 6 of the Caucasian group. Other occupations included student (3 Hmong),

While there was no significant difference between the groups of mothers in age or length of labor, Table 5 illustrates that there were large differences in level of income and education. Again, these cultural differences were expected and difficult to eliminate. The differences between the groups in income was also reflected in the home settings. The Hmong and Mien homes were generally sparsely furnished but clean and functional with brightly colored decorations on the walls. In comparison, the Caucasian groups' homes ranged from modest apartments to large, expensive houses. Perhaps because the Hmong and Mien infants did not have a crib or bassinet, during the home visits the infants were usually in close proximity to their mother, often lying quietly asleep or alert on the couch, bundled tightly with blankets usually with a hat on their head. In contrast, during the home visits with the Caucasian group, the babies were rarely in the main room of the house, but usually in their own room or the parent's bedroom in a crib or bassinet. The Caucasian babies were not swaddled but covered loosely with a blanket. Another difference was the characteristic sleeping position the infants were placed in: always on their back in the Hmong and Mien group and on their stomach or side by the Caucasian mothers. If siblings were present during the Hmong and Mien home visits, they would quietly watch the examination with interest. Generally, siblings were either not present or were in another room during the visits with the Caucasian group. The differences in home setting are partly due to income differences but appear largely the result of cultural differences in child-rearing practices.

Table 5

Range, Mean, Standard Deviation and t-Test Values on Variables Comparing Hmong/Mien and Caucasian Mothers

	Hmong/Mien (n = 10)	Caucasian (n = 10)	t	p
Age (in years)				
Range	15 - 41	17 - 36	0.25	0.80
M	24.8	25.8		
SD	9.89	7.51		
Education (last grade)				
Range	0 - 12	9 - 16	3.44	0.005*
M	6.7	12.8		
SD	5.27	1.93		
Annual income[a]				
Range	<5,000 - 10,000	<5,000 - <20,000	5.33	0.0002*
M	1.5	4.1		
SD	0.52	1.44		
Length of labor (in hours)				
Range	2 - 18	3 - 24	-0.11	0.91
M	8.4	8.1		
SD	6.04	6.24		

[a]Income scale: 1 = Less than 5,000; 2 = $5,001 - 10,000; 3 = $10,001 - 15,000; 4 = $15,001 - 20,000; 5= More than $20,000.

*$p < 0.05$.

As Table 6 depicts, the two groups of mothers were significantly different in use of medication during labor. Only one of the Hmong and Mien mothers used any medication, a local, while 60% of the Caucasian mothers had epidurals, 30% had local or pudendal and 10% had no medication. No barbiturates or sedative medication was used. Marcane, 1/8 - 1/4%, was the only drug used for epidural injection. One of the mothers with an epidural had pitocin augmentation. The 1 Caucasian mother who received no medication had a short labor, lasting only 3 hours. Traditionally, Hmong and Mien women did not use any medication during labor and have been reported to have short labors. In their study of prenatal care for the Hmong and Mien, Doutrich and Metje (1988) also report how many of the women distrust Western medical practices used in labor and prefer little interference. In contrast, it was unusual to find a Caucasian mother who did not use medication. Because there was no difference between the groups in length of labor, the difference in medication use also portrays a cultural difference in childbirth practices.

In summary, while the two groups of infants did not differ in variables such as sex, birth weight, age at exams and time of last

Table 6

Comparison of Mother's Use of Medication During Labor by Ethnic Groups

Ethnic group	None	Local	Epidural
Hmong/Mien	9	1	0
Caucasian	1	3	6

feeding before exams, they were almost dichotomous in their type of feeding. The two groups of mothers were similar in age, length of labor, parity and marital status but remarkably different in their use of medication during labor as well as income level and education. These differences seem to reflect the larger cultural differences between the two groups which may not only be difficult to control but is important in understanding the cultural distinctions of these groups.

Brazelton NBAS Group Comparisons

The Brazelton NBAS was used to compare the two different ethnic groups of newborns with particular interest in items reflecting social behavior. Group comparisons will be presented first, followed by a discussion of other variables influencing the Brazelton exam results.

An analysis of variance was used to compare the two groups of newborns' performance on the Brazelton exam. The two exams on each infant were averaged to reveal one set of scores. Individual item scores were recoded into cluster scores, then the cluster scores for each group were averaged to reveal one set of cluster scores for total group comparison. As Table 7 reveals, there was no significant difference between the two ethnic groups on any of the Brazelton clusters, though the motor cluster approaches significance. Caucasian infants scored higher on the motor cluster than the Hmong and Mien infants on each exam. Brazelton cautions against interpreting mean differences which are less than 1 point even with the cluster system. The collective portrait that the average scores on Table 7 describe is that of an infant who can habituate to a light or rattle readily in a

Table 7

Comparison of Mean, Standard Deviation and p Values Between Ethnic Groups on Brazelton Cluster Scores Using Analysis of Variance

Cluster	Hmong/Mien	Caucasian	F	p
		Habituation		
Exams 1 & 2			0.35[a]	0.56
n	14	12		
M	6.8	7.3		
SD	1.5	1.8		
Exam 1				
n	7	6		
M	6.1	6.8		
SD	1.7	2.4		
Exam 2			0.19[b]	0.66
n	7	6		
M	7.6	7.8		
SD	0.8	0.8		
		Orientation		
Exams 1 & 2			2.16[a]	0.15
n	20	20		
M	6.1	5.4		
SD	1.3	1.6		
Exam 1				
n	10	10		
M	6.0	4.9		
SD	1.1	1.5		
Exam 2			0.76[b]	0.39
n	10	10		
M	6.2	5.8		
SD	1.5	1.6		

Table 7 (Continued)

Cluster	Hmong/Mien	Caucasian	F	p
		Motor		
Exams 1 & 2			3.85[a]	0.06
n	20	20		
M	4.8	5.4		
SD	0.9	0.7		
Exam 1				
n	10	10		
M	4.4	5.2		
SD	0.7	0.6		
Exam 2			0.92[b]	0.34
n	10	10		
M	5.2	5.6		
SD	1.0	0.7		
		Range		
Exams 1 & 2			0.90[a]	0.35
n	20	20		
M	4.0	3.8		
SD	0.4	0.7		
Exam 1				
n	10	10		
M	3.9	3.6		
SD	0.3	0.9		
Exam 2			0.27[b]	0.60
n	10	10		
M	4.1	4.0		
SD	0.5	0.4		

Table 7 (Continued)

Cluster	Hmong/Mien	Caucasian	F	p
		Regulation		
Exams 1 & 2			0.42[a]	0.52
n	20	20		
M	4.7	4.5		
SD	1.0	0.7		
Exam 1				
n	10	10		
M	5.0	4.9		
SD	1.1	0.6		
Exam 2			0.64[b]	0.43
n	10	10		
M	4.5	4.1		
SD	0.8	0.6		
		Autonomic		
Exams 1 & 2			0.48[a]	0.49
n	20	20		
M	7.0	6.8		
SD	0.8	0.6		
Exam 1				
n	10	10		
M	6.8	6.5		
SD	0.8	0.4		
Exam 2			0.79[b]	0.38
n	10	10		
M	7.2	7.2		
SD	0.7	0.5		

[a]Combined exams. [b]Change over time.

Table 8

Comparison of Mean, Standard Deviation and p Values Between Brazelton Exam 1 and Exam 2 Cluster Scores for Both Groups Combined Using Analysis of Variance

Cluster	Exam 1	Exam 2	F	p
Habituation			5.76	0.03*
n	13	13		
M	6.4	7.7		
SD	2.0	0.8		
Orientation			1.90	0.18
n	20	20		
M	5.4	6.0		
SD	1.4	1.5		
Motor			16.28	0.0008*
n	20	20		
M	4.8	5.4		
SD	0.7	0.9		
Range			2.50	0.13
n	20	20		
M	3.8	4.0		
SD	0.7	0.5		
Regulation			9.70	0.006*
n	20	20		
M	4.9	4.3		
SD	0.8	0.7		
Autonomic			8.00	0.01*
n	20	20		
M	6.6	7.2		
SD	0.6	0.6		

*$p < 0.05$.

behavior in order to meet basic needs of nourishment and love. Two weeks after birth also seems to be a time when parents report problems in consolability, often relating to sleep and digestion. Range of state and the orientation clusters did not show any significant differences, though both groups did show higher scores on the second examination.

Although there were no significant differences between the groups, to describe the groups as completely similar in performance would not be fair, as subtle differences are still apparent which may be meaningful in understanding the cultural and environmental influences on the newborn. In addition, limitations of the study must be taken into account. The stated purpose of the study was not to generate conclusions about the two ethnic groups but to explore cultural and environmental influences on newborn behavior. Looking at each cluster separately, including specific items within each cluster, will help to illustrate how the two groups are alike or different. Items contained within each cluster were analyzed between the groups with a _t_ test. Since older Brazelton studies also used this type of analysis, this analysis was also helpful in comparing results with those studies.

The motor cluster distinguished the ethnic groups best. As depicted in Table 9, muscle tone, motor maturity, defensive movement, and activity were all significant contributors to the group difference. Pull to sit was not significantly different though the Caucasian babies scored higher in this item, too. The Southeast Asian infants scored lower on muscle tone, defensive movement, and activity on the first exam, but remained significantly lower only in maturity and activity

Table 9

Comparison of Ethnic Groups on Individual Brazelton Items in the Motor Cluster Using a t Test on Each Exam

Cluster items	Exam 1				Exam 2			
	Hmong/Mien (n = 10)	Caucasian (n = 10)	t	p	Hmong/Mien (n = 10)	Caucasian (n = 10)	t	p
Tone			2.09	0.05*			0.88	0.39
M	5.0	5.7			5.3	5.6		
SD	0.6	0.8			0.8	0.6		
Maturity			-0.33	0.75			2.62	0.01*
M	4.9	4.8			5.5	6.8		
SD	0.8	0.4			0.9	1.2		
Pull to sit			1.55	0.13			1.23	0.23
M	3.8	5.4			5.0	6.2		
SD	1.8	2.6			2.1	2.2		
Defensive movement			2.40	0.03*			-0.78	0.44
M	4.7	6.6			6.7	5.9		
SD	2.2	1.1			2.2	2.3		
Activity			3.02	0.007*			2.39	0.02*
M	4.1	5.5			4.3	5.5		
SD	1.1	0.8			1.2	0.9		

*$p < 0.05$.

on the second exam. Activity level showed the greatest difference and was also the only consistent difference. Activity was one of the differences that originally impressed the investigator when caring for infants of this cultural group. Activity is also described in the literature review as one aspect of temperament that appears relatively stable over time and was found to distinguish other samples of Oriental and Caucasian infants. The Hmong and Mien practice of swaddling the infant may also contribute to decreasing activity. Both groups improved in motor maturity as expected, but the Caucasian group showed the biggest improvement which accounts for the significant difference on the second exam. The quality of motor movements, whether jerky or smooth, and the control displayed in arc movement is measured by this item. The Caucasian infants may have performed better in this item on the first exam without the influence of obstetrical medication. As cited in the literature review, Murray et al. (1981), found poorer motor cluster scores with the use of epidural medication versus no medication. Although the Southeast Asian group in this study scored lower than the Caucasian group, the confounding medication variable may have dampened the differences in motor behavior between these two groups. The Caucasian infants also had better muscle tone on the first exam, which may represent inherent differences or the effects of different birth histories or both. An interesting difference in the first exam is the defensive movement item. Freedman and Freeman (1969) found Chinese-American infants to lie quietly without struggling to remove a cloth placed over their face, while the Caucasian newborns tried to

remove the cloth by turning their face and swiping with their hands. Each group's mean item score in this study translates into the above description. Freedman (1974) interprets this as an aspect of a quiet, "impassive" temperament, but it also corresponds to motor maturity and activity. By the second exam, the Hmong and Mien infants were struggling to remove the cloth just as the Caucasian infants were less active with hand swiping. Freedman used an early version of the Brazelton scale on 2- to 4-day-old infants and only administered one examination in the study of Chinese-American babies. Statistical data from his expanded Oriental sample was not available, but he does report similar results. It is also notable that Freedman did not find any difference in the pull to sit item which he thought supported equal motor development in the Oriental and Caucasian groups. This item seems more reflective of muscle tone, just as defensive movement relates to activity and motor maturity. Pull to sit was also the item parents appeared most anxious about when watching the exam.

In summary, motor behavior was the most distinguishing factor between the two groups. This supports the findings reported in the literature review that newborns of different ethnic groups seem most likely to differ in this area. Motor behavior was also found to be relatively stable over time as compared to other behavior on the Brazelton exam, which may attest to a genetic predisposition in quality of motor development.

The orientation cluster measures the baby's alertness and ability to respond to visual and auditory stimuli such as the examiners' voice

and face, a red ball and a rattle. It also seems to measure tactile sensitivity, as the research found it easiest to elicit the "best" response when the infant was bundled or held. Although there was no statistical difference between the groups, the Hmong and Mien infants showed higher mean scores in every item on the first exam and half of the items on the second exam (see Table 10). The only significant item differences were inanimate and animate auditory items on the first exam. It is interesting that the Southeast Asian infants also scored higher on auditory habituation while the Caucasian infants scored higher on habituating to a light (see Table 11), although these differences were not significant. The almost preferential difference in auditory and visual sensitivity seemed apparent at times in the infants' use of auditory and visual stimuli for self-quieting. Parents often expressed interest and amazement at how well their infant could see and hear as the Brazelton exam demonstrates. Most infants did best with auditory and visual stimuli combined. The Caucasian group showed the biggest increase in scores for the first exam to the second, while the Hmong and Mien babies showed minimal improvement, which may suggest a medication influence in the Caucasian group.

The range of state cluster assesses the arousal level, irritability, and lability of states. There was no significant difference in cluster scores, and both groups scored relatively the same. The only statistical difference in item comparison is the peak of excitement score on the first exam (see Table 12). Caucasian newborns cried more readily and needed more consoling once upset than the Hmong

Table 10

Comparison of Ethnic Groups on Individual Brazelton Items in the Orientation Cluster Using a t Test on Each Exam

Cluster items	Exam 1				Exam 2			
	Hmong/Mien (n = 10)	Caucasian (n = 10)	t	p	Hmong/Mien (n = 10)	Caucasian (n = 10)	t	p
Inanimate visual			-1.64	0.11			0.00	1.00
M	5.4	3.9			5.3	5.3		
SD	1.5	2.4			2.4	2.0		
Inanimate auditory			-2.47	0.02*			-0.10	0.92
M	7.3	5.6			6.9	6.8		
SD	1.2	1.7			2.3	2.3		
Inanimate visual and auditory			-0.50	0.62			0.00	1.00
M	6.5	6.2			7.1	7.1		
SD	0.9	1.6			1.3	1.3		
Animate visual			-1.40	-0.17			-1.22	0.23
M	4.8	3.7			5.4	4.6		
SD	1.6	1.8			1.3	1.5		

*$p < 0.05$.

Table 10 (Continued)

Cluster items	Exam 1				Exam 2			
	Hmong/Mien (n = 10)	Caucasian (n = 10)	t	p	Hmong/Mien (n = 10)	Caucasian (n = 10)	t	p
Animate auditory			-2.41	0.02*			-0.86	0.40
M	7.0	5.6			6.7	6.0		
SD	1.2	1.3			1.9	1.9		
Animate visual and auditory			-1.50	0.15			-0.81	0.42
M	6.1	5.2			6.5	5.9		
SD	0.9	1.6			1.5	1.7		
Alertness			-1.17	0.25			-0.41	0.68
M	5.2	4.3			5.9	5.5		
SD	1.6	1.8			1.9	2.4		

*p < 0.05.

Table 11

Comparison of Ethnic Groups on Individual Brazelton Items in the Habituation Cluster Using a t Test on Each Exam

Cluster items	Exam 1				Exam 2			
	Hmong/Mien	Caucasian	t	p	Hmong/Mien	Caucasian	t	p
Light			1.62	0.13			1.62	0.13
n	8	7			7	7		
M	5.1	6.7			7.0	8.0		
SD	1.4	2.3			1.1	1.1		
Rattle			-1.18	0.27			-1.18	0.27
n	5	7			5	5		
M	8.0	6.8			8.6	8.0		
SD	0.7	2.1			0.5	1.0		
Bell			-0.44	0.67			-0.44	0.67
n	5	4			4	3		
M	8.2	8.5			8.2	8.0		
SD	0.8	1.0			0.5	1.0		

Table 12

Comparison of Ethnic Groups on Individual Brazelton Items in the Range Cluster Using a t Test on Each Exam

Cluster items	Exam 1				Exam 2			
	Hmong/Mien (n = 10)	Caucasian (n = 10)	t	p	Hmong/Mien (n = 10)	Caucasian (n = 10)	t	p
Peak excitement			2.11	0.04*			1.30	0.21
M	5.6	6.7			5.3	6.0		
SD	1.2	1.0			1.0	1.3		
Rapidity of buildup			1.30	0.21			0.11	0.91
M	4.0	5.1			4.0	4.1		
SD	1.6	2.1			1.8	2.2		
Irritability			0.66	0.51			-0.79	0.43
M	5.3	5.8			4.8	4.3		
SD	1.5	1.8			1.4	1.3		
Lability			0.67	0.51			1.27	0.21
M	3.5	3.8			2.8	3.4		
SD	1.0	0.9			0.7	1.2		

*$p < 0.05$.

and Mien infants. Freedman (1974) also reports this observation in his study. Some of the "nursery" nurses at Emanuel Hospital felt the opposite was true, describing Southeast Asian babies as crying intensely and difficult to console. The lability of state item appears to be the item most subject to error.

Regulation of state measures the baby's ability to respond to the environment and control the quality of the response with self-quieting ability. There was no significant difference between the groups on cluster scores or item scores (see Table 13). Both groups of infants tended to be less consolable with a decrease in self-quieting and hand-to-mouth ability over time. The Hmong and Mien infants did score higher in consolability, especially at the first exam. Cuddliness was equal in both groups and over time. This item appears consistent as a basic individual quality but is difficult to measure at one point in time. Parents are the best judge with repeated contact and often describe their infant in terms of being cuddly or not cuddly. During the examination, the type of self-quieting activity the infant displays is recorded. Infants in both groups demonstrated the following behaviors in decreasing order of frequency: attending to visual and auditory stimuli; hand-to-mouth activity; postural changes; state changes for no observable reason; and sucking.

The autonomic cluster assesses the infant's response to stress such as handling and undressing. There were no significant differences in cluster scores, and the only difference in item comparisons was in the amount of startles in the second exam (see Table 14). Although this

Table 13

Comparison of Ethnic Groups on Individual Brazelton Items in the Regulation Cluster Using a t Test on Each Exam

	Exam 1				Exam 2			
Cluster items	Hmong/Mien	Caucasian	*t*	*p*	Hmong/Mien	Caucasian	*t*	*p*
Cuddliness			-0.40	0.69			0.00	1.00
n	10	10			10	10		
M	5.3	5.1			5.0	5.0		
SD	1.0	1.1			1.1	1.2		
Consolability			-1.65	0.11			-0.62	0.54
n	10	10			8	9		
M	6.2	5.3			5.1	4.6		
SD	1.1	1.2			1.7	1.3		
Self-quieting			0.54	0.59			-1.05	0.30
n	10	10			10	10		
M	4.4	4.8			4.2	3.4		
SD	1.5	1.8			2.0	1.2		
Hand to mouth			0.42	0.67			-0.18	0.86
n	10	10			10	10		
M	4.2	4.6			3.9	3.7		
SD	2.1	2.0			2.4	2.5		

Table 14

Comparison of Ethnic Groups on Individual Brazelton Items in tge Autonomic Cluster Using a t Test on Each Exam

Cluster items	Exam 1				Exam 2			
	Hmong/Mien n = 10	Caucasian n = 10	t	p	Hmong/Mien n = 10	Caucasian n = 10	t	p
Tremors			0.00	1.00			-0.48	0.63
M	2.7	2.7			2.1	1.7		
SD	2.3	1.7			2.0	1.6		
Startles			1.66	0.11			2.45	0.02*
M	2.3	3.0			2.0	2.4		
SD	0.4	1.2			0.0	0.5		
Skin color			1.00	0.33			-0.60	0.55
M	5.5	5.8			5.2	5.1		
SD	0.7	0.6			0.4	0.3		

*$p < 0.05$.

finding may relate to the increased activity level of the Caucasian babies, this may be a chance occurrence.

None of the infants had more than three abnormal reflexes. Table 15 compares the elicited responses found to be abnormal in the two groups. Freedman (1974) found crawling to be abnormal in the Chinese-American infants in his study and discussed differences in nasal bone structure and temperament as reasons for this finding. All but 2 of the Hmong and Mien infants in this study could easily turn their head and push with their feet when placed in the prone position. The Caucasian group showed very strong rooting responses, which probably relates to the breastfeeding in this group. Although sometimes hard to elicit, automatic walk is a reflex that delighted parents. Clonus,

Table 15

Comparison of Abnormal Elicited Responses in Ethnic Groups on the Brazelton NBAS

	Number of infants	
Elicited response	Hmong/Mien	Caucasian
Automatic walk	4	3
Crawling	2	1
Incurvation	1	2
Rooting	2	4
Glabella	0	1
Hand grasp	1	0

nystagmus and tonic neck reflex were frequently diminished, receiving a score of 1, but this is considered normal for these three reflexes.

One item that is not included in the clusters is the smile item. Two of the infants in this study, 1 Hmong and 1 Caucasian, both boys, did smile twice during the second exam. Both mothers reported seeing the baby smile at other times. There was no mistaking either smile for a grimace; it was a contented, brief but beautiful smile. The feeling of warmth that a baby's simple smile engenders is a powerful bonding mechanism.

In summary, the two ethnic groups were not significantly different on the Brazelton exam. This may support the idea that differences in social behavior, temperament, and motor development are influenced more by environmental factors than genetic components. However, subtle differences predominantly in motor behavior with a few references to temperament are also apparent. The question whether there are inherent behavioral differences between these two groups of infants which may influence parent-infant interaction does not seem to be answered conclusively by this study. This study does demonstrate the capabilities and qualities of newborn behavior as well as unique individual differences apparent from birth. Though no measure of parent-infant interaction was used, observations made by the investigator during the study support the notion that "styles of interaction" can be seen which reflect cultural differences between the groups.

Table 16

Range, Mean, Standard Deviation and t-Test Values on Initial and Predominant States of Infants on Brazelton Exams

State variables	Hmong/Mien (n = 10)	Caucasian (n = 10)	t	p
Initial state				
First exam			-0.30	0.76
Range	1 - 4	1 - 3		
M	2.3	2.2		
SD	0.82	0.63		
Second exam			0.18	0.86
Range	1 - 4	1 - 5		
M	2.5	2.6		
SD	0.97	1.50		
Predominant state				
First exam #1			1.20	0.24
Range	3 - 6	3 - 6		
M	4.2	4.7		
SD	0.78	1.05		
First exam #2			-1.29	0.21
Range	2 - 6	2 - 5		
M	4.3	3.5		
SD	1.56	1.17		
Second exam #1			1.0	0.33
Range	3 - 6	4 - 6		
M	4.0	4.4		
SD	0.81	0.96		
Second exam #2			0.94	0.35
Range	2 - 6	2 - 6		
M	4.4	3.9		
SD	1.26	1.10		

Note. Infant states: 1 = deep sleep; 2 = light sleep; 3 = drowsy; 4 = alert; 5 = active; 6 = crying.

Table 17

Significant Correlations of Initial and Predominant States on Both Brazelton Exams With Cluster Scores for Both Groups Using Pearson Correlation Coefficient

State variables	Cluster	Subgroups
Initial state exam 1	Habituation n = 15 r = -0.73 p = 0.001*	Hmong/Mien n = 8 r = -0.90 p = 0.002*
		Caucasian n = 7 r = -0.63 p = 0.125
	Autonomic n = 20 r = -0.50 p = 0.02*	
First predominant state exam 1	Motor n = 20 r = 0.60 p = 0.005*	
	Range n = 20 r = -0.57 p = 0.008*	
First predominant state exam 2	Range n = 20 r = -0.45 p = 0.04*	

*$p < 0.05$.

smoothly when the infant is initially asleep rather than awake. In reviewing the individual exams and descriptive paragraphs, the researcher found this to be true. When looking at the correlation between initial state and habituation on the first exam by ethnic groups, only the Hmong and Mien continued to show a significant correlation. The reason for this is unclear, since the groups did not differ in initial state. Perhaps it relates to feeding method or medication, since these were two distinguishing variables between the groups in the first exam.

The first predominant state on the first exam correlated positively with the motor cluster and negatively with the range of state cluster for both groups. The higher the infants' predominant state (alert, active, crying), the better the performance on motor items and the worse the performance on state items. Alert, active babies have increased muscle tone and activity and can be more irritable, excitable and labile in state than a sleepy or drowsy baby. The same correlation between predominant state and range of state cluster was demonstrated in the second exam. Subdividing into groups, on the second exam only the Hmong and Mien group continued to show a correlation. Lester and Brazelton (1982) describe "individual" differences in a culture as being important patterns to understand that are sometimes lost when simply comparing differences in mean performance between groups.

Other relationships which were analyzed with the Pearson correlation coefficient are depicted in Table 18. Some interesting relationships emerge which seem to relate to newborn characteristics and

Table 18

Significant Correlations Between Variables and Cluster Scores for Both Groups Using Pearson Correlation Coefficient

Variable	Cluster	Subgroups
Infant sex Male (n = 12) Female (n = 8)	Orientation Exam 2 r = -0.46 p = 0.03*	
Parity Primipara (n = 6) Multipara (n = 14)	Motor Exam 2 r = 0.44 p = 0.04*	
Infant age at first exam (n = 20)	Regulation Exam 1 r = -0.65 p = 0.001*	Hmong/Mien r = -0.79 p = 0.005* Caucasian r = -0.37 p = 0.28

*$p < 0.05$

parent-infant interaction. The infant's age at the first exam correlated negatively with the regulation of state cluster, which includes the items cuddliness, consolability, self-quieting and hand-to-mouth activity. During the "sensitive" period of bonding in the first 24 hours, the infant is often in a quiet, alert state for a period of time. Thus, the younger infants scored higher on these regulation of state items. Parent-infant interaction could be enhanced at this time, and often parents remarked at how surprised they were to find how alert and quiet their infant was shortly after birth. When this correlation

was looked at by subgroups, only the Hmong and Mien continued to show the relationship. Although epidural and local medication has been shown to have a lesser depressant effect after birth than sedative medication, this difference in ethnic group may pertain to subtle differences in how medication can affect the first hours and days after birth.

Infant sex showed a mild negative correlation with the orientation cluster on the second exam. Since boys were assigned a score of 1 and girls a score of 2, this means boys scored higher on orientation to animate and inanimate stimuli on the second exam. This may be a sexual difference or a cultural difference in mothers' attention to boys versus girls. However, it is a weak correlation, and the groups were not evenly distributed.

Parity correlated positively with motor performance on the second exam, meaning babies from multiparous mothers scored higher on motor items. Perhaps babies with older siblings receive more physical stimulation from a more experienced mother as well as contact with other children. This was also a weak correlation, and the multiparas outnumbered the primiparas by 40%.

Length of labor, mother's age, infant age at the second exam, last feeding before each exam, and initial state on the second exam showed no correlations with the Brazelton cluster scores. While the examiner was administering the examinations, time of last feeding seemed to influence how well the exam proceeded, especially at the second exam and with the breast-fed infants. Babies who had not nursed for more than 2 hours before the exam were easily distracted, harder to console and less able

to attend to the orienting items. This information was obtained from the descriptive paragraphs written by the examiner after each exam.

Intervening Variables

Two noncontrolled variables in this study are method of feeding and obstetrical medication. Both of these variables were compared to the cluster scores using an analysis of variance to assess their relative influence.

As Table 19 depicts, feeding method was only significantly related to the motor cluster, with the breast-fed infant scoring higher than the bottle-fed infant. This probably reflects the group difference in motor performance, as all the breast-fed infants were Caucasian; however, the effect of breastfeeding versus bottle feeding on motor performance cannot be understood by this analysis.

Table 20 presents the comparison of medication use with cluster scores. There was no significant effect on any of the clusters, but the group performance over time in the orientation cluster approaches significance. The nonmedicated group showed minimal improvement over time, the local medication group showed the largest improvement, and the epidural group showed a slight decrease over time. The epidural group also had the lowest mean scores. The low scores in the local group on the first exam may be explained by looking at the birth histories. Two of the infants had short labors between 5 to 7 hours, one of which developed a cephalohematoma by the second exam indicating a stressful labor. The other baby in this group had an 18-hour labor with some meconium staining, also indicating a stressful labor. Each of these

Table 19

Comparison of Feeding Method With Brazelton Cluster Scores Using Analysis of Variance

	Breast		Bottle			
	Exam #1	Exam #2	Exam #1	Exam #2	Combined exams	Change over time
				Habituation		
n		4		22		
M	5.1	8.0	6.6	7.6		
SD	4.4	0.9	1.6	0.8		
F					0.37	1.74
p					0.55	0.21
				Orientation		
n		12		28		
M	5.0	5.8	5.6	6.1		
SD	1.1	1.7	1.5	1.5		
F					0.82	0.14
p					0.37	0.71

Table 19 (Continued)

	Breast		Bottle			
	Exam #1	Exam #2	Exam #1	Exam #2	Combined exams	Change over time
				Motor		
n		12		28		
M	5.4	5.9	4.5	5.2		
SD	0.6	0.6	0.7	0.9		
F					5.60	0.06
p					0.02*	0.79
				Range		
n		12		28		
M	3.6	4.0	3.8	4.0		
SD	0.8	0.6	0.6	0.4		
F					0.19	0.19
p					0.66	0.66

*$p < 0.05$.

Table 19 (Continued)

	Breast		Bottle			
	Exam #1	Exam #2	Exam #1	Exam #2	Combined exams	Change over time
				Regulation		
n		12		28		
M	5.0	4.3	4.9	4.3		
SD	0.5	0.5	1.0	0.8		
F					0.007	0.08
p					0.93	0.76
				Autonomic		
n		12		28		
M	6.2	7.2	6.8	7.2		
SD	0.2	0.6	0.7	0.6		
F					1.24	1.84
p					0.27	0.19

Table 20 (Continued)

	No medication		Local		Epidural			
	Exam #1	Exam #2	Exam #1	Exam #2	Exam #1	Exam #2	Combined exams	Change over time
				Motor				
n	20	20	8	8	12	12		
M	4.6	5.4	4.5	5.0	5.3	5.7		
SD	0.7	0.7	1.0	1.6	0.3	0.5		
F							1.36	0.58
p							0.28	0.57
				Range				
n	20	20	8	8	12	12		
M	3.7	4.0	4.1	4.1	3.7	4.0		
SD	0.5	0.6	0.7	0.3	0.8	0.3		
F							0.49	0.20
p							0.62	0.81

Table 20 (Continued)

	No medication		Local		Epidural			
	Exam #1	Exam #2	Exam #1	Exam #2	Exam #1	Exam #2	Combined exams	Change over time
				Regulation				
n	20	20	8	8	12	12		
M	4.8	4.3	5.5	4.4	4.8	4.2		
SD	1.0	0.7	0.7	0.8	0.7	0.8		
F							0.50	0.57
p							0.61	0.57
				Autonomic				
n	20	20	8	8	12	12		
M	6.7	7.2	7.0	7.6	6.3	7.0		
SD	0.8	0.7	0.6	0.0	0.3	0.5		
F							2.49	0.03
p							0.11	0.97

three infants were also examined in the first 24 hours when recovery from birth may interfere with attending to stimuli. This example shows how it is difficult to separate the many variables influencing newborn behavior. The results from the analysis of variance are hard to interpret since the ethnic differences cannot be separated from the other confounding variables.

Limitations

In every study there are limitations which affect interpretation of the results. The following are the major limitations in this study with suggestions on how to overcome them.

The most obvious limitation in this study is the small sample size. A few of the studies reviewed in the literature which used the NBAS have used samples of this size and reported significant results, but most of these studies have also used other measurement tools or more than two Brazelton exams. Generally, the larger the sample, the more representative of the population and the more accurate the statistical analysis. The reality of the small Hmong and Mien population in Portland and the limited time frame of the study did not allow for a larger sample. Matching the samples on sample criteria was a means used to improve sample reliability.

The lengthy time frame for data collection of slightly more than 1 year could contribute to tester differences in the administration of the measurement tool. Although the investigator tried to prevent tester bias by not forming expectations and judgments, this is also a consideration. As the examiner's skill is an important aspect of how

well the infant will perform on the Brazelton tool, increasing experience using the tool could lead to measurement error. Almost all of the Hmong and Mien infants were examined prior to the Caucasian babies. However, the investigator tended to feel more comfortable with the Hmong and Mien parents, as they appeared more relaxed than the Caucasian parents. A reliability check on Brazelton exam administration with a qualified instructor would increase measurement reliability. Obtaining the matched subject soon after the first subject could also prevent tester differences.

The two intervening variables, feeding and medication, which could not be separated from ethnic groups, made it difficult to interpret whether group similarities and differences were accurate. This problem is not easily solved, as both these variables relate to cultural differences in the groups. Brazelton stresses that group comparisons should be complemented with individual comparisons in order to understand more clearly how control variables may differentially effect different groups. In addition, income and educational differences between the two samples may have had an influence.

Additional intervening variables in both settings seemed to influence how the examination proceeded. These include noise level, temperature, light, observers, and interruptions. However, there were similar conditions regarding this aspect in both groups, and the investigator learned to be flexible in exam procedure and adaptable in taking these environmental factors into account as part of the infant's normal environment.

Finally, other potential contributory influences on the newborn's behavior were not analyzed such as mother's diet, psychological state, spacing of pregnancies, and patterns of care in the home. Clearly as more variables are controlled or analyzed the quality of the data measurement and analysis will improve.

CHAPTER IV

SUMMARY

This chapter summarizes the research study, including the conceptual framework, methodology, results and limitations. The implications of the study for nursing practice and suggestions for future research conclude this chapter.

This was an exploratory study concerning how Hmong and Mien newborn infants compare to American Caucasian newborns in social behavior. The research question arose as the investigator became aware of cultural differences in the style of mother-infant interaction in a group of Hmong and Mien refugees while working with this group in an acute health care setting. A review of the literature on infant behavior and cross-cultural differences among infants provided support for the notion that babies exhibit unique behavior which may relate to qualitative differences in development, temperament, and cultural patterns of parent-infant interaction and child-rearing practices. Most of the studies concerned with newborn behavior utilized the Brazelton Neonatal Behavior Assessment Scale as the measurement tool since this examination incorporates a wide range of meaningful newborn behavior through interaction with the examiner, thus directly assessing social behavior. The issue of nature versus nurture in relation to newborn behavior surfaced as an area of controversy in some of the research studies, though much of the more recent research acknowledged the importance of both heredity and environment in shaping behavior.

The conceptual framework underlying this study is derived from Lester and Brazelton (1982) and may be described as transactional and holistic. The infant is described as a "biological-psychological system," always in a dynamic state of development becoming increasingly complex over time. Infant behavior also represents adaptive qualities which have significance for survival of the individual, species, and culture. Qualitative differences in behavior between infants of different cultures may relate to larger cultural variations in temperament, ideology, child-care practices and parent-infant interaction. The influence of environmental factors in the newborn period, such as labor and delivery, medication, and feeding, are recognized as powerful variables in this recovery and adjustment period. This study did not try to separate the infant into two parts, one genetic and one environment; however, by controlling for some of the environmental variables, this study focused on the inherent cultural uniqueness in each ethnic group.

Ten Hmong and Mien newborns and 10 American Caucasian newborns were examined using the Brazelton NBAS at 1 to 3 days and 10 to 15 days of age. The samples were matched for sex, age and parity of the mother, and place of delivery. Additional criteria included normal vaginal delivery with minimal medication; full-term gestation; no complications of pregnancy, labor or delivery; and normal physical examination. The samples were similar in mean age of testing, initial and predominant states, birth weight, Apgar scores, hours of labor, and time of first feeding. The samples were significantly different in level of income,

mother's years of education, feeding method and use of medication during labor. These variables were difficult to control, as they reflected cultural differences in the two groups.

Using an analysis of variance, the two groups were not significantly different in behavior as measured by the Brazelton NBAS using the recommended cluster scoring technique. The seven clusters included habituation, orientation, motor, range of state, regulation of state, autonomic, and reflexes. However, subtle differences were apparent when individual items on the exam were analyzed with a t test, especially in motor behavior. Hmong and Mien infants were less active and mature in motor behavior than the Caucasian infants. During the home visits, Hmong and Mien mothers tended to swaddle their babies, while Caucasian mothers seemed to encourage infant movement. This observation is analogous to what Freedman (1974) reported in his study of Oriental and Caucasian infant behavior regarding the Navajo use of the cradleboard and the "marriage" of culture and biology. He described the Navajo baby as being "temperamentally and physically suited" to accept the restrictive cradleboard, as they are less active, irritable, and more hypotonic than the Caucasian infants. Other similarities with Freedman and Freedman's (1969) results were only apparent in the first exam or were not significant, which raises questions as to the reliability of those results. As the review of literature supports, motor behavior is a common behavioral difference in cross-cultural infant studies. Hmong and Mien infants also scored better in auditory sensitivity and in the peak of excitement item, meaning they cried less

readily and needed less consoling once upset. Freedman and Freedman also reported relative "imperturbability" in their study of Chinese-American and Caucasian infants. Despite these few differences, the two groups of infants were similar in behavior, though each baby displayed unique individual behavior. Although subtle differences may not be significant statistically, these distinctions may be important in understanding parent-infant interaction in a particular cultural group.

Interesting correlations among variables, such as infant sex, parity of mother, infant state, and age at the exam with the Brazelton cluster scores for both groups, revealed information about influences in early parent-infant interaction that the Brazelton NBAS seeks to elucidate. This attests to the versatility of the tool. Cultural distinctions in a few of the correlations support the importance of combining group comparisons with individual comparisons in order to better understand how control variables may differentially affect each cultural group.

The major limitations of the study include the small sample size, the length of time for data collection, and the two noncontrolled variables of medication and feeding method which may have skewed the results of group comparisons. The Hmong and Mien mothers received no medication during labor and all bottle-fed their babies, while more than half of the Caucasian mothers had epidural medication and breast-fed their babies.

In conclusion, the researcher does not feel this study adequately answered the research question. Although the infants were similar in

most of their behavior, their subtle differences and the limitations of the study must be taken into account. What is apparent to the researcher is the unique capabilities each infant displayed from birth and the powerful influence this behavior has for the developing parent-infant relationship. Although many of the Hmong and Mien mothers and fathers did not speak English, they showed interest and amazement while watching their baby during the assessment. The Caucasian parents asked many questions and were already attributing personality traits to their babies, which usually related to their own behavior as infants or present personality. All the parents appeared relieved to know their infants were healthy as explanations about normal infant behavior were offered in response to questions.

Implications for Nursing Practice

As nurses work with people of many different cultures, it is important for them to try to understand how culture influences behavior, including parent-child relationships and child-rearing practices. Knowledge and understanding is the first step in overcoming an ethnocentric bias in our approach to different peoples. To be truly helpful in delivering health care, nurses must be nonjudgmental and flexible in their approach. Exposure to different cultures also broadens one's conception of "normality," increasing one's knowledge about child development and family relationships.

Nurses caring for infants and parents during the newborn period of "bonding" are in a most opportune position to strengthen this bond and possibly affect the future parent-child relationship. Personifying the

appropriate and that culture members not feel "used" for research purposes. Utilizing nurses' reports may also be helpful in the immediate newborn period.

A larger sample with more than two Brazelton exams in the first month of life would also be more reliable in determining cultural variations in infant behavior. Combining the Brazelton results with those of other assessment tools in a longitudinal study could provide knowledge concerning the relationship between infant behavior, temperament and the developing parent-child relationship.

Looking at more than two cultural groups, such as Caucasian, Black, and Asian, or looking at differences within a broad cultural group such as Hmong and Mien and Chinese-American may provide clearer descriptions of infant behavior and facilitate an understanding of how cultures are similar or different in regard to infant behavior and parent-infant interaction.

Controlling for variables such as feeding and medication use during labor between cultural groups would increase the reliability of data measurement. If controlling for culturally relative variables was difficult as in this study, looking at the influence of variables within a cultural group, such as breastfeeding versus bottle feeding in a Caucasian sample, could facilitate understanding of how this variable may influence the infant's behavior.

In conclusion, the concept of "reciprocity," which Brazelton describes as the special communication between infants and parents, was only alluded to in this study but is a meaningful focus in studies concerned with infant behavior.

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APPENDIX A

DESCRIPTIVE DATA SHEET

Code _____

Date _____

APPENDIX A

DESCRIPTIVE DATA SHEET

Marital Status:

1. Married
2. Single

Present Occupation:

Mother _____

Father _____

Annual Family Income:

1. Less than 5,000
2. $5,001 - 10,000
3. $10,001 - 15,000
4. $15,001 - 20,000
5. More than $20,000

Education:

Last Grade Completed:

Mother

Father

4 5 6 7 8
Grade School

9 10 11 12
High School

1 2 3 4
College

Number of years in U.S. _____

Number and ages of other children: _____

APPENDIX B

BRAZELTON NEONATAL BEHAVIORAL ASSESSMENT SCALE

APPENDIX B

BRAZELTON NEONATAL BEHAVIORAL ASSESSMENT SCALE

BEHAVIORAL AND NEUROLOGICAL ASSESSMENT SCALE

Infant's name	Date Hour
Sex Age	Born
Mother's age Father's Age	Father's S.E.S.
Examiner(s)	Apparent race
Conditions of examination:	Place of examination
Birthweight	Date of examination
Time examined	Length
Time last fed	Head circ.
Type of delivery	Type of feeding
Length of labor	Apgar
Type, amount and timing of medication given mother	Birth order
	Anesthesia?
	Abnormalities of labor

Initial state: observe 2 minutes

1	2	3	4	5	6
deep	light	drowsy	alert	active	crying

Predominant states (mark two)

1	2	3	4	5	6

ELICITED RESPONSES

	O*	L	M	H	At
Plantar grasp		1	2	3	
Hand grasp		1	2	3	
Ankle clonus		1	2	3	
Babinski		1	2	3	
Standing		1	2	3	
Automatic walking		1	2	3	
Placing		1	2	3	
Incurvation		1	2	3	
Crawling		1	2	3	
Glabella		1	2	3	
Tonic deviation of head and eyes		1	2	3	
Nystagmus		1	2	3	
Tonic neck reflex		1	2	3	
Moro		1	2	3	
Rooting (intensity)		1	2	3	
Sucking (intensity)		1	2	3	
Passive movement		1	2	3	
Arms R		1	2	3	
L		1	2	3	
Legs R		1	2	3	
L		1	2	3	

O* = response not elicited (omitted)
At = asymmetry

Descriptive paragraph (optional)

Attractive	0	1	2	3
Interfering variables	0	1	2	3
Need for stimulation	0	1	2	3

What activity does he use to quiet self?

hand to mouth

sucking with nothing in mouth

locking onto visual or auditory stimuli

postural changes

state change for no observable reason

COMMENTS:

BEHAVIOR SCORING SHEET

Initial state

Predominant state

Scale (Note State)	1	2	3	4	5	6	7	8	9
1. Response decrement to light (1,2)									
2. Response decrement to rattle (1,2)									
3. Response decrement to bell (1,2)									
4. Response decrement to tactile stimulation of foot (1,2)									
5. Orientation--inanimate visual (4,5)									
6. Orientation--inanimate auditory (4,5)									
7. Orientation--inanimate visual and auditory (4,5)									
8. Orientation--animate visual (4,5)									
9. Orientation--animate auditory (4,5)									
10. Orientation--animate visual and auditory (4,5)									
11. Alertness (4 only)									
12. General tonus (4,5)									
13. Motor maturity (4,5)									
14. Pull-to-sit (4,5)									
15. Cuddliness (4,5)									
16. Defensive movements (3,4,5)									
17. Consolability (6 to 5,4,3,2)									
18. Peak of excitement (all states)									
19. Rapidity of build-up (from 1,2 to 6)									
20. Irritability (all awake states)									
21. Activity (3,4,5)									
22. Tremulousness (all states)									
23. Startle (3,4,5,6)									
24. Lability of skin color (from 1 to 6)									
25. Lability of states (all states)									
26. Self-quieting activity (6,5 to 4,3,2,1)									
27. Hand-to-mouth facility (all states)									
28. Smiles (all states)									

SUMMARY OF BRAZELTON SCALE SCORING DEFINITION

Standard Items

1. Response decrement to light (1 and 2)

1 No diminution in startles over 10 stimuli.
2 Delayed startles; rest of responses still present (i.e., body movements, eye blinks, respiratory changes continue over 10 trials).
3 Startles no longer present but body movements are still present after 10 trials.
4 No complete shutdown although startles no longer present, body movement delayed, respiratory and blinks same in 10 trials.
5 Shutdown of body movements, some diminution in blinks and respiratory changes after 9 stimuli.
6 _____ after 7-8 stimuli.
7 _____ after 5-6 stimuli.
8 _____ after 3-4 stimuli.
9 _____ after 1-2 stimuli.
NA No response hence no decrement.

2. Response decrement to rattle (1 and 2)

1 No diminution in startles over 10 stimuli.
2 Delayed startles; rest of responses still present (i.e., body movements, eye blinks, respiratory changes continue over 10 trials).
3 Startles no longer present but body movements are still present after 10 trials.
4 No complete shutdown although startles no longer present, body movement delayed, respiratory and blinks same in 10 trials.
5 Shutdown of body movements, some diminution in blinks and respiratory changes after 9 stimuli.
6 _____ after 7-8 stimuli.
7 _____ after 5-6 stimuli.
8 _____ after 3-4 stimuli.
9 _____ after 1-2 stimuli.
NA No response hence no decrement.

3. Response decrement to bell (1 and 2)

1 No diminution in startles over 10 stimuli.
2 Delayed startles; rest of responses still present (i.e., body movements, eye blinks, respiratory changes continue over 10 trials).
3 Startles no longer present but body movements are still present after 10 trials.
4 No complete shutdown although startles no longer present, body movement delayed, respiratory and blinks same in 10 trials.
5 Shutdown of body movements, some diminution in blinks and respiratory changes after 9 stimuli.
6 _____ after 7-8 stimuli.
7 _____ after 5-6 stimuli.
8 _____ after 3-4 stimuli.
9 _____ after 1-2 stimuli.
NA No response hence no decrement.

7. Orientation--inanimate visual and auditory (4 and 5)

1 Does not focus on or follow stimulus.
2 Stills with stimulus and brightens.
3 Stills, focuses o stimulus when presented, little spontaneous interest, brief following.
4 Stills, focuses on stimulus, following for 30° arc, jerky movements.
5 Focuses and follows with eyes horizontally for at least a 30° arc. Smooth movement, loses stimulus but finds it again.
6 Follows for two 30° arcs with eyes and head. Eye movements are smooth.
7 Follows with eyes and head at least 60° horizontally, maybe briefly vertically, partly continuous movement, loses stimulus occasionally, head turns to follow.
8 Follows with eyes and head 60° horizontally and 30° vertically.
9 Focuses on stimulus and follows with smooth, continuous head movement horizontally, vertically, and follows in a circular path for a 180° arc.

8. Orientation--animate visual (4 and 5)

1 Does not focus on or follow stimulus.
2 Stills with stimulus and brightens.
3 Stills, focuses on stimulus when presented, little spontaneous interest, brief following.
4 Stills, focuses on stimulus, following for 30° arc, jerky movements.
5 Focuses and follows with eyes horizontally for at least a 30° arc. Smooth movement, loses stimulus but finds it again.
6 Follows for two 30° arcs with eyes and head. Eye movements are smooth.
7 Follows with eyes and head at least 60° horizontally, maybe briefly vertically, partly continuous movement, loses stimulus occasionally, head turns to follow.
8 Follows with eyes and head 60° horizontally and 30° vertically.
9 Focuses on stimulus and follows with smooth, continuous head movement horizontally, vertically, and follows in a circular path for a 180° arc.

9. Orientation--animate auditory (4 and 5)

1 No reaction.
2 Respiratory change or blink only.
3 General quieting as well as blinking and respiratory changes.
4 Stills, brightens, no attempt to locate source.
5 Shifting of eyes to sound, stills and brightens.
6 Alerting and shifting of eyes and head turns to source.
7 Alerting, head turns to stimulus, and search with eyes.
8 Alerting prolonged, head and eyes turn to stimulus repeatedly (3 out of 4 times).
9 Turning and alerting to stimulus presented on both sides on every presentation of stimulus (4 out of 4 times).

10. Orientation animate--visual and auditory (4 and 5)

1 Does not focus on or follow stimulus.
2 Stills with stimulus and brightens.
3 Stills, focuses o stimulus when presented, little spontaneous interest, brief following.
4 Stills, focuses on stimulus, following for 30° arc, jerky movements.
5 Focuses and follows with eyes horizontally for at least a 30° arc. Smooth movement, loses stimulus but finds it again.
6 Follows for two 30° arcs with eyes and head. Eye movements are smooth.
7 Follows with eyes and head at least 60° horizontally, maybe briefly vertically, partly continuous movement, loses stimulus occasionally, head turns to follow.
8 Follows with eyes and head 60° horizontally and 30° vertically.
9 Focuses on stimulus and follows with smooth, continuous head movement horizontally, vertically, and follows in a circular path for a 180° arc.

11. Alertness (4 only)

1 Inattentive--rarely or never responsive to direct stimulation.
2 When alert, responsiveness brief and always delayed--alerting and orientation very brief and general. Not specific to stimuli.
3 When alert, responsiveness brief and often delayed--quality of alertness variable.
4 When alert, responsiveness brief but not generally delayed though may be variable.
5 When alert, responsiveness of moderate duration--response may be delayed and can be variable.
6 When alert, responsiveness moderately sustained, not delayed and not variable.
7 When alert, episodes are of generally sustained duration. Delay and variability no longer issues.
8 Always has sustained periods of alertness in best periods. Alerting and orientation frequent. Stimulation brings infant to alert state and quiets infant.
9 Always alert for most of exam. Intensely and predictably alert.

12. General tone--predominant tone (4 and 5)

1 Flaccid, limp like a rag doll, no resistance when limbs are moved, complete head lag in pull-to-sit.
2 Little response felt as infant is moved, but less than 25% of the time.
3 Flaccid, limp most of the time, but is responsive about 25% of the time with some tone.
4 Some tone half the time, responds to being handled with average tone less than half the time.
5 Tone average when handled, lies with relaxed tone at rest.
6 Responsive with good tone as infant is handled approximately 75% of the time, may be on the hypertonic side up to 25% of the time, variable tone in resting.

7 Is on the hypertonic side approximately 50% of the time.
8 When handled infant is responsive with hypertonicity about 75% of the time.
9 Hypertonic at rest (in flexion) and hypertonic all the time.

13. Motor maturity (4 and 5)
1 Cogwheel-like jerkiness, overshooting of legs and arms in all directions.
2 Jerky movements predominate with mild overshooting.
3 Jerky movements predominate with no overshooting.
4 Jerky movements half the time, smooth movements half the time, arcs up to 45°.
5 Smooth movements predominate, arcs predominantly 60° half the time.
6 Smooth movements, arcs predominantly 60°.
7 Smooth movements and arcs of 90° less than half the time.
8 Smooth movements and unrestricted arms laterally to 90° most of the time.
9 Smoothness, unrestricted (90°) all of the time.

14. Pull-to-sit (4 and 5)
1 Head flops completely in pull-to-sit, no attempts to right it in sitting.
2 Futile attempts to right head but some shoulder tone increase is felt.
3 Slight increase in shoulder tone, seating brings head up once but not maintained, no further efforts. Head may pivot briefly through midline.
4 Shoulder and arm tone increase, seating brings head up, not maintained at midline but there are further efforts to right it.
5 Head and shoulder tone increase as pulled to sit, brings head up once to midline by self as well, maintains it for 1-2 seconds.
6 Head brought up twice after seated, then can keep it in position 2 seconds or more.
7 Shoulder tone increase but head not maintained until seated, then can keep it in position 10 seconds. When it falls, repeatedly rights it.
8 Excellent shoulder tone, head up for 10 seconds after seated, no headlag as comes up.
9 Head up during lift and maintained for 1 minute after seated, shoulder girdle and whole body tone increases as pulled to sit.

15. Cuddliness (4 and 5)
1 Doesn't resist but doesn't participate either, lies passively in arms and against shoulder (like a sack of meal).
2 Actually resists being held, continuously pushing away, thrashing or stiffening.
3 Resists being held most but not all of the time.
4 Eventually molds into arms, but after a lot of nestling and cuddling by examiner.
5 Usually molds and relaxes when first held.
6 Always molds and relaxes when first held.
7 Always molds, initially nestles head in crook of elbows and neck of examiner.

8 In addition to molding and relaxing, infant nestles and turns head, leans forward on shoulder, fits feet into cavity of other arm, head nestles in crook of elbow and neck, all of body participates.
9 All of the above, and baby grasps and clings to examiner.

16. Defensive movements (4 and 5)
1 No response.
2 General quieting.
3 Nonspecific activity increase with long latency.
4 Same with short latency.
5 Rooting and lateral head turning.
6 Neck stretching.
7 More than one nondirected swipe of arms, in the upper quadrant area of body.
8 More than one directed swipe of arms, toward the midline in the plane of the cloth.
9 Successful removal of cloth with swipes.

17. Consolability with intervention (6 to 5, 4, 3, or 2 for at least 15 secs.)
1 Not consolable.
2 Pacifier or finger in addition to dressing, holding and rocking.
3 Dressing, holding in arms and rocking.
4 Holding and rocking.
5 Picking up and holding.
6 Hand on belly and restraining one or both arms.
7 Head on belly steadily.
8 Examiner's voice and face alone.
9 Examiner's face alone.

18. Peak of excitement
1 Low level of arousal to all stimuli. Never above state 2, does not awaken fully.
2 Some arousal to stimulation--must be awakened to reach state 3.
3 Infant reaches state 4 only briefly; is predominantly in state 3 or lower.
4 Infant reaches state 5, but is predominantly in state 4 or lower.
5 Infant reaches state 6 after stimulation once or twice, but predominantly is in state 5 or lower.
6 Infant reaches state 6 after stimulation more than 2 times, but returns to lower states spontaneously, at least twice.
7 Infant reaches state 6 in response to stimuli more than twice, but with consoling is easily brought back to lower states.
8 Infant screams (state 6) in response to stimulation more than twice, although some quieting can occur with consoling, wit difficulty. Always needs finger or pacifier to console.
9 Infant achieves insulated crying state. Unable to be quieted or soothed.

8 Tremulousness seen more than 3 times in state 4 and may be seen more than 3 times in each of several other states.
9 Tremulousness seen consistently and repeatedly in all states.

23. Amount of startle during exam (3-6)

1 No startles noted.
2 Startle as a response to the examiner's attempts to set off a Moro reflex only.
3 2 startles, including Moro.
4 3 startles, including Moro.
5 4 startles, including Moro.
6 5 startles, including Moro.
7 7 startles, including Moro.
8 10 startles, including Moro.
9 11 or more startles, including Moro.

24. Lability of skin color (as infant moves from 1-6)

1 Pale, cyanotic, does not change during exam.
2 Pale or cyanotic skin color which improves minimally, at the most, during exam.
3 Pale skin color with change to slightly more blue around mouth or extremities during exam, improving somewhat during exam.
4 Healthier color at outset with slight change to acrocyanosis in extremities as well as chest or abdomen but more rapid recovery. May be mild cyanosis around mouth or extremities after stress during exam.
5 Healthy color, with changes on parts of the body only. May be a mild color change of chest and abdomen; mottling may appear on face, chest or limbs; original color returns quickly.
6 Healthy color, complete change in color to red over whole body late in exam, but color returns with soothing or covering.
7 Healthy color changes to very red when uncovered or crying; recovers slowly if covered or soothed.
8 Healthy color rapidly changes to very red early in exam, recovery is slow.
9 Marked, rapid changes to very red; good color does not return during rest of exam.

25. Lability of states (all states)

The score corresponds to the frequency of changes:

1 = 1-2 changes over 30 minutes
2 = 3-5
3 = 6-8
4 = 9-10
5 = 11-13
6 = 14-15
7 = 16-18
8 = 19-22
9 = 23 onwards.

26. Self-quieting activity (6 and 5 to 4, 3, 2 or 1)

1 Cannot quiet self, makes no attempt, intervention is always necessary.
2 A brief attempt to quiet self (less than 5 secs.) but with no success.
3 Several attempts to quiet self, but with no success.
4 One brief success in quieting self for a period of 5 secs. or more.
5 Several brief successes in quieting self.
6 An attempt to quiet self which results in a sustained successful quieting with the infant returning to state 4 or below for at least 15 seconds.
7 One sustained (15 secs.) and several brief successes (5 secs.) in quieting self.
8 At least 2 sustained (15 secs.) successes in quieting self.
9 Consistently quiets self for sustained periods, never needs consoling.

27. Hand-to-mouth facility (all states)

1 No attempt to bring hands to mouth.
2 Brief swipes at mouth area, no real contact.
3 Hand brought to mouth and contact, but no insertion, once only.
4 Hand brought next to mouth area twice, no insertion.
5 Hand brought next to mouth area at least 3 times, but no real insertion, abortive attempts to suck on fist.
6 One insertion which is brief, unable to be maintained.
7 Several actual insertions which are brief, not maintained, abortive sucking attempts, more than 3 times next to mouth.
8 Several brief insertions in rapid succession in an attempt to prolong sucking at this time.
9 Fist and/or fingers actually inserted and sucking on them for 15 seconds or more.

28. Smiles (all states)

Recorded number observed.

APPENDIX C

PERMISSION TO CONDUCT STUDY

September 8, 1987

Kristin M. Dillon, P.N.P.
4031 N. Overlook Blvd.
Portland, Oregon 97227

Dear Ms. Dillon:

The Institutional Review Board at Emanuel Hospital & Health Center met on September 8, 1987 to review your study entitled "A Comparison of Hmong and Mien Newborn Infants and American Caucasion Newborns with the Brazelton Neonatal Behavioral Assessment Scale."

After reviewing the supporting materials and discussing the project with you, the Board voted unanimously in support of your project.

Thank you for your time.

Sincerely,

Keith Hansen, M.D.
Chairman
Institutional Review Board

KH:jlm

June 29, 1987

To: Committee on Human Research, MacHall Rm.2
Ext.7887, Mial Code L106

From: Kristin Dillon, RN., and Sheryl Boyd, RN, Ph.D., Advisor

Subject: Response to initial review of Project, ORS# 2030
TITLE: A Comparison of Hmong and Mien Newborn Infants and American Caucasian Newborns with the Brazelton Neonatal Behavioral Assessment Scale

In clarification of the subject number in this study, the investigator feels that 20 subjects is sufficient to analyse the data statistically using the Brazelton exam as the investigative tool. Although a greater number of subjects is desirable, this is a pilot study which has a limited time frame and available Hmong and Mien subjects. The purpose of the study is not to make generalizations about a population. In the same sense, the investigator does not have a clear hypothesis because this is a descriptive, exploratory study seeking to elucidate how different cultural groups of newborn infants may be alike or different in their behavior. The results of this study may help in forming a specific hypothesis.

In response to the issue of maternal drug abuse, the investigator will check the patient record for any indication of drug use or abuse as well as question the mother about medications or drugs. The findings of this study will be descriptive of differences in the groups and all intervening variables will be considered in the analysis.

THE OREGON HEALTH SCIENCES UNIVERSITY

MEMO

Date: July 10, 1987

To: Kristin Dillon, R.N. MN and
Sheryl Boyd, RN, Ph.D. Advisor L 343

From: Bernard Pirofsky, M.D., Chairman
The Committee on Human Research

Subject: ORS# 2030
TITLE: A Comparison of Hmong and Mien Newborn Infants and American Caucasian newborns with the Brazelton Behavioral Assessment Scale

This confirms receipt from you of the revised consent form, and/or answers to questions, assurances, etc., for the above entitled study.

It satisfactorily meets the recommendations made by the Committee on Human Research at its recent review. The proposal to use human subjects is herewith approved.

If this project involves the use of an Investigational New Drug, a copy of the protocol must be forwarded to the Pharmacy and Therapeutics Committee, Dr. S.R. Alexander, Chairman.

The Institutional Review Board is in compliance with the requirements in Part 56, Subchapter D, Part 312 of the 21 Code of Federal regulations published January 27, 1981.

Thank you for your cooperation.

[redacted]

APPENDIX D

CONSENT FORM

CONSENT FORM

OREGON HEALTH SCIENCES UNIVERSITY

I agree to participate in a Masters research project study entitled "A comparison of Hmong and Mien newborn infants and American Caucasian newborns with the Brazelton Neonatal Behavioral Assessment Scale." The purpose of this study is to examine similarities and differences among American Caucasian newborn infants and Hmong and Mien newborns. This study is being conducted by Kristin Dillon, R.N., Pediatric Nurse Practitioner and graduate student in Nursing at Oregon Health Sciences University under the direction of Sheryl T. Boyd, R.N., Ph.D.

Although there are no direct benefits to me in my participation, it is hoped that my participation will help nurses understand how newborn individuality may influence parental responses as well as contribute to differences in the way people raise their children. The only "risk" foreseen in this study is my inconvenience in terms of time, allowing my infant to be with the pediatric nurse practitioner for approximately thirty minutes at two different times. I understand my infant will be examined by Ms. Dillon in the hospital and at home during the first week with an exam called the Brazelton Neonatal Behavioral Assessment Scale. The exam will take approximately thirty minutes to administer and measures the newborn's individuality and social responsiveness, such as how alert or cuddly the baby is. After the examinations, Ms. Dillon will be glad to share with me the results of the exams which may help me to understand my infant's behavior better. Neither my name nor my identity will be used for publication or publicity purposes.

I understand that I do not have to join in this study and may withdraw from the study at any time without affecting my relationship with Emanual Hospital or outpatient clinic or the Oregon Health Sciences University. Kristin Dillon has offered to answer any questions I may have about the study and to supply results of the study at my request. She may be reached at the Oregon Health Sciences University at 279-7893.

I also understand that the Oregon Health Sciences University, as an agency of the state, is covered by the State Liability Fund. If I suffer any injury from the research project, compensation would be available to me only if I established that the injury occurred through the fault of the University, its officers or employees. If I have any further questions, I may call Dr. Michael Baird at (503) 279-8014.

I understand the information on this form and agree to participate in this study.

_____

Parent Date

_____

Witness Date

This consent form was interpreted orally.

_____

Interpreter Date

AN ABSTRACT OF THE THESIS OF
KRISTIN DILLON, BSN, PNP

For the MASTER OF NURSING
Date of Receiving this Degree:
Title: A COMPARISON OF HMONG AND MIEN NEWBORN INFANTS AND AMERICAN CAUCASIAN NEWBORNS WITH THE BRAZELTON NEONATAL BEHAVIORAL ASSESSMENT SCALE

APPROVED: _____
Sheryl Boyd, RN, PhD, Thesis Advisor

This exploratory study compared Hmong and Mien newborn infants with American Caucasian infants using the Brazelton Neonatal Behavioral Assessment Scale (NBAS). The purpose of the study was to examine newborn social behavior from a cross-cultural perspective to facilitate understanding of how infants may contribute to cultural patterns of child care and parent-infant relationships.

The sample of 10 Hmong and Mien and 10 Caucasian infants were examined with the Brazelton NBAS twice, once at 1-3 days of age in the hospital setting and again at 10-15 days of age in the home setting. The Brazelton NBAS consists of 28 items and measures the infant's psychosocial, motor, and physiological behaviors as the examiner interacts with the infant within the prescribed guidelines. The sample was matched for infant sex, age and parity of the mother, and place of delivery. All infants were full term, normal birth weight, and healthy products of uncomplicated vaginal deliveries. The samples were significantly different in income level, level of mother's education, method of feeding and use of medication during labor.

Using an analysis of variance, the averaged scores from the two exams for each group were analyzed with the seven cluster scoring

technique recommended by Brazelton. The results revealed no significant differences between the groups on the following clusters: habituation, orientation, motor, range of state, regulation of state, autonomic, and reflex. Comparison of individual items on the exam using a t test did show a few significant differences, especially in motor behavior. Hmong and Mien infants were less active, less excitable, and easier to console than the Caucasian babies. These results support similar cultural differences reported in the literature between Oriental and Caucasian infants and children. However, the small sample size, the sample differences in labor medication and method of feeding, and the lack of significant differences in the cluster scores necessitate a cautious interpretation of results. Cultural differences in infant behavior and the possible influence on child-rearing practices and parent-infant relationships needs more thorough investigation.