INFANT TEMPERAMENT AND SLEEP PATTERNS

by

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CHAPTER I

INTRODUCTION

The regularity of the infant's sleep-wake rhythm and his/her ability to sleep through the night are two of the most critical aspects of infant behavior. The infant's sleeping pattern necessarily influences the caregiver's pattern of living and this in turn may modify the type of care provided.

Barnard and Douglas (1974) contend that regularity of the infant's sleep-wake rhythm is one of the foremost concerns of parents, and Illingsworth (1951) points out that irregular sleep patterns are extremely common at one time or another in young children. Anders (1979) states that the two major concerns of parents regarding their infant's sleep in the first year are sleeping through the night and night awakenings.

Though virtually all parents anticipate some sleep disturbances in their children, Hirschberg (1957) addressed the fact that when these disturbances occur parents become anxious and have great difficulty accepting the diversity of individual sleep patterns both in the same child and in different children. Furthermore he asserts that mothers in particular tend to doubt their parenting competence if their infants do not sleep well. These feelings of inadequacy have been supported if not created by authors such as Sundell (1922) who stated "a sleepless baby is a

reproach to his guardians" (1922, p. 89). Illingsworth (1951) agrees that management of the child is important but claims that the character of the child is equally influential in causing sleep disturbances.

In recent years, there has been increased interest in studying the innate characteristics of individual children. These studies have shown that infants differ in the ways in which they respond to their environment, and contrary to earlier beliefs they are neither unorganized nor passive receptive organisms (Chess, 1966; Kroner, 1971). Thus, the infant's responses to the caregiver are determined not only by the attitude and behavior of the parent but also by the infant's temperament (Chess, 1966).

At the same time there is mounting evidence that the infant's temperament affects the caregiver's attitude and responses. For instance, it has been shown that temperament may affect the mother's attitude towards the infant in a negative fashion (Barnard, 1977; Burns, 1978; Thomas, Chess & Birch, 1968).

Barnard and Eyres speculate that "easy temperament" and regularity of sleep in the infant facilitate certain positive mothering characteristics (N-Cast Study Guide, Class 8, p. 40-41). This inference is generated from findings of studies comparing mothering pattern scores to scores achieved by their 2-year-old children on the Bayley Scale of Mental Development (MDI). They found that children

whose scores were highest had mothers who were more responsive, more involved, less restrictive and less intrusive. A retrospective analysis of the data revealed that the infants of the more responsive, more involved mothers tended to exhibit an "easy temperament" in the early months and regular sleeping patterns at 8 months.

Since nurses are frequently in a position to support and counsel parents who have concerns regarding their infant's sleeping pattern, and since it appears that the type of mothering may affect infant development (Korner, 1965), it becomes important to further clarify the relationship between the infant characteristic of temperament and sleeping patterns. Additional knowledge regarding this relationship should enable professional nurses working in a variety of nursing areas to interpret the infant's behavior to his parents and to counsel them regarding management of irregularity in their infant's sleeping patterns. These nurses include clinical specialists, public health nurses, staff nurses, and pediatric nurse practitioners who practice in such settings as postpartum units, newborn nurseries, pediatricians' offices, well-child clinics, and health maintenance organizations.

Review of the Literature

The literature review addresses the normal development of infant sleeping patterns, infant temperament, the

relationship between infant temperament and sleep patterns, and the relationship between infant temperament and mother-infant relationships.

Development of Infant Sleeping Patterns

Knowledge of the development of infant sleep patterns forms a basis on which to build an understanding of the relationship between regularity of sleep and temperament. Several studies have looked at the characteristics of infants' sleep and the development of infants' sleep patterns (Dittrichova, 1966; Emde & Walker, 1976; Kleitman & Engelmann, 1953; Lenard, 1970; Parmelee, Wenner & Schulz, 1964).

The findings of Parmelee et al. and Kleitman and Engelmann's studies of changes in sleep patterns in relation to maturation are summarized in Table 1. The major findings of these two studies are that there is a decrease of only 1 to 2 hours in the total amount of sleep per 24 hours over the first 4 to 6 months of life; the total amount of sleep taken during the day decreases while the total amount of sleep taken at night increases steadily and progressively over the first 4 to 6 months; and the ability to sustain a single long period of sleep increases dramatically over the first 4 months.

Table 1

Summary of Findings Regarding Changes in Sleep Patterns with Maturation

Period	Total Sleep (hrs)	Total Daytime Sleep (hrs)	Total Nighttime Sleep (hrs)	Duration Longest Sleep Period (hrs)	Duration Longest Wakeful Period (hrs)
1st Week	16.3 (P)	7.8 (P)	8.3 (P)	4.1 (P)	2.4 (P)
2nd Week		7.4 (P)	8.5 (P)		
3rd Week	14.9 (K&E)	6.5 (K&E)	8.5 (K&E)		
8th Week		5.9 (P)	9.2 (P)	6.5 (P)	
12th Week		5.0 (K&E)	10.0 (K&E)		
		5.1 (P)	9.7 (P)	7.7 (P)	
16th Week	14.6 (K&E)	4.4 (K&E)			3.6 (P)
		4.6 (P)	10.0 (P)	8.5 (P)	
26th Week	13.7 (K&E)	3.6 (K&E)	10.0 (K&E)		

P = Parmelee et al.,(1964)

K&E = Kleitman and Engelmann (1953)

Some investigators attribute the increasing disparity between the amount of sleep taken at night and amount taken during the day to the increasing influence of "conditioning" (Battle, 1970; Kleitman & Engelmann, 1953). Kleitman and Engelmann believe that even the day-night disparity in amounts of sleep evident in the newborn's sleeping pattern is related to such environmental differences as temperament and noise. They admit however, that there might also be a natural rhythm within the infant that must be adjusted to the 24-hour cycle. Parmelee et al., while agreeing that some learning must be involved in the development of the diurnal cycle, attribute both it and the ability to sustain longer periods of sleep to increasing maturation of the central nervous system. Such behavioral changes as the increasing ability of the infant to wait for his feedings and to entertain himself while awake, which appear around the third month of life, as well as changes in electroencephalographic tracings coincide with increased duration of sleeping periods and attest to increasing maturation of the central nervous system.

In the newborn the electroencephalographic tracings are characterized by a pattern of delta waves found only in the adult sleep state (Nagera, 1966) but around the second or third month the delta waves become less prominent and alpha waves and sleep spindles appear, coinciding both with the increased duration of the sleeping periods and the

frequency and duration of quiet or non-rapid-eye-movement (NREM) sleep (Dittrichova, 1966; Parmelee et al., 1964). The percentage of quiet sleep in relation to total sleep increases with age from 16.7 in the second week to 34.8 in the 24th week. Active or rapid-eye-movement (REM) sleep decreases from 79.7% of the total sleep in the second week to 54.8% in the 24th week. Dittrichova states that the most notable changes in the duration of quiet sleeping periods take place in the first 12 weeks of life. For instance, the longest period is 11 minutes by the second week and over 20 minutes by the 12th to 24th weeks.

Disturbed sleeping patterns are often a sign of neuro-developmental disorder. Abnormal sleeping patterns have been found in infants of heroin and methadone-addicted mothers, in neurologically damaged infants and infants with Down's Syndrome (Barnard & Eyres, Study Guide; Blackburn, Study Guide). It has been found that infants with mild degrees of birth trauma and infants of heroin-addicted mothers have a decreased amount of NREM sleep as compared to normal infants (Lenard, 1970). This is significant in that increasing amounts of NREM sleep coincide with the increasing duration of sleep periods and thus contributes to the development of the diurnal pattern (Dittrichova, 1966). Premature infants have been noted to lack clear differentiation between quiet NREM and active or REM sleep states (Parmelee et al., 1964) and Barnard and Eyres (1979)

state that the sleeping patterns of prematures are less regular than those of normal infants.

Thus, there is evidence that the development of the diurnal sleeping pattern and increased duration of sleeping periods are the result of central nervous system maturation. There is also evidence that infants with known neurological damage have differing sleep characteristics and patterns. In addition, Barnard and Eyres (1979) believed that the attainment and the regularity of the diurnal sleeping patterns may also indicate infant well-being as well as central nervous system maturation. They became interested in examining the sleeping patterns of infants because they believed these patterns were a characteristic which could be used as an indicator of the infants' well-being. Their ultimate goal was to determine early predictors of child health and developmental problems that would strengthen preventive care. They concluded that keeping a record of the infant's sleeping pattern provided an objective means of assessing difficulties and in addition offered the opportunity for looking at the relationship of the sleeping pattern in the early months to later behaviors.

Thus, in 1974, Barnard and Eyres initiated a study using a sample of 193 mothers who lived in the Puget Sound area near Seattle, Washington who were members of a prepaid

insurance program. They started following these mothers from the eighth month of pregnancy. The mother-infant pairs were then seen at the time of delivery and at 1, 4, 8, 12 and 24 months following delivery. The mothers were primiparous with an average age of 24.9 years, and were mainly Caucasian in racial origin. Half of the mothers had formal education beyond high school while half had no education beyond high school; half of the mother-infant pairs had experienced one or more of the perinatal risk factors identified by the researchers while half had experienced no perinatal risk factors. Infants with major defects were excluded from the study. The four major areas of their study included infant characteristics, animate and inanimate environment, parent perceptions and attitudes, and the amount of life change in the mother's life.

Various assessments including the Brazelton Neonatal Behavioral Assessment Scale (BNBAS), examinations, and interviews with the mother were completed over the 24-month period. The infant's sleeping pattern was determined by reviewing the Sleep-Activity Record (SAR), which is a tool designed by Barnard as an aid in helping caregivers and mothers gain an objective picture of the infant's behavior. The mother recorded when her infant slept, ate, cried, urinated, had bowel movements, and when caretaking activities were performed. Each mother was asked to record the

infant's activities for one week following the home visit at 1, 4, 8 and 12 months.

The SAR measured eight variables: regularity of night sleep; regularity of day sleep; regularity of total sleep; longest duration of night sleep in hours; longest duration of day sleep in hours; average number of night awakenings; average number of feedings per day; and regularity of feedings. Sleep was defined as regular if it occurred for more than 30 minutes at the same hour on 5 out of the 7 days and was described as a percentage. Night sleep was defined as the amount of sleep that occurred in the hours in which the parents usually slept, and day sleep was the amount of sleep that occurred during the hours of the day when the parents were usually awake. Total regular sleep was simply the sum of the regular night sleep and the regular day sleep. Barnard and Eyres' findings regarding regularity of sleep are summarized in Table 2.

In examining the correlation between the SAR variables, it was found that the regularity of night sleep at any given age was significantly correlated with regularity of night sleep at the preceding age, whereas there was no correlation between successive ages with regards to day sleep until after 8 months. The measure of combined day and night sleep regularity showed significant correlations with each preceding age. It was found that the more feedings per day, the shorter the duration of night and day

Table 2

Summary of Findings on Regularity of Sleep by Barnard and Eyres

Age	Total Night Sleep %	Sleep Mean %	Sleep Range %	Day Sleep Mean %	Day Sleep Range %	Median Number Night Awakenings
1 month	31.7	83.6	40.0-91.7	5.5	0-43.5	1.6
4 months	39.9	99.9	66.7-100	0.1	0-33.3	0.5
8 months	43.0	99.9	57.1-100	0.1	0-23.1	0.5

sleep, the less regular both night and day sleep, the more night awakenings. The numbers of night awakenings at 1, 4, 8, and 12 months were negatively correlated at each age with the duration of the longest night sleep and the regularity of night sleep. These correlations were expected. However, the associations among the neonatal infant measures and the sleep-activity variables were less than expected. It was found that newborn infants with higher Deviancy Behavior Scores (DBS) had a tendency to have longer periods of night sleep, especially at 12 months, more regular day sleep at 1 month, and more regular day and night sleep combined at 4 months. The DBS was obtained by rescoring the original scoring system of the BNBAS from a 9-point to a 3-point scale. This modification was necessary to allow comparison of scores collected on various assessment tools. Each infant's behavior on each of the

items of the BNBAS was scored on a 3-point scale developed by the project staff and Dr. Brazelton. They assigned a value of 1 to "normal," 2 to "questionable," and 3 to "deviant". In order for a behavior on a particular item to be coded as either "normal" or "deviant" it must have been so rated by four examiners. The number of items rated as "deviant" was totalled to yield the DBS.

A second modification of the original scoring of the BNBAS was undertaken to form a summary score. Factor analysis of the original 9-point items yielded four behavioral clusters, namely: alertness, irritability, habituation, and motor. A score was assigned to each cluster, with a low score indicating deviancy. Habituation was defined as the infant's ability to decrease his response to repetitive stimuli known as amount of response decrement. Barnard and Eyres (1977) reported that infants with less response decrement to repetitive stimuli (therefore a higher habituation score) had more regular periods of sleep after 8 months while those with a good response decrement had longer day sleep at 4 months. This latter response is understandable as it follows that the infant who is able to shut out stimuli during the daytime should have longer periods of day sleep. The investigators did not offer an explanation for the fact that the infant with less response decrement to repetitive stimuli had more regular sleep at 8 months. There was a positive association between the newborn's

alertness score and regular night sleep at 8 and 12 months. Barnard and Eyres suggest that possibly these infants show good self-differentiation from the beginning and thus can settle down at 8 months more easily. The investigators also reported that there was a positive association between the number of night awakenings at 4 months and the newborn's irritability score. It was found that regular day sleep at 1 month was positively associated with the newborn's motor score while regular night sleep was negatively associated with the motor score. No explanation was offered for this finding.

Further, Barnard and Eyres reported that regularity of all sleep at 1 month was positively associated with the gestational age of the newborn and the longest night sleep was also positively associated with gestational age. These correlations support the premise that regularity of sleeping pattern and longer sleep periods reflect central nervous system maturation.

Barnard and Eyres findings showed that mothers with more education tended to feed their infants more often at 1 month, their infants also tended to have more regular night sleep at 1 and 8 months, and more regular day sleep at 4 months. These same infants also had fewer night awakenings at 4 months. The investigators did not offer any explanation of this finding.

Barnard and Eyres (Study Guide, N-Cast) state that

when the developmental outcomes of the infants were assessed at 2 years of age, the child's performance on the MDI was not associated with any of the early infant assessments such as the BNBAS, or the Dubowitz Gestational Age Assessment with the exception of the neurological status at birth. However, at 2 years of age there was a significant association between the mother's involvement/responsivity, nonintrusive/nonrestrictive scores and her child's scores on the MDI. The mother's involvement/responsiveness, nonintrusive/nonrestrictive scores were obtained from teaching-stimulation observations at 2 years. Barnard and Eyres developed observational guide tools which enable the investigator to observe a mother interacting with her infant and teaching him/her a new task. From these observations, scores can be established which describe two "basic typologies": 1) the mother's involvement and responsiveness, and 2) the mother's non-restrictiveness and nonintrusiveness. The difference on the MDI for the highly involved/responsive group and the less involved/less responsive group was 15 points; while the difference between the nonrestrictive/nonintrusive group and the restrictive/intrusive group was 18 points.

To look for an explanation of these findings the investigators retrospectively examined the data to determine the factors that differentiated the more responsive/more involved mothers and the nonrestrictive/nonintrusive mothers.

Certain characteristics of their infants were found. For example, the infants of the highly involved/responsive mothers tended to perform well in the neurological exam as a newborn, to have temperaments classified as "easy" on Carey's Infant Temperament Questionnaire in the early months, to have moderately irregular sleep patterns at 1 month but to have regular sleep patterns at 8 and 12 months. The only infant characteristic that differentiated the non-restrictive/nonintrusive mothers was a tendency for the infant to have an "easy" temperament in the early months.

The findings of Barnard and Eyres (Study Guide, N-Cast) suggest that regularity of sleep in the infant might be a factor which affects the mother in such a way that her pattern of mothering is more responsive and more involved than would be the case if her infant was an irregular sleeper. They claim that the relationships which they found between early infant characteristics such as the infant's sleeping pattern and later maternal behavior support the view that certain early behavioral responses may be predictors of later developmental outcomes (Study Guide, N-Cast). The usefulness of the SAR was demonstrated in measuring how well the infant was adapting to his/her environment.

The studies reviewed generally agree that the development and duration of sleeping patterns are indicators of the maturation of the central nervous system. Most infants

studied, evidenced regularity of night sleep early in infancy whereas the day sleep was generally irregular for a longer period. One study identified clusters of behavior in the newborn that were associated with regularity of sleep in later infancy.

Infant Temperament Characteristics

In recent years considerable attention has been given to individual differences in infants (Korner & Grobstein, 1967). Korner (1965; 1971) asserts that there are many differences in children that are apparent at birth. Infants differ not only in physical appearance but in the way they react to and interact with people and things in the environment (Blackburn, Study Guide, 1977). Korner (1965; 1971) points out that infants have been shown to differ in sensory responsiveness and also in their ability to be consoled and in their amount or degree of irritability. According to Carey,

> The individual or primary reactive pattern is an independent, major variable which while interacting with the environmental forces in personality development has an existence and continuity of its own (1970, p. 1).

This individual or primary reactive pattern has been termed infant temperament. The concept of infant temperament was introduced by Thomas, Chess, Birch, Hertzig, and Korn (1963) and is defined as the behavioral style of the individual, irrespective of the content, level of ability, or motivation

of particular activity (Thomas & Chess, 1977).

In 1956 the New York Longitudinal Study (NYLS) was initiated (Thomas et al., 1964; Thomas, Chess & Birch, 1968). The purpose of the study was to observe objective temperamental characteristics in children and the relationship of these characteristics to normal and abnormal development. One hundred and thirty-six infants and their parents were drawn from middle and upper middle class families living in New York City or the surrounding suburbs. Seventy-eight percent of the sample was Jewish, 7% Catholic, and 15% Protestant. Forty percent of the mothers and 60% of the fathers had college or postgraduate degrees and less than 10% of the parents had not attended college.

The infants were followed from birth to adolescence with regularly scheduled interviews, observations and psychological testing. Parents were interviewed on a schedule, established according to the infant's age as follows: every 3 months from 3 to 18 months, every 6 months from 2 to 5 years, and annually from 6 to 17 years of age. At 16-17 years of age the adolescent was interviewed separately from the parents. Psychological testing was undertaken at 3 and 6 years while behavioral observations were completed annually beginning with nursery school. Any specialized reports such as those from psychiatric examinations or hospitalizations were included in the data.

The study sought to gather data regarding a wide variety of daily activities. Descriptions of the objective behavior of the child were elicited, rather than possible explanations of the cause of behavior. Using a subset of 18 children to establish validity of parental report, a comparison was made of the parents' description of the child's behavior with that obtained from two independent observers during home visits. The independent scorers' observations agreed with the parental observations at the 0.01 level of confidence.

Nine categories of temperament emerged from inductive content analysis of the parent interview protocols for the infancy period of the first 22 children studied. The nine categories were: activity level, rhythmicity, approach-withdrawal, adaptability, intensity, threshold of responsiveness, quality of mood, distractibility, and attention span or persistence. A 3-point scale was established for each category and the item scores transformed into a weighted score for each category. High intra and interscorer reliability at the 90% level of agreement was achieved. When the data collected for infants up to 2 years of age were subjected to qualitative and factor analysis, three temperamental constellations of functional significance were defined: "easy," "slow-to-warm-up," and "difficult." However, 35% of the children did not fit into any of the temperamental categories and among children who fell into the

same category there was wide variation in the degree of manifestation of symptoms.

One constellation characterized the "easy" child. This child manifested regularity of biological function by taking his feedings or sleeping at the same times each day, showed positive approach responses to new situations, had high adaptability to change, and exhibited mild to moderately intense mood. Forty percent of the NYLS sample fell into this category. At the opposite extreme was a group of children characterized by irregularity of biological function, negative or withdrawing responses to new stimuli, no or slow adaptability to change, and intense mood expression which were frequently negative. This temperament was described as "difficult." Approximately 10% of the sample fell into this group. A third group was characterized by a combination of negative responses of mild intensity to new stimuli, slow adaptability after repeated contact and less tendency to show regularity of biological function. These children were known as "slow-to-warm-up" children. Fifteen percent of the children fell into this group.

It was hypothesized by Thomas et al. that given a uniform environment and set of stresses, certain patternings of temperament would result in certain behavioral disorders more than others. Thomas et al. found that 70% of the difficult children later developed behavior problems.

According to their findings the difficult child occupied no set ordinal position in the family and his siblings showed a wide variety of temperamental characteristics. Parental behavior and attitudes did not initially differ from those of the overall group. Therefore, Thomas et al. make the statement that their hypothesis that children with "difficult" temperamental attributes would be more at risk for behavioral disturbances was confirmed.

Carey (1970) used the work of Thomas et al. to develop a 70-item questionnaire for use in the pediatrician's office. Over a 1-year period he solicited 101 subjects between 4 and 8 months of age from his predominantly middle class private practice. The mothers were asked to rate their babies in each of the nine categories of temperament identified by Thomas et al. (1968). Infants were then classified as one of the following: "difficult," "intermediate-high," "intermediate-low," or "easy." Carey does not mention in the article describing the development of the tool how the remaining 29% of his sample were categorized nor does he mention their score outcomes.

In the initial stages of his study, Carey attempted to compare the results from the questionnaire with the NYLS interview. Four mothers were interviewed by a pediatrician familiar with the NYLS interview and asked to complete the questionnaire immediately afterward. The interview summary was scored by NYLS testers. For three of the four babies

examined by both interviewer and questionnaire there was with one exception complete agreement as to the ratings for the five major categories: rhythmicity, adaptability, approach-withdrawal, intensity and mood. The fourth baby's results were discarded because the baby was less than 3½ months of age whereas the other three babies were all between 6 and 7 months old. It was felt that the questionnaire and the NYLS interview were basically measuring the same characteristics since there was high agreement shown in the results of the two methods in the cases of three of the four infants. It was also shown that the two methods identified about the same percentage of children with temperaments classified as "difficult" in different but similar populations, 10% by interview and 11% by questionnaire.

The validity of Carey's Infant Temperament Questionnaire (ITQ) was further established by comparing the average scores obtained by the questionnaire with those obtained by the interview. By both methods, the average baby was found to be active, regular, adaptable, high in initial approach, mild in intensity of responses, positive in mood, distractible, and persistent. In order to determine test-retest reliability, the same four mothers who were interviewed and given the questionnaire to complete were asked to complete the questionnaire a second time two weeks later. There was complete agreement in the five major categories for the three infants between 6 and 7 months of age.

In 1978 Carey revised his questionnaire in order to increase internal consistency (Carey & McDevitt, 1978). The number of items was increased from 70 to 95 and rating options were increased from 3 to 6 ranging from "almost never" to "almost always." There were more high-low item reversals to reduce social desirability response distortion with the revised questionnaire and the items were randomized as to situation to decrease the chances of a response set. The revised questionnaire was completed by the mothers of 203 infants from 4 to 8 months of age. The sample was drawn from two private practices and one group practice. Internal consistency was improved from 0.76 to 0.83. Test-retest reliability was maintained at the previous acceptable level. It was therefore believed that the old and new questionnaires were measuring the same characteristics. In the revised questionnaire Carey added the "slow-to-warm-up" category included in the Thomas categorization. He thereby had five categories each accounting for the following: "easy" 42.4%; "intermediate-low 31.0%; "intermediate-high" 11.3%; "slow-to-warm-up" 5.9% and "difficult" 9.4%.

A study comparing temperamental differences in monozygotic and dyzygotic twins (Torgersen & Kringlen, 1978) demonstrated at both 9 weeks and 9 months, that the monozygotic twin pairs were more similar temperamentally than the dyzygotic pairs. The intrapair differences between the two

groups became more significant at 9 months. The degree of physical similarity in the dyzygotic twins was independent of their temperamental scores. The result of this study supports the hypothesis that individual differences are inherited characteristics of the infant and are evident from birth. The data on the infants' temperament were obtained through interviews of the mother based on the protocol developed by Thomas et al. (1963).

Burns (1978) studied the relationship between infant temperament and the mother's evaluation of her infant. Using a sample of 50 mother-infant pairs in which the infant was 3 to 5 weeks of age, she found that the infant's intensity of reactions, rhythmicity, and activity level were the temperament characteristics which were most closely related to the mother's perceptions. However, there was a lack of a direct one-to-one relationship between infant temperament and maternal perceptions of the infant.

Moyer (1981) hypothesized that the infant who was classified as "easy" on the Carey ITQ would be more willing to accept food from the mother and as a consequence would tend to be heavier in weight. To test her hypothesis she used a sample of 30 mothers of 4-month old infants. She found an "easy" temperament was associated with overweight infants and a "difficult" temperament was associated with underweight infants.

Campbell (1979) looked at the relationship between infant temperament and mother-infant interaction at two time points, 3 and 8 months, and found that infants rated as "difficult" by their mothers on Carey's ITQ received less responsive mothering at both time points. Mothers were found to spend less time with the infants rated as "difficult." Milliones (1978), using the revised ITQ developed by Carey, also found that the more difficult the infant's temperament as perceived by the mother the less responsive she was to the infant.

Thus it appears that individual behavioral differences are apparent in early infancy and have been termed infant temperament. Most infants can be classified into one of five major categories identified by Carey. There is evidence to support the view that the infant's temperament affects the caregiver's attitudes and responses.

Relation of Temperament to Sleeping Patterns

Moore and Ucko (1953) sought to determine the usual pattern of adjustment to sleeping through the night and the proportion of babies who make this adjustment. They also sought to discover what the differences were between infants who made such an adjustment and infants who did not. They looked for differences in the characteristics of the infant, social environment, and the parents. They defined night sleep as that which occurred between midnight

and 5 a.m. One hundred and sixty infants from central London were included. The sample was fairly representative of the population using the National Health Service and included subjects from each of five major categories of the Registrar General's classification of social class.

The information on sleeping patterns was obtained through routine interviews with the mothers. Home visits were made to a subgroup of 45 mothers during which time more detailed interviews were conducted. The information gained in these interviews confirmed the information given in the routine interviews. In addition, 30 mothers kept daily records of their babies if there was some problem with the sleeping pattern until the infant began to sleep regularly through the night.

Moore and Ucko reported that by 3 months, 70% of the babies had ceased waking, by 6 months 83% had ceased waking while 10% never settled during the first year. Further, of those infants who had settled almost half reverted to night waking, irrespective of age of first settling. The age of settling was defined as the age, estimated to the nearest week, at which the child began his/her first period of four weeks or more of sleeping through the night, waking less than one time per week.

Moore and Ucko found that none of the following variables showed any relationship to the age of settling during

the first three months of life: birth weight, sex, weight increase, weight at 3 months, whether or not the baby had had colic, the age of cutting the first tooth, whether the baby had been breast fed or bottle fed, the age of weaning from the breast, the father's occupational class, the mother's level of education, the mother's age, a change of bed or sleeping room for the infant, infant excitability, the intensity of the infant's crying, or infant cheerfulness.

Several variables were identified as being related to settling. An association was found between asphyxia at birth and failure to settle by 3 months. Forty-eight percent of the babies reported to have had asphyxia at birth failed to settle by 3 months compared to only 28% of the babies without asphyxia who subsequently failed to settle by 3 months. It was found that those babies from the asphyxia group who had failed to settle by 3 months continued to show a greater tendency to have night awakenings throughout the first year of life. It was also found that first and second children differed significantly in age of settling from subsequent children, a larger number of whom tended to settle by 13 weeks. Based on these findings, Moore and Ucko suggested that the experience of having had previous children plays a more important role in an infant's settling than the age or education of the mother.

An association was found between failure to settle by 3 months and whether a baby was "never fed" in the night, "fed sometimes," or "always fed." Only 13% of "unfed" babies failed to settle, compared to 32% of those "fed regularly" and 40% of those "fed sometimes." Further, the group fed sometimes contained a significantly higher proportion of babies that continued to awaken more frequently during the first year. The researchers stated that inconsistent handling might be the cause of the failure of the infant to settle in that the infant has no firm basis on which to establish a regular sleeping pattern. On the other hand the researchers state that the inconsistent handling might be a by-product of maternal anxiety, which could be communicated to the infant in many ways, thereby affecting his ability to relax and sleep soundly.

Moore and Ucko (1957) found that neither the total duration of feedings nor the actual sucking time discriminated between "settlers" and "non-settlers." However, the difference between the length of these two times which they termed the "excess nursing time" was found to discriminate between "settlers" and "non-settlers" by 13 weeks and the difference was significant at the 0.01 level. The "excess nursing time" was a measure of the time given by the mother to the baby for contact and play, over and above the needs for feeding. They reported that the babies that received

the least amount of "excess nursing time" had the greatest tendency to awaken, whereas those that received "a rather excessive" amount were the next most wakeful group. Those infants that received between 10 and 20 minutes in addition to their feeding time settled best. Moore and Ucko state that, apparently, for most infants an adequate amount of contact with the mother is an important factor conducive to the establishment of the sleeping rhythm. The investigators did not report differences in method of feeding, whether breast or bottle, with regards to "excess nursing time." When efforts were made to extend these findings to other aspects of the mother's child care methods and to her personality through the use of a variety of rating methods, the ratings failed to discriminate between infants who settled and those who did not. On the subgroup of 45 cases receiving extra home visits, differences in the ratings of the mothers' child care methods and personalities were in the expected direction: the "settled" babies had mothers who were judged to be more positively accepting, more self-confident, less anxious and who showed less negative feelings towards their infants. However, in general, the differences in the scores of the mothers of "settled" and "non-settled" infants were not statistically significant.

Moore and Ucko postulate that infants have a natural tendency to lengthen their period of continuous night sleep while curtailing daytime sleep. They hypothesize that the settling process is a form of learning at the level of biological adaptation and requires no consciously directed training by the parents. According to them, it is connected with fundamental physiological changes affecting the whole pattern of mental and physical activity, and if disturbed by illness or change will resume when the disturbance is past. If the settling process is delayed beyond the fourth or fifth month, however, the automatic gravitation to the diurnal cycle may be lost and adjustment may then be very difficult to attain. Failure to settle may be due to a lack of wisdom on the part of the parents resulting in either insufficient nursing or too much nursing time. The overly anxious, overly solicitous, ambivalent mother may not give her infant enough of her time. On the other hand the failure to establish rhythmic sleep patterns may be caused from something within the infant such as the delayed effects of asphyxia, or other birth trauma, or perhaps a certain "constitutional sensitiveness" of the infant. Moore and Ucko speculate that continued waking might be related to a failure of adaptation on both sides. The interaction of these factors is so complex it is seldom possible to identify that a given infant's failure to sleep is the result of a particular cause.

The reasons for the relationship between deficiency of nursing time and night waking or failure to settle are not established. Moore and Ucko suggest that there is probably a basic quality of emotional response in the mother which finds expression in a number of ways usually, but not always, in adequate nursing time that contributes to settling. The better sleep record of the third child and subsequent children would support the idea that the mothers of these children are more skilled in handling babies, less anxious about minor disturbances, and less emotionally involved with their individual babies. These mothers are busier but may be more likely to mother their babies in a warm, competent, and healthily balanced way. These findings suggest that a moderately generous amount of nursing and play is recommended from the earliest months since it appears to be conducive to sound sleep as well as to happy relationships.

Carey (1974) undertook a survey of sixty, 6-month old infants randomly selected from his private practice to study the relationship between temperament and night waking in infancy. He was especially interested in the relationship between sensory threshold and night waking as he sought to clarify the term "constitutional sensitiveness" coined by Moore and Ucko (1957). He classified night awakening as the waking and crying of a baby at one or more times between midnight and 5 a.m. on at least four out of seven

nights for at least four consecutive weeks between the age of 6 and 12 months. Mothers were questioned specifically about night awakenings at the routine health maintenance visits when the infants were 6, 8, 10, and 12 months of age. Temperament was measured by the use of Carey's ITQ (1970).

Carey found that 15 of the 60 infants had night awakenings. Of these, five were male and 10 were female, six were first born and nine were later born. The distribution of temperament syndromes showed 46 infants (76.7%) as "easy" or "intermediate-low", and 14 (23.3%) as "intermediate-high" or "difficult." In the group of night awakening babies, 11 (73.3%) were "easy" or "intermediate-low" and 4 (26.7%) were "difficult" or "intermediate-high." An examination of the profile scores in the nine temperamental categories for infants with and without night awakening revealed no significant differences above or below the mean except for the sensory threshold category score. Thirteen of the 15 infants with night awakening had a low sensory threshold score. Night awakening occurred equally in all four temperamental syndromes and not to any greater extent in the more "difficult" infants who are harder to manage in the daytime.

Carey therefore concluded that night waking is a common phenomenon that results from the interaction of a temperamental predisposition with the other factors of health and management, and not just from management alone. He suggests

that is maternal anxiety, anger, or feelings of helplessness are the result rather than the cause of the baby's waking then the mother should not be criticized by rather supported in her mother role.

Bernal (1979) examined the problem of night awakening at 14 months in relation to sleep behavior during the first year of life, tendency to awaken at night at 3 years, and such other variables as type of feeding in infancy, and the characteristics of the mother-child relationship. A convenience sample was obtained of 77 babies, who were the products of normal, vaginal, uncomplicated deliveries, with gestational ages between 38 to 42 weeks and with birth weights between 5.5 and 9 pounds. None of the babies were delivered by forceps and none had had meconium staining. The mothers were between 18 and 30 years of age, and none had had toxemia, diabetes or other illnesses during their prebnancy.

Sources of neonatal information included the delivery record, observations of maternal-infant feeding interactions on the 5th day, neurological and behavioral tests on the 8th day, and a continuous diary kept by the mother fir the first 10 days of her infant's life. The babies were examined at 8, 14, 20 and 30 weeks, and 14 months of age. At each of these times the procedures included two observation periods, assessment of the 48-hour diary kept by the mother and an interview with the mother. At the 8-week visit the observation

period included a feeding followed by approximately one hour of the baby's waking time.

Bernal found that at 14 months, 21 babies were waking regularly at night while three others who had been awakening at night were now sleeping regularly. When the mothers of these 24 babies were asked to keep diaries of the infants' activities for two sample nights, it was found that three infants slept considerably less than the other babies in the sample.

In looking retrospectively at the differences between the "problem babies" and the other babies, it was found that the length of labor was significantly longer for the problem group, a mean of 13.2 hours compared to 6.9. The time to first cry was on the average longer for the problem group than for the control group, 36.4 seconds compared to 19.6 seconds. The "state of the baby scores," total measurements representing evaluations of three aspects of the babies' states at birth, color, muscle tone, and reflex irritability, made by the midwife, student midwife, or other observer in the delivery room were significantly higher for the non-problem group than for the problem group. The problem group babies were fed more frequently. The total amount of crying and the frequency of crying were higher in the problem group in the first 10 days than for the other babies. The longest period of night sleep was shorter at each of the four data

collecting points, 8, 14, 20 and 30 weeks for the problem group than for the non-problem group. A significant relationship was found between the amount of night waking at 30 weeks and sleep problems at 14 months although no relationship was found between night waking at the other data collecting times and sleep problems at 14 months.

Thirty-seven of the 77 infants comprising the sample initially were seen at their third birthday for follow-up. Fifteen of the children were reported to be waking more than one time per night per week and 11 of these were from the problem group. Four children from the problem group were now reclassified as good sleepers. Bernal states that the relationship between frequent wakers at 3 years and at 14 months is significant ($X^2 = 9{\cdot}14$, $p < 0.01$). Since the more difficult course of delivery was associated with greater irritability and wakefulness of babies in the problem group, he suggests that the development of sleep problems may be related to a neurological effect. No significant differences in mothering were found between the two groups in this study and no attempt was made to relate night waking to the individual infant's or child's temperament.

Snow, Jacklin, and Maccoby (1980) studied the relationship between frequency of crying episodes and frequency of sleep-wake transitions and the stability of each over time. Their subjects consisted of three cohorts who were followed

from 3 through 26 months of age. One cohort consisted of infants born at a university hospital serving primarily the families of professional and business people as well as a few welfare mothers. The other two cohort groups were drawn from infants born at a nearby general hospital serving a broader socio-economic group. Selection criteria required that the infants had to have been the result of uncomplicated vaginal deliveries with Apgar scores of at least 7. The authors do not specify whether the Apgar scores had to be "7" at 1 or 5 minutes after birth.

Data on infants' sleep-wake behavior and frequency of crying were obtained from diary records kept by the parents for a 24-hour period at six time points: 3, 6, 9, 12, 18, and 26 months. The 24-hour diaries consisted of 15-minute intervals. Parents were instructed to record their infant's sleep by placing an "S" in each 15 minute interval in which sleep occurred and a "C" in each interval in which crying occurred. The sleep-wake transition score was a measure of the number of times the infant passed from a sleep interval to an awake interval or an awake interval to a sleep interval. The crying episodes score indicated the number of 15 minute intervals in which crying occurred. The mean number of intervals during which crying occurred decreased from 4.4 at 3 months to 1.3 at 26 months. The mean number of transitions between sleep and wakefulness decreased from

10.2 at 3 months to 4.8 at 26 months. Sex differences were not found to be significant.

The frequency of sleep-wake transitions showed some stability over time although it was not as stable as crying frequency. Sleep-wake transition scores were most stable between 6 and 18 months. The frequency of transitions at 6 months significantly predicated transitions at 9, 12, and 18 months. Sleep-wake transitions at 3 and 9 months, 9 and 18, and 18 and 26 months were significantly related. The relation between crying frequency and sleep-wake transitions frequency was significant at 6, 9, and 18 months and approached significance at 3 and 26 months.

Snow et al. concluded that, as suggested by Thomas, Chess, and Birch (1968), crying and sleep irregularity do appear to be characteristics which fall into a common temperamental package. Children who are frequent criers are also likely to display sleep patterns in which they fall asleep and wake up quite frequently. They also found that the likelihood of the crying occurring at sleep-wake transitions was significantly greater than the likelihood of crying's occurring during the remainder of the wakeful time. From these data it appears that between the ages of 3 and 18 months, the infant who cries more during the sleep-wake transition also cries more at other times.

In the discussion of the findings, Snow et al. claimed that babies who are more often in negative moods in early infancy and more irregular in their sleeping pattern are likely to display negative moods relative to their peers at 6, 9, and 18 months. Conversely, young infants who cry infrequently and display regular patterns of sleep are likely to show the same signs of the "easy" temperament as they grow older.

It is speculated by Snow et al. that these differences in temperament will call forth differences in adult caregiving which in turn might reinforce the infant's behavior. For example, the "easy" baby might call forth positive maternal feelings which positively affect caregiving whereas the "difficult" baby might cause his mother to feel frustrated and distressed. Feelings of maternal frustration might exacerbate the already negative condition of the difficult infant or child. Accordingly, once the cyclical process has begun, the outcome in terms of child behavior may be just as much the result of parental input as the inborn tendencies of the infant or child.

Studies have been conducted in an effort to identify variables that contribute to sleep patterns. It has been suggested that there is probably a basic quality of emotional response in the mother than contributes to settling.

This quality often is expressed in adequate nursing time. Low sensory thresholds are associated with night awakenings. Length of labor, condition of the newly born, and amount and frequency of crying in the first 10 days have been related to sleep problems at 14 months. Relationships have been found between frequency of crying episodes and frequency of sleep-wake transitions and the stability of each over time.

Studies Relating Infant Temperament to Mother-Infant Relationships

Korner (1965) points out that research has clearly demonstrated that adequate mothering is crucial for early child development. In addition she questions the extent of the contribution of the child's characteristics to the parent-child interaction.

Burns (1978) examined this question by looking at the relationship between the mother's perception of her infant's temperament and her perception of her infant compared to the "average infant." Fifty primiparous mothers between 18 and 35 years of age, with healthy infants 3 to 5 weeks old, were given three questionnaires: Broussard's Neonatal Perception Inventory II (NPI), Broussard's Degree-of-Bother (DB) Scale, and a modified version of Carey's ITQ.

The Broussard NPI measures the cognitive aspect of the mother's evaluation of her infant by comparing the mother's

perception of the amount of difficulty her baby has in certain areas such as crying or spitting up with the average baby. In Burn's study, mothers viewed the average baby as having more difficulty with the designated behaviors than their own babies. Both for the average baby and their own, crying topped the list as being the most problematic, with predictability being the second most troublesome behavior.

Broussard's DB Scale measures the affective component of a mother's evaluation of her infant. The DB requires a mother to estimate the extent to which she feels bothered by her own baby's crying, predictability, spitting up, feeding, bowel movements and sleeping. Again, crying and predictability topped the list of problematic behaviors in Burns' study.

Multiple regression analysis showed that intensity of reactions was the single most important infant temperamental characteristic and was directly related to negative maternal attitudes. Irregularity of biological function, withdrawal responses, negative moods, and decreased activity levels followed in descending rank order. Rhythmicity then, was one of the three major temperament characteristics that affected the mother's feelings of bother as measured by Broussard's inventory.

Only four out of the seven children rated as difficult

were rated as less than average on the NPI while 10 of the 33 children with easier temperaments were rated as not better than average on the NPI. One the other hand, three of the children rated as "difficult" had NPI and DB scores which indicated that their mothers' attitudes toward them were positive. Burns suggests that these mothers were able to overlook the extreme aspects of these infants' temperaments. A direct relationship between infant temperament and maternal attitudes was not apparent. Burns concluded that it is not clear whether infant temperament influences maternal attitude or whether both variables are influenced by another unidentified variable such as the "mother's psychological state" (p. 61).

Campbell (1979) studied the relationship between the mother-infant interaction and maternal ratings of infant temperament and found that the "difficult" infant received less responsive mothering at 3 and 8 months. The sample included 38 full-term Caucasian infants obtained from a pediatrician's private practice. All the mothers were married, and their mean age was 28 years.

At 3 months, all mother-infant paris were observed in the home for 50 minutes during which time mothers were encouraged to continue with their normal routines. The behaviors of mothers and infants were recorded in 1-minute blocks. At the end of the observation period, the mothers

were asked to complete Carey's ITQ. Mother-infant behavior was again observed in the home at 8 months but coded in 20-second blocks. Maternal ratings of infant temperament were obtained again using the ITQ.

Results indicated that at 3 months, mothers who rated their infants as more irregular in biological functioning spent less time engaged in play and were less responsive to their babies' cries. There was a tendency for these mothers to spend less overall time interacting with their infants. Maternal ratings of temperament failed to correlate significantly with observable infant behavior except that infants who were classified as "difficult" were more likely to cry. However, by 8 months, infants rated as "difficult" no longer cried more than the other infants. Further, the "difficult" infants were no longer rated as more negative in mood or less adaptable than controls. Yet, the mothers of the infants rated as "difficult" at 3 months remained significantly less responsive to their infants' cries and vocalizations. Thus, Campbell concluded that negative maternal perceptions may have deleterious consequences on the development of a positive mother-infant relationship during the first year.

Milliones (1978) also studied the relationship between perceived infant temperament and maternal behaviors in 24 black infants and their mothers. The mean age of the infants

was 11.5 months, and the mean age of the mothers was 24.2 years. The mother-infant pairs were enrolled in what was described by the author "as an outreach primary prevention program in a large urban northern city."

The mothers completed Carey's ITQ (revised). At the same time family specialists who had observed the mother-infant dyad weekly completed the Maternal Variable Scale (MVS). The MVS is a 15-item instrument developed to assess the maternal variables that facilitate positive attachment. The two domains used in developing items for the scale were the quality of contingent responsiveness to the infant and the amount of maternal interaction with the infant. The higher the MVS score, the more responsive the mother. The higher the score in the ITQ (revised), the more temperamentally difficult the infant's temperament was perceived to be by the mother. The results showed a Pearson Correlation of -0.54 ($p < 0.01$) between the MVS and the ITQ scores suggesting that the more "difficult" the infant, the less responsive the mother. Almost 30% of the maternal responsiveness variance was accounted for by temperament. The results of this study further suggest the potential importance of the perceived temperament of the child and its relationship to maternal behavior.

Several researchers have studied the effect of infant temperament on mother-infant interactions. There is evidence

to show that the infant influences the mother's perceptions and also her behavior. Infants classified as "difficult" received less responsive mothering.

Conceptual Framework

From the review of the literature the following conceptual framework has been developed to provide a rationale for the investigation of the relationship between infant temperament and infant sleeping patterns. As a result of the normal development and maturation of the central nervous system, an infant gradually lengthens the duration of his night sleeping, lessens the amount of his daytime sleep, and thus attains the diurnal sleeping pattern. Attainment of the diurnal sleeping pattern coincides with both physiological and behavioral changes and generally occurs around the third month of life. Regularity of the sleep-wake pattern, the times of going to sleep and waking up and the ability of the baby to sleep through the night, the diurnal sleeping pattern, have been used by some investigators as indicators of the baby's ability to handle and adapt to his environment (Barnard & Eyres, 1977).

Irregularity of biological functioning has been considered by some investigators to be a temperamental or innate characteristic of the infant. Thus, Snow et al. (1980) found that there was a significant association

between the frequency of sleep-wake transitions and the frequency of crying episodes. Their study indicated that irregular sleepers were also more irritable and more negative in mood. However, Carey (1974) found that night waking in infants 6 to 12 months of age occurred just as much in the infants classified as "easy" as in the infants classified as "difficult." The relationship between irregularity of sleep and night waking and temperament is not clear. It has been shown, however, that irregularity of biological function may negatively affect maternal attitude (Burns, 1978) and subsequently the care givern to the infant (Campbell, 1979). The present research, therefore, infers a relationship between temperament and regularity of the sleep-wake pattern in the 4-month-old infant. By this time in the infant's life, the diurnal sleep-pattern should be established and temperament may be reliably assessed.

Hypotheses

Infant temperament will affect the infant's sleeping patterns so that:

1) Infants classified as "easy" will have more regular night, day, and total sleep, fewer night awakenings, and more hours of night and day sleep than infants classified as "difficult."

2) The group of infants classified as "easy" and "intermediate-low" will have more regular night, day, and total sleep, fewer night awakenings, and more hours of night and day sleep than a group of infants showing a tendency towards a more difficult temperament and classified as either "intermediate-high," "slow-to-warm-up" or "difficult."

CHAPTER II

METHOD

Subjects

The subjects for this study consisted of 41 mothers and their infants who ranged in age from 3½ to 5 months of age. The convenience sample was obtained from the metropolitan Portland area. In order to represent a broad socio-economic range, the sample was drawn from mothers utilizing three differing sources of infant health care, a county well-child clinic (8 subjects, or 19.5%), the pediatric out-patient clinic of a university hospital (2 subjects, or 4.9%), and the services of three private practice pediatricians (9 subjects, or 22.0%). In addition, 22 subjects (53.7%) were drawn from a county birth list obtained from the Department of Health, Vital Statistics Division, Multnomah County.

Selection criteria required that the mother be primiparous, between 19-35 years of age, and living with the father of the infant. In addition, she was to have completed at least a 10th grade education, and if English was not her first language, she was to have obtained her secondary or college education in English. She was to have had a normal pregnancy with no complications such as diabetes or hypertension and have remained healthy since the birth of

her baby. She was to have been the person providing the infant with the major portion of his/her care and was not to have been away from the infant more than an average of 4 hours per day nor separated from the infant for more than 24 hours since his/her birth. Finally, she was never to have been hospitalized for an emotional problem nor have received medications for such illnesses.

The above criteria were used to provide homogeneity in the sample by controlling for the effect of such extraneous variables as adolescent pregnancy which might affect the relationships. Further, it was expected that primiparas would have had less experience with babies and therefore their perceptions of infants would be different than those of multiparas. It was also believed that if the mother was living with the father of the baby, she would probably have more emotional, social and financial support which would enable her to better meet her infant's physical and emotional needs. The requirement that the mother have at least a 10th grade education or show evidence of proficiency in English was to ensure that the mothers would be able to comprehend the statements and the method of rating their infants on the ITQ (revised) and the instructions for completing the SAR which they were asked to complete. The criteria of not having been hospitalized nor have taken medication for an emotional problem were to decrease the

chances of a mother being emotionally unstable which could possibly affect a mother's perceptions of her infant. The criteria that the mother be the major caregiver, not away from the infant more than 4 hours per day on the average, and not having had a separation for more than 24 hours since the birth of the infant were an attempt to control for amount of time spent away from the infant. A large amount of time either in one instance or on a regular basis could affect the mother's perception of her infant.

Criteria for selection of infants included birth weight greater than 2500 grams, and a gestational age between 38 to 42 weeks. Infants had to have been delivered vaginally following a labor of no more than 24 hours duration with no perinatal complications. In a small number of subjects (4), where the mother was not certain of the exact time of onset of labor, periods of labor up to 30 hours duration were accepted provided there were no perinatal complications. All infants had to have remained healthy since birth and not been hospitalized. The infants were to have been between 3½ to 5 months of age when the ITQ (revised), and the SAR were completed by the mother.

These criteria for infant selection were used to control for the factors of low birth weight, prematurity, and prolonged length of labor, which have been associated with morbidity in the intrapartum period, with disorders of

mental and physical development in childhood, and with disturbances in sleeping patterns (Barnard & Eyres, 1977). Barnard and Eyres for instance, have found that the sleeping patterns of premature infants at 1 month are more irregular than those of full term infants, and other investigators such as Moore and Ucko (1957) have found that there was an association between increased frequency of night waking in the first year of life and asphyxia at birth. The criteria that the deliveries be vaginal was to control for perinatal complications which often lead to the necessity for a cesarean section delivery and to control for possible effects that such a delivery might have on the mother's perception of her infant. It was desirable for the infants to have been in good health since birth in order to attempt to control for possible detrimental effects that illness or hospitalization might have on the sleeping pattern. Also, hospitalization might affect the mother's perception of the infant as a result of separation. The infants were to have been between 3½ to 5 months of age as the diurnal sleep pattern is usually well established by this age (Parmelee et al., 1964) and by this time the temperament can be reliably assessed (Thomas et al., 1968).

In order to control for the possible effects that a greater number of people living in the home might have on the infant's sleeping pattern or on the mother's perception

of the infant, there could be no other persons living in the home besides the mother, father, and infant. It was believed that these criteria, both for infant and mother, would control for factors such as physical health of the infant, emotional and social support of the mother, continuity of contact and consistency of caregiving which might affect the relationship between the perceived temperament and sleeping patterns of the infant.

Data Collection Instruments

The Background Data Sheet, developed by the investigator was used to obtain demographic information such as the mother's age, level of education, and family income as well as further screening information to ensure that all the subjects met the intake criteria. The demographic data were necessary in order to compare the findings of this study with those of other studies in terms of sample characteristics. Appendix A contains a copy of the Background Data Sheet.

The mother's perception of her infant's temperament was obtained through the use of ITQ (revised) developed by Carey (1978) (See Appendix B). Sleep patterns were assessed by the use of the SAR, developed by Barnard (Barnard & Eyres, 1977). See Appendix C for an example of the SAR. Both tools were completed by the mother.

Measurement of the Independent Variable

The independent variable was the mother's perception of the infant' temperament as measured by the ITQ (revised 1977, Carey, 1978). The ITQ (revised) consists of 95 items or statements describing specific behaviors of the infant in certain situations. The mother was asked to rate the frequency with which the statement might be true for her baby on a 6-point Likert scale ranging from "almost never" to "almost always." The statements on the original Carey tool were derived from the research interview of Thomas et al. (1968). They are objective descriptions of the child's behavior in a wide variety of situations and are designed to measure the parent's perceptions of their infants in nine categories of behavior.

The nine categories of reactivity defined by Thomas et al. have been retained in the revised ITQ. They are: activity, rhythmicity, approach-withdrawal, adaptability, intensity, threshold of responsiveness, quality of mood, distractibility, and attention span or persistence. Activity refers to the frequency or tempo of the infant's body movement while rhythmicity relates to the degree of regularity in functions such as sleeping, waking, eating, and bowel movements. Approach-withdrawal defines the infant's initial reaction to new stimuli as food and toys. Adaptability

applies to the ease or difficulty with which an initial pattern may be modified in the direction desired by the caretaker. Intensity refers to the energy content of a response while threshold of responsiveness relates to the level of stimulation necessary to evoke a response. Quality of mood defines amount of pleasant compared to unpleasant behavior. Distractibility refers to the effectiveness of environmental stimuli in altering the direction of on-going behavior and attention span relates to the length of time an activity is pursued.

Approximately half of the items on the revised ITQ are reversed in such a way that in some cases "almost always" indicates a high category rating while in other cases it indicates a low rating. This ordering has been used to reduce social desirability response distortion (Carey, 1978). The items are randomized for content and category to decrease the chance of a response set. Thus statements regarding sleeping or eating are not grouped together as they were in the original questionnaire but are scattered through the instrument.

The ITQ (revised) concludes with a section entitled "Mother's General Impressions" (MGI). The mother is asked to describe in her own words the infant's temperament, to identify how it may have been a problem to her, and to state whether she regards her baby as "about average," "more

difficult," or "easier than average" in relation to other babies. In addition, she is asked to rate her infant's behavior as high, variable, or low, in each of the nine categories.

The instrument is scored by first circling the mother's responses to each of the items on the score sheet. The responses are then tallied by summing the number of circles in each of the six columns for each of the nine categories. These sums are multiplied by a corresponding factor. For example, the sums in the lowest rated column are multiplied by 1 while those in the highest rated column are multiplied by 6. These products are then summed and divided by the number of items that were answered in each of the nine temperament categories to arrive at the category score. The number of items for each category ranges from eight to 13. If an item does not apply to a particular infant, the mother is asked to not respond to that statement. The nine category scores are transferred to the Profile Sheet and a number representing each category score is placed in the box relative to the mean and standard deviations for each category. An example of the scoring sheet and the Profile Sheet are found in Appendices D and E respectively.

In general scores greater than the mean in Carey's standardization sample (1978) indicate more activity, arrhythmicity, withdrawal, slowness to adapt, negativity of

mood, and greater intensity. Thus, the diagnostic cluster "easy" is indicated by a score less than the mean for rhythmicity, approach, adaptability, intensity, and mood. For an infant to be rated as "easy," scores can be greater than the mean in no more than two of the difficult/easy categories (rhythmicity, approach, adaptability, intensity, and mood) and in neither category can the score be greater than one standard deviation. The "difficult" cluster is designated by four or five scores greater than the mean in the five difficult/easy categories. These must include intensity, and two scores must be greater than one standard deviation. The "slow-to-warm-up" cluster is designated by low activity, tending to withdraw, slow adaptability, mild in intensity, and negative in mood. "Intermediate-high" is represented by four or five difficult/easy categories above the mean with two to three scores greater than one standard deviation above the mean. "Intermediate-low" is a cluster that includes all infants who do not fit into one of the other four categories.

For purposes of this study, the four statements on the questionnaire pertaining to sleep (28, 46, 50, and 67) are not included in the scoring procedure. It is recognized that the elimination of the four questions pertaining to sleep may have some effect on the validity and reliability of the tool. However, it was necessary to eliminate those

measurements related to sleep that were part of the tool used for measuring the independent variable to avoid redundancy. It is expected that the effect on the tool's psychometric properties would only be slight as only four out of a total of 95 statements were involved.

Carey and McDevitt (1977) compared the results from the original questionnaire with those from the revised tool (1978) and claim that both questionnaires are measuring approximately the same phenomenon. They based this claim upon the fact that the respective frequencies of the three more difficult diagnoses by the two tools are very similar. For the original and revised tool the frequencies are as follows: "difficult," 12.0% and 9.4%; "intermediate-high," 10.5% and 11.3%; and "slow-to-warm-up," 8.0% and 5.9% respectively. Therefore, Carey and McDevitt claim the same validity for both tools. The authors do not state how they arrived at the score for the "slow-to-warm-up" category from the original data.

Carey was able to improve the internal consistency of the questionnaire from 0.76 for the whole instrument to 0.83 by increasing the number of items from 70 to 95 and by increasing the number of response options from three to six. By computer analysis, all items were evaluated for their correlations with other items in their assigned categories and items not correlating with $r = 0.3$ or better were dropped

and others added in order to ensure that the items were measuring the same variable in the infant. The minimum category value for internal consistency was increased from 0.27 to 0.49. The test-retest reliability for the revised tool was found to be 0.75, and approximates the previous acceptable coefficient of 0.84 which was obtained by having half of the mothers of half of the infants complete the questionnaire a second time with a mean retest interval of 25.1 days.

Measurement of the Dependent Variable

Measures of the dependent variable, sleep regularity, were the scores on the six dimensions of the SAR. These were: regularity of night sleep, regularity of day sleep, regularity of total sleep which include regular night and day sleep, average number of hours of day sleep, average number of hours of night sleep, and average number of night awakenings. The SAR was designed as an aid in helping mothers and health providers gain an objective picture of the infant's sleeping, eating, and waking behaviors. Thus, it can be used to see the relationship between the infant's behaviors and factors in his environment such as caretaking activities. The mother records when the child sleeps, eats, wets, has bowel movements, and when caretaking activities are performed. The record is divided horizontally into 24

one-hour blocks and vertically into seven spaces to facilitate recording for one week. Each day's activities are recorded on a horizontal line. Thus, by examining the record from top to bottom, it is possible to readily assess the infant's pattern of sleep or eating.

The parent's usual time for going to bed and arising are used to designate the infant's night period. If the mother's usual bedtime or time of arising differed from the father's then the mother's times are used to designate the infant's night periods. A bracket is drawn around the night period as defined by the parents' bedtime and awakening time. Straight lines are drawn on the record to the nearest quarter of the hour to indicate when the infant slept. Night awakenings are counted as each break in sleep during the parents' night. The average number of night awakenings per 24 hours are determined by dividing the total number of wakeful night periods for one week by seven. The average number of hours of night and day sleep are determined in like manner, summing the total number of hours for each and dividing by seven. Regularity of night sleep is determined by counting the number of hours during which the infant sleeps more than 30 minutes at least five nights of the week. By scanning the record vertically, the number of times that the infant sleeps for more than 30 minutes during one particular one hour period for five days can be easily counted.

If the infant sleeps during that one hour period for more than 30 minutes on at least five nights then it is counted as one hour of regular sleep. By dividing the number of hours of the infant's regular night sleep by the number of hours in the mother's night and multiplying by 100, a percentage of regular night sleep is determined. In the same manner, the number of hours of regular day sleep and the percentage of regular day sleep are determined. The total amount of regular sleep is determined by adding the total amount of regular night and day sleep, dividing by 24, and multiplying by 100 to obtain the percentage of total regular sleep. A sample SAR and the scoring methods used to determine regularity of sleep and number of night awakenings appears in Appendix C.

For the purposes of this study, only the variables having to do with regularity of sleep, average amount of night and day sleep in hours, and average number of night awakenings were recorded and scored. The developers of the tool state that no attempt was made to check the validity of the mother's recording, nor was there any weekly test-retest reliability testing done. However, since it would be impractical for an observer to go into the infants' homes and observe their sleeping patterns and since videotape machines or other sleep recording devices might be too costly, the mothers' recordings of the infants' sleeping

patterns are the most practical method to obtain the data. Barnard and Eyres (1979) reported that a high percentage of mothers at all time points completed and returned the SAR's indicating a high degree of commitment on the part of the mothers. For instance, 78% of the mothers completed and returned the records at 4 months. In addition, many mothers noted extra observations and went into more detail than they were asked to do also indicating their involvement. While commitment and involvement do not prove reliability or validity, the mothers' efforts suggest that their recordings would be fairly accurate and that they would be fairly reliable.

Design and Procedure

This study used a cross-sectional, ex post facto/correlational design to relate infant temperament to regularity of the sleep patterns. Fifty-two mothers were approached, eight refused, 46 agreed to participate and 41 completed the ITQ and the SAR. The mothers were approached personally by the investigator, the purpose of the study explained, initial screening completed, background information and informed consent obtained. (Appendix F contains an example of the Informed Consent). The mother was given the ITQ (revised) and the SAR to complete at home. She was also provided a stamped pre-addressed envelope for the return of the

questionnaire and the SAR to the investigator. The mother was asked to complete the temperament questionnaire before she began to keep the SAR in order that her perceptions of the infant's temperament would not be influenced by her recording of the infant's sleep pattern.

In the instances where the private pediatrician's permission was given to allow the investigator to contact mothers who met intake criteria, the mother was contacted by telephone either by the investigator or by one of the pediatrician's office staff. The purpose of the study was then explained to the mother and if she agreed to participate an appointment was set up for a home visit. At the home visit the same procedure was followed as was carried out in the well-child clinics.

The subjects recruited from the country birth lists were contacted by the investigator by telephone. If the mother agreed to participate in the study, an appointment for a home visit was made at her convenience. The mother was given the ITQ (revised) and the SAR at the home visit and was asked to return both items by mail in the pre-addressed envelope.

A telephone call was made two days after the initial contact to answer any of the mother's questions and to encourage her to complete the tools. If an ITQ and the SAR were not returned within 10 days or two weeks, a follow-up

telephone call was made. The ITQ and the SAR were coded to preserve the anonymity of the subjects.

CHAPTER III

RESULTS AND DISCUSSION

It was hypothesized that infants classified as "easy" would have more regular night, day, and total sleep, fewer night awakenings, and more hours of night and day sleep than infants classified as "difficult." It was further hypothesized that the group of infants showing a tendency toward as "easy" temperament and classified as "intermediate-low" and "easy" would have more regular night, day, and total sleep, fewer night awakenings, and more hours of night and day sleep than a group of infants showing more "difficult" temperaments and classified as either "intermediate-high," "slow-to-warm-up," and "difficult."

Following a description of the sample, a brief presentation of the findings concerning infant sleeping patterns, the findings regarding the relationship between infant temperament and infant sleeping patterns are discussed. Other findings are then presented and a brief summary concludes the chapter.

The Sample

Over a 3-month period, 46 mother-infant pairs were identified as meeting the criteria for inclusion in the study and agreed to participate. Sleep records and questionnaires were completed and returned by 41 subjects, representing

a response rate of 89.1%. Eight respondents (19.5%) were clients from the Clackamas County Well-Child Clinics, 9 (22%) were from the private practices of three pediatricians, 2 (4.9%) were from a university hospital outpatient clinic, and 22 (53.7%) were from Multnomah County Birth Lists. As this sample was obtained from three diverse types of infant health care services and from a county birth list, it is more likely to be representative of a general population than a sample drawn from only one of the health care settings.

Selected characteristics of the mothers are presented in Table 3. It may be seen that the present sample is similar to that of Barnard and Eyres (1977) with respect to age and education. The difference documented in family income is doubtless more apparent than real, in view of the rise in cost of living from 1974 to 1981. The median income of $14,500 is similar although somewhat lower than the average income of $16,200 for a white family in the U.S. with only the husband working (U.S. Bureau of the Census, 1980). The present sample also resembled the general population of primiparous mothers in Oregon in age and education (State of Oregon, Health Division, 1981).

Eighteen (43.9%) of the infants were male and 23 (56.1%) were female. Eighty-eight percent (N = 36) of the infants were born following a labor of less than 24 hours while 12% (N = 5) were born following a labor of 24 to 30 hours.

Table 3

Characteristics of Mothers of Present Sample, of Barnard and Eyres' Sample, and of all Primiparous Mothers in Oregon

Characteristic of Mother	Present Study (1981)	Barnard & Eyres (1977)	Oregon[a] Primiparous Mothers
Age			
Mean	24.4	24.9	
S.D.	3.2	4.3	
Median	24.0		23.2
Education			
Mean	13.2	14.0	
S.D.	2.0	2.5	
Median	13.0	13.9	12.0
Family Income			
Median	$14,500	$11,500	-----

[a]State of Oregon, Health Division, 1981.

However, none of the infants were reported to have suffered any perinatal complications. The mean age of the infants at the time of recruitment was 17.1 weeks with a range of 14 to 20 weeks.

In Barnard and Eyres's sample, 97 of the infants (50.3%) were male and 96 (49.7%) were female. One-half of the mother-infant pairs in Barnard and Eyres's sample had experienced one or more of the risk factors including a prolonged second stage of labor and an infant Apgar of 6 or below at 1 minute or 5 minutes. In Carey's 1974 sample which related temperament with the incidence of night awakenings, 27 were male (45%) while 33 were female (55%). In Carey and McDevitt's sample, which was used to standardize the revised ITQ, 104 of the infants were boys (51.2%) and 99 were girls (48.8%). The authors do not state the mean birth weight of the infants nor their health status at birth or at the time the questionnaire was completed by their mothers.

The infants of the present sample weighed more on the average than those in Barnard and Eyres's sample (3449 grams compared to 3374 grams) and also more than the average white infants born in the U.S. in 1980 (3449 grams compared to 3402 grams) as reported by the U.S. Bureau of the Census (1980). Perhaps these differences are related to some of the selection criteria for this study, namely that the infant be healthy, the product of a normal, full-term pregnancy, and

free from perinatal complications, while the national averages include all infants. Barnard and Eyres's sample included infants with known risk factors including low-birth weight which would tend to lower the mean birthweight of their sample. However, the general similarity between the present sample and that of Barnard and Eyres makes possible legitimate comparisons of the findings of the two studies regarding sleep patterns and infant temperament.

While Carey's 1974 study looked at the relationship between the temperament of the infant and the number of night awakenings, comparisons between Carey's findings and those of the present study are limited by several factors. First, the infants in Carey's 1974 study were older (6 to 12 months) than those of the present study (3½ to 5 months) which might contribute to differences in the findings between the two studies. Second, Carey did not limit his sample to infants of primiparous mothers as did the present investigator nor did he state the mean birthweight for the infants in his sample. Carey's sample was drawn from his private practice and was comprised of a generally middle class population, however, the mean income of his sample families is not stated. For these reasons comparisons between the findings of the present study and those of Carey's 1974 study are limited.

It is also difficult to make comparisons between the

present study and Moore and Ucko's (1957) study which examined infants' usual pattern of sleeping through the night and tendencies to awaken. The only criterion for inclusion in their study was that the family was to have no plans for moving within 6 months following the birth of the baby. They included infants who had suffered asphyxia at birth and although they related birthweights to infants' tendencies to awaken they did not report a mean birthweight. Thus, although the studies have several factors in common such as number of night awakenings, comparisons between them can only be made with reservation.

In summary, althought the present sample of convenience drawn from three different sources of infant health care in the community and the county birth list can claim civersity of sample sources generalizations of the findings can only be made cautiously. The fact that 53.7% of the sample was obtained from the county birth list means that a certain amount of bias is involved in the sample. The birth list records only the names of those infants whose parents have given permission for the release of their names for advertising purposes and represents approximately 25% of all live births in the county within a certain period (Multnomah County, Department of Vital Statistics, 1981). Certain intake criteria such as the mothers not being away from the baby more than an average of 4 hours per day results in a

sample that is more or less affluent. However, similarities in the characteristics of the present sample and that of Barnard and Eyres make comparisons of the findings between the two studies legitimate. Even though the mean birthweight of the present sample is similar to that reported for all white infants born in the U.S., generalizations of the findings of this study to the larger population must be tempered by consideration of the intake criteria and biases involved in this sample. Comparisons with other studies such as Carey's 1974 study likewise can only be made with reservation.

Percentage Distribution of the Various Temperament Categories

Percentage distributions of the various temperament categories among the samples of Thomas et al. (1968), Carey (1974; 1978), Barnard and Eyres (1977), and the present researcher are presented in Table 4. While no two samples show exactly the same category distributions there are marked similarities among the samples. Except for Barnard and Eyres's sample the percentage of infants classified as "difficult" was very similar: 10% for the NYLS, 9.4% for Carey's 1978 sample, 12.2% for the present sample, but 16.7% for Barnard and Eyres's sample. It is possible that the greater percentage of "difficult" infants in Barnard and Eyres's sample is due to the fact that they used the

original ITQ which did not include a "slow-to-warm-up" category. Infants categorized as "slow-to-warm-up" in Thomas et al.'s interview and in the revised ITQ might be categorized as "difficult" in the original ITQ. Carey reported combined percentage distributions for the "easy/intermediate-low" groups and the "intermediate-high/difficult" groups for his 1974 study, however, these combined scores are similar to those of the other studies.

Table 4

A Comparison of Percentage Distributions of Temperament Classifications Among Five Studies

Temperament Category	NYLS* (1968) N = 136 %	Carey** (1974) N = 60 %	Carey (1978) N = 203 %	Barnard*** (1977) N = 24 %	Present Study (1981) N = 41 %
Difficult	10	23.3**	9.4	16.7	12.2
Slow-To-Warm-Up	15	----	5.9	----	14.6
Intermediate-High	--	----	11.3	8.3	7.3
Intermediate-Low	--	----	31.0	45.8	36.6
Easy	40	76.7**	42.4	29.2	29.3

* The NYLS study reported scores in only 3 categories

** Carey's 1974 study reported combined scores for the difficult/intermediate-high groups and the easy/intermediate-low groups. The slow-to-warm-up category was not included in their scoring.

***Slow-To-Warm-Up category not included in the scoring.

The mean scores of the present sample indicate that the average infant has a slight tendency to be: arrhythmical, unadaptable, negative in mood, nonpersistent, low in threshold, nondistractible; but to be approachable and mild in intensity. The mean scores for each category of the present sample are slightly higher than the scores in Carey's 1978 sample with the exception of activity, approach and intensity. The only categories where the difference is significant ($p < 0.05$) are activity and rhythmicity. This comparison shows that even with samples of differing sizes the means of seven of the nine categories are not significantly different from one another (See Table 5).

Descriptive Findings and Discussion Relating to Infant Sleep Patterns

Measures of the sleep variables are presented in Table 6 both for the present sample and for the infants studied at 4 months of age by Barnard and Eyres (1977). The findings of the two studies are similar with the exception of regularity of day sleep. Barnard and Eyres reported a lower mean of 0.1% for regular day sleep while the present study found a mean of 14.3%. They suggest that there is a possibility that the mothers were less precise in recording day sleep than night sleep but they do not suggest why this might be so. Barnard and Eyres did not report a mean number of hours of night and day sleep. However, the present study

Table 5

Comparison of the Mean Scores of Present Sample on Revised Infant Temperament Questionnaire and Mean Scores of Sample Used by Carey to Standardize the Tool in 1978

Temperament Characteristic	Present Sample (N = 41)		Carey's Sample (N = 203)		
	Mean	S.D.	Mean	S.D	T-Test
Activity	4.05	0.06	4.40	0.56	8.75**
Rhythmicity	2.69	0.85	2.36	0.68	2.2*
Approach	2.18	0.68	2.27	0.78	0.82
Adaptability	2.12	0.64	2.02	0.59	0.91
Intensity	3.24	0.75	3.42	0.71	1.58
Mood	2.94	0.62	2.81	0.68	0.23
Presistence	3.09	0.87	3.03	0.82	0.43
Distractibility	2.27	0.60	2.23	0.60	0.4
Threshold	3.89	0.77	3.79	0.76	0.71

*p $<$ 0.05
**p $<$ 0.001

found a mean of 8 hours for night sleep and 5.7 hours for day sleep resulting in a mean of 13.7 hours for total sleep. This finding is similar to that of Parmelee et al (1964) who reported a mean of 14.53 hours for total sleep for infants 16 weeks of age.

In the present study, babies had a mean number of night awakenings of 1.08 per night, and only 5% (2 infants) were sleeping through the night. This finding differs from that of Moore and Ucko (1957) who claimed that 70% of the infants

Table 6

Comparison of Sleep Pattern Findings of 4-Month-Old Infants in Barnard and Eyres's Study and the 3½-5-Month Old Infants in the Present Study

Sleep Characteristic	Present Study (N = 41)	Barnard & Eyres's Study (N = 139)
Regular Night Sleep Median %	90.0%	99.9%
Regular Day Sleep Median %	14.3%	0.1%
Total Regular Sleep Median %	41.7%	39.9%
Mean No. of Night Awakenings	1.0	0.5
Mean Hours of Night Sleep	8.0	---*
Mean Hours of Day Sleep	5.7	---*

*Not Available

in their sample were sleeping through the night by 3 months and 83% by 6 months. The difference between these two findings may be related to differences in defining the night period and to differences in the method of collecting the data. Moore and Ucko defined the night period as the hours between 12 midnight and 5 a.m. while in the present study the night period was defined as the parents' usual hours of sleeping which was generally 8 hours or more. The longer the night period the more likely an infant would awaken.

Moore and Ucko for the most part used routine interviews with the mother during the first 24 months of the baby's life to obtain their data. The present study employed the SAR on which the mother actually recorded her baby's sleep on a daily basis. It is likely that recording the baby's daily sleep would result in a more accurate record than the recall used for interview data.

Relationship Between Infant Temperament and Sleep Characteristics

From the review of the literature it had been hypothesized that infant temperament would affect the infant's sleeping patterns so that infants classified as "easy" would have more regular night, day, and total sleep, fewer night awakenings, and more hours of night and day sleep, than infants classified as "difficult." Table 7 shows the comparison between the sleep variables for the infants in the five temperament categories. It was found that infants with temperaments classified as "easy" had a significantly greater mean percentage of total regular sleep and a significantly greater number of hours of night sleep than infants classified as "difficult." "Easy" infants were found to have a greater percentage of regular night sleep, regular day sleep, and a greater amount of day sleep that the "difficult" infants but these differences were not significant. Thus, the hypothesis was supported in part.

Table 7

Comparison of Mean Sleep Variable Scores
Among Five Temperament Classifications

Temperament Classification	Sleep Variable Scores* RNS %	RDS %	TRS %	NNA Number	NSH Hours	DHS Hours
Easy	93.0	15.5	44.0	0.8	8.4	5.8
Intermediate-Low	90.3	16.9	43.8	1.1	7.9	6.2
Intermediate-High	78.3	13.3	38.9	1.7	7.4	5.9
Slow-To-Warm-Up	87.8	21.1	46.5	1.5	7.7	6.9
Difficult	91.8	7.9	35.0	0.8	7.2	5.5
Difference Between Easy and Difficult (t-test)	0.26	1.78	2.28**	0.08	2.61***	0.47

*Sleep Variable Abbreviations:
RNS - Regular Night Sleep)
RDS - Regular Day Sleep)----------(Expressed as a mean percentage)
TRS - Total Regular Sleep)

NNA - Number of Night Awakenings)
NSH - Night Sleep Hours)----(Expressed as a mean number)
DSH - Day Sleep Hours)

** $p < 0.05$
*** $p < 0.02$

It was also hypothesized that the group of infants classified as either "easy" or "intermediate-low" would have more regular night, day, and total sleep, fewer night awakenings, and more hours of night and day sleep than a group of infants showing a tendency towards a more "difficult" temperament and classified as either "intermediate-high," "slow-to-warm-up," or "difficult." When the infants classified as "easy" and "intermediate-low" were grouped together and the infants classified as "intermediate-high," "slow-to-warm-up," and "difficult" were grouped, the numbers in the respective groups increased to 27 and 14. A comparison of the combined groups appears in Table 8. It was found that the "easy/intermediate-low" group had more regular night, day, and total sleep, fewer night awakenings, and more hours of night sleep compared to the "intermediate-high/slow-to-warm-up/difficult" group, however, the differences were not significant. The "intermediate-high/slow-to-warm-up/difficult" group were found to have more hours of day sleep but the difference was again not significant. Thus, this hypothesis was not supported.

It was speculated that the "slow-to-warm-up" infants are a special group in that they showed the highest percentage of total regular sleep, regular day sleep, and one of the highest means for number hours of day sleep (See Table 7). They had more regular day sleep than the "easy" infants

Table 8

Comparison of Sleep Variable Means Between the "Easy/Intermediate-Low" Group and All Others

Sleep Variables	Temperament: Easy/Intermediate-Low (N = 27) Mean	S.D.	All Others (N = 14) Mean	S.D.	t-test
Regular Night Sleep	91.50%	10.42	87.17%	13.51	n.s.
Regular Day Sleep	16.28%	10.44	15.59%	11.30	n.s.
Total Regular Sleep	43.88%	7.21	40.77%	8.03	n.s.
Number of Night Awakenings	0.98	0.69	1.27	0.92	n.s.
Number Hours of Night Sleep	8.10	0.95	7.46	1.01	n.s.
Number Hours of Day Sleep	6.00	1.45	6.44	1.70	n.s.

*$p < 0.05$

and significantly more than the "difficult" infants ($p < 0.05$. They also had significantly more total regular sleep than the "difficult" infants ($p < 0.05$).

To examine the data further the "slow-to-warm-up" infants were excluded from the "intermediate-high/difficult" infant group. When the "easy/intermediate-low" infants were compared to the "intermediate-high/difficult" infants the differences between the two groups were much the same as between the "easy" and "difficult" groups, that is, the "easy/intermediate-low" group had significantly more total regular sleep and significantly more night sleep hours than the "intermediate-high/difficult" group. The "intermediate-high/difficult" group had slightly more hours of day sleep than the "easy/intermediate-low" infants but the difference was not significant. Table 9 presents the comparisons between the "easy/intermediate-low" groups of infants and the more "difficult" infant group.

These findings lend further support to the speculation that the "slow-to-warm-up" infants are a special group. Further, the findings support the view that the "easy/intermediate-low" infants are similar in temperament while "intermediate-high/difficult" infants are also similar. Conventionally, the "slow-to-warm-up" group are rank ordered next to the "difficult" group (Carey, 1978). In scoring it is frequently noted that the "slow-to-warm-up infant has a

Table 9

Comparison of Sleep Variable Means Between the "Easy"/"Intermediate-Low" Group and the "Intermediate-High"/"Difficult" Group

Sleep Variable	Temperament: Easy/Intermediate-Low (N = 27) Mean	S.D.	Intermediate-High/Difficult (N = 8) Mean	S.D.	t-test
Regular Night Sleep	91.50%	10.42	86.71%		n.s.
Regular Day Sleep	16.28%	10.44	15.0 %		n.s.
Total Regular Sleep	43.88%	7.21	36.5 %		2.73*
Number of Night Awakenings	0.98	0.69	1.14		n.s.
Number of Hours of Night Sleep	8.10	0.95	7.29	0.95	2.07**
Number of Hours of Day Sleep	6.00	1.45	6.08	2.06	n.s.

*$p < 0.01$

**$p < 0.05$

profile very similar to that of the "intermediate-low" infant. This suggests that the "slow-to-warm-up" infant should be ranked between the "intermediate-low" and the "intermediate-high" infant. These findings suggest that in comparisons of infant temperament and sleeping patterns the "slow-to-warm-up" infants should have a sleep profile more similar to the "intermediate-low" and "easy" infant.

The individual category scores, the infants' overall temperament rating expressed as an ordinal value and the MGI scores, were correlated with the six sleep variables. Several significant correlations were found as shown in Table 10. The MGI scores are the mother's 3-point ratings of her baby in the nine categories of reactivity and her overall impression of her baby's temperament and do not necessarily agree with the scores derived from the questionnaire as a whole.

It was found that the easier the temperament according to the overall rating the greater the tendency for the infant to have more hours of night sleep ($r = -0.33$, $p < 0.05$). Infants with high thresholds also tended to have more hours of night sleep ($r = -0.29$, $p < 0.05$) which supports Carey's 1974 finding that 13 out of 15 wakeful babies had lower thresholds than the nonwakeful babies. According to MGI scores the milder and the less distractible the infant, the more hours that the infant slept at night, and the greater

the percentage of regular night sleep. The milder the infant and the less distractible as determined by the overall questionnaire scores the greater the percentage of total regular sleep. The more positive the mood according to the MGI scores the more hours of night sleep.

Table 10

Significant Correlations Between Infant Temperament and Infant Sleep Variables

Temperament Category	RNS	RDS	TRS	NNA	NSH	DSH
Rhythmicity						-0.27*
Intensity	-0.28*		-0.26*			
Persistence				-0.27*		-0.27*
Distractibility			-0.29*			
Threshold				-0.29*		
Temperament Rating Score				-0.33*		
Mother's General Impression Scores (MGI)						
Adaptability		0.33*	0.34*	-0.37**		
Approach		-0.32*	-0.40**			
Mood					-0.28*	
Intensity					0.38**	
Distractibility	0.27*				0.52***	-0.32*

*p ≤ 0.05

**p ≤ 0.01

***p ≤ 0.001

Less persistent infants tended to awaken more frequently at night ($r = 0.27$, $p \leq 0.05$). This relationship between the number of night awakenings and persistence is interesting and points out the fact that the sleeping process is a complex phenomenon and is not only physiological in nature.

The more adaptable the infant according to the MGI scores the more frequently he/she would awaken at night ($r = -0.37$, $p \leq 0.009$); the less adaptable according to the MGI scores, the greater was the percentage of regular day and total regular sleep ($r = 0.33$, $p \leq 0.02$; and $r = 0.34$, $p \leq 0.02$ respectively). The more approachable the infant according to the MGI scores the greater was the percentage of regular day and total sleep ($r = -0.32$, $p \leq 0.02$; and $r = -0.40$, $p \leq 0.005$, respectively). These three associations between MGI scores and the infants' sleep patterns are difficult to explain. For instance, the finding that the association of frequent night awakenings and the infant being perceived as more adaptable according to the MGI scores is contrary to the support found for hypothesis one. However, hypothesis one is supported by data obtained from the calculated overall questionnaire scores. A comparison of the MGI scores with the more detailed descriptions of the infants as rated by the questionnaire in the nine categories of reactivity showed that in only three categories (approach/withdrawal, threshold, and rhythmicity) did the

MGI scores correlate significantly with the questionnaire category score. This discrepancy between the MGI and the overall temperament score has been noted by other researchers.

In the study by Barnard and Eyres (1977), a special cohort of 24 mothers completed Carey's ITQ at 1, 4, 8, and 12 months. They found that at 1 month only 2 of the 9 reactivity category scores showed significant relationships with the MGI scores, whereas at 4 months, 7 of the categories showed significant relationships. The improved correlations found at 4 months compared to those at 1 month may relate to the fact that it was the second time that the mothers completed the questionnaire, thus they were more familiar with the questionnaire and the study as a whole and they felt less of a need to present their infant as socially desirable. Carey (1970) reported that a substantial number of mothers presented general impression scores that markedly minimized the amount of difficulty their babies were giving them according to their questionnaire answers. He suggested that the mothers did this in order to make their babies more socially desirable. In the present study, of the five infants classified as "difficult," two were rated by their mothers as being "easier than average" and two were reported as being "about average" on the MGI score. The fifth mother did not complete this page.

Other Findings

Positive correlations were found between the mother's age and the infant's persistence scores ($r = 0.42$, $p < 0.01$), and between the mother's level of education and the infant's persistence scores ($r = 0.50$, $p < 0.000$). The older, better educated mother had an infant who was less persisting and mothers with higher incomes tended to view their infants as being less persisting. This could be a chance finding related to the small sample size or it could be that the older, better educated mother with a higher income spends more time with the baby and tends to anticipate the baby's needs before the baby gets really upset and thus prevents the infant from persisting in the accomplishment of a task. It would be interesting to see if this correlation persisted in the following months and years.

There was a tendency for female infants to have more regular night sleep ($r = 0.26$, $p < 0.05$), and fewer awakenings ($r = -0.26$, $p \leq 0.05$). There was a tendency for male infants to be seen by their mothers as being more withdrawing ($r = -0.26$, $p = 0.05$), and less persistent ($r = -0.39$, $p < 0.01$) and for female infants to be seen as more regular in biological function ($r = -0.33$, $p < 0.02$) and more negative in mood ($r = 0.31$, $p < 0.05$). These significant findings based on the MGI scores are difficult to interpret.

They lend support to the traditional view that mothers perceive and relate differently to male and female infants.

Summary of Findings

The results of this study show that there is some relationship between "easy" or "difficult" temperament and the regularity of the infant's sleeping pattern, the number of night awakenings and the amount of sleep the baby is taking. It was found that infants classified as "easy" had a significantly greater percentage of total regular sleep and more hours of night sleep than infants classified as "difficult." The combined group of "easy/intermediate-low" infants was also found to have a significantly higher percentage of total regular sleep and more hours of night sleep than the "intermediate-high/difficult" group of infants. Infants with a tendency toward a more "easy" temperament also were found to have more regular night sleep, more regular day sleep, fewer night awakenings and fewer hours of day sleep, compared to the infants in the "intermediate-high/difficult" group but these differences were not significant.

Infants who tended to be milder in intensity tended to have more regular night and total sleep and infants who tended to be less persistent tended to awaken more at night. Infants who were viewed by their mothers' as being more

positive in mood, mild in intensity, and not easily distracted had a tendency to sleep more at night compared to other infants.

CHAPTER IV

SUMMARY AND CONCLUSIONS

The regularity of the infant's sleeping patterns and the ability of the infant to sleep through the night are two common concerns of parents during the first few months of life. Parents can be reassured that as a result of central nervous system maturation most infants will gradually lengthen their periods of sleep particularly at night and will attain the diurnal (night-sleeping, day-waking) pattern by 3 to 4 months of age. There is some evidence that certain characteristics of parental handling, such as the length of time the mother holds her baby during a feeding apart from actual sucking time have some effect on the baby's ability to sleep through the night, but few studies have examined the effect that the infant's own temperament has on his/her ability to sleep through the night and to establish regular sleep patterns. In light of the increasing interest in the temperament of the infant as an important factor in the mother-infant interaction and in the physical-emotional-intellectual development of the infant, it is important to clarify the influence of temperament on two common parental concerns of the infancy period: regularity of the infant's sleeping pattern and the ability of the infant to sleep through the night.

The intent of this study was to focus on the possible relationship between infant temperament and the regularity of the infant's sleeping pattern and his/her ability to sleep through the night as reflected in the number of night awakenings. Specific questions asked were: a) are the sleeping patterns of infants perceived by their mothers as having an "easy" temperament more regular than those of infants classified as "difficult?" b) do infants classified as "easy" have a greater number of hours of night and day sleep? c) is there a tendency for infants classified as "difficult" to have a greater number of night awakenings than infants classified as "easy?"

Forty-one mother-infant pairs were recruited from three different types of health care services and from a county birth list. The mothers who were all primiparous between 19-35 years of age, had had no illnesses or complications during the pregnancy or delivery, and were not away from the baby more than 4 hours per day on the average. They were living with the father of the baby, had at least a 10th grade education and were fluent in English. The infants who were all healthy were the products of uncomplicated, vaginal deliveries, had had a birthweight greater than 5 lbs, 10 oz., and their perinatal periods had been uncomplicated.

Three data collection instruments were used in this study: a background data sheet, the ITQ (revised), and the SAR developed by Barnard. The background data sheet was developed by the investigator and was used both as a screening tool to ensure that the mother-infant pair met the requirements for admission to the study, and to collect descriptive data regarding study subjects. Carey's revised ITQ was completed by the mothers at home and was used to measure the independent variable infant temperament. The SAR was completed by the mother over a 7-day period and provided measures of the dependent variable.

It was hypothesized that infants classified as "easy" would have more regular night, day, and total sleep, fewer night awakenings, and more hours of night and day sleep than infants classified as "difficult."

The hypothesis was partially supported in that infants classified as "easy" had a significantly greater percentage of total regular sleep and a significantly greater amount of night sleep hours than the "difficult" group. It was also found that the "easy" infants had a greater percentage of regular night and day sleep, fewer night awakenings, and more hours of day sleep than the "difficult" infants but the differences were not statistically significant. It was further hypothesized that the group of easier infants classified as "easy" and "intermediate-low" in temperament

would have more regular night, day, and total sleep, fewer night awakenings, and more hours of night and day sleep than a group of more "difficult"infants classified as "intermediate-high," "slow-to-warm-up," and "difficult." This hypothesis was not supported. The differences between the combined groups although not statistically significant were in the same direction as those between the "easy" and "difficult" groups with the exception of day sleep hours. However, when the "slow-to-warm-up" group was excluded from the "difficult" group it was found that the "easy/intermediate-low" group had a significantly greater percentage of total sleep, and a greater amount of night sleep hours than the "intermediate-high/difficult" group, findings similar to those comparing the "easy" and "difficult" groups. The "slow-to-warm-up" infants were found to be a special group having the highest mean percentage of regular day sleep and total regular sleep, the highest mean number of night awakenings, and one of the highest mean numbers of day sleep hours. They were found to have significantly more day sleep hours and a significantly greater percentage of total regular sleep than the "difficult" infants.

Several significant correlations were found between individual category scores of the overall temperament questionnaire and the sleep variables. For instance, the less intense the infant, the greater the percentage of both

regular night and total sleep. Intensity is one of the most important of the temperament characteristics that differentiates the "difficult" from the "not difficult" infants (Thomas et al., 1963) and this relationship between intensity and regularity of sleep suggests that infants with "difficult" characteristics have less regular sleep. Infants with high thresholds tended to have more hours of night sleep. Less persistent infants tended to have a greater number of night awakenings and less distractible infants tended to have a greater percentage of regular night and total sleep than other infants. Thus, the findings indicate that there may be a relationship between behavioral style or temperament and the regularity of sleep, number of night awakenings, and number of hours of night sleep.

Several significant correlations between demographic variables and temperament characteristics were found. Older mothers with more education tended to have infants who were less persistent, and mothers with higher incomes tended to view their infants on the MGI scores as being less persistent than other infants. Female infants tended to have more regular night sleep, fewer night awakenings and to be viewed by their mothers as being more regular in their biological functioning.

Analysis of the SAR's yielded the following descriptive data: the median percentage of regular night sleep was 90,

of regular day sleep was 14.3 and of total regular sleep was 41.7. Most infants in the sample were awakening at least one time per night. The mean number of hours of night sleep for the infants was 8 while the mean number of hours of day sleep was 5.7.

Suggestions for Future Research

Several limitations of this research should be acknowledged as well as potentials for future research pointed out. The county birth lists provided an opportunity to obtain a more diverse sample in a shorter period of time than would have been possible using either one or all of the sources. However, some self-selection was involved in using this list as it consists of parents who consent to have their names released for advertisement purposes. This probably resulted in a somewhat biased sample. There was some difficulty in obtaining the cooperation of the mothers whose names were recruited from the birth lists. Approximately eight potential subjects (27%) whose names were obtained from this source declined to participate in the study whereas none of the mothers recruited from the other sources declined. Considerable time and energy was spent in obtaining subjects from the birth lists in making contact, setting up appointments, making home visits, and in follow-up telephone calls. A randomly selected sample gathered

over a longer period of time from the three different sources of health care services would probably require less time and effort, and probably result in better cooperation of the mothers participating.

This study was limited to 41 mother-infant pairs. A study needs to be done using a larger randomly obtained sample in order that the sample be more representative and the results more generalizable. A study with a sample representative of all socio-economic levels needs to be undertaken in order to make comparisons between potential differences in infant sleeping patterns and temperament that may be related to socio-economic factors.

Another suggestion for future study would be to replicate this study with mothers of 6 to 9-month-old infants to increase our knowledge of infant sleeping patterns for this age group. While the findings of the present study did not support Carey's 1974 findings that infants with more night awakenings tended to have lower sensory thresholds, a study of older infants might support his findings.

In order to increase the homogeneity of the sample in the present study the intake criteria necessitated the exclusion of certain families such as those in which the mother is employed outside the home, those in which the mother is not living with the father of the baby, those in which persons other than the father and mother are living

in the home, and those cases in which the mother is not a first-time mother. It would be interesting to do a similar study including some if not all of the above mentioned variables to allow for further comparisons. For instance, what differences could be found between the regularity of sleeping patterns, number of night awakenings, and amount of night and day sleep of infants of first time mothers compared to infants of experienced mothers? What differences, if any, could be found between the sleeping patterns of infants in which the mother is employed outside the home and those of infants where the mother is not employed outside the home? Does having other persons living in the home on a regular basis affect the sleeping pattern of infants? What differences could be found between the sleeping patterns of those infants in which the mother is living with the father of the baby and those in which the mother is not living with the father of the baby?

Another study that might prove interesting would be to relate initial reactivity as measured by the Brazelton newborn exam to the same infant's sleeping pattern at 3 months and his/her intensity scores at 3 months. Such a study would further clarify the relationship between a newborn's initial pattern of reactivity with sleep patterns and temperament at 3 months and might be useful for predictive purposes and in parent education.

The relationship found between the mother's age, education, and income and the infant's persistence scores could be further clarified in another study where the questionnaire is administered when the infant is 3 or 4 months old and at subsequent ages. Should such a relationship be found it would be interesting to ascertain if the relationship held over time.

One problem encountered in this study was the possibility that mothers were not keeping accurate records of their infants sleeping patterns. In several cases mothers delayed starting the record until the infant had recovered from immunization shots or a cold. The similarity of the findings of the data obtained from the SAR's of the present study with those of Barnard and Eyres' (1977) is reassuring in this regard but there is no guarantee that mothers in both studies did not err in recording their infant's sleep and waking pattern in an effort to make their baby appear to be well adjusted and to be sleeping through the night. If mothers are used as the source of data collection which seems feasible for this type of study, then the findings must be considered in light of this factor.

Implications for Practice

The results of the study support the findings of other studies regarding the development of infant sleeping patterns.

This growing body of knowledge should be utilized by professional nurses in educating and reassuring parents. By 3 to 4 months of age most infants will be sleeping on the average of 8 hours each night and 90% of their night sleep will take place at the same time from day to day. This information should be a source of encouragement for parents concerned about the irregularity of their young infant's sleeping pattern. Parents of 3½ to 5-month old infants who awaken at least one time per night may likewise be reassurred that this is a common occurrence and that in a study of 41 infants it was found that the average number of night awakenings was 1 per night.

Nurses working in well-child clinics, pediatric outpatient clinics, pediatricians offices, and on the pediatric wards in the hospital should be alert for infant behavior that displays a high degree of intensity or for statements by parents indicating that their baby has extremely intense reactions. Such observations or statements might be an indication for having the parents complete the ITQ (revised) in order to gain a more complete picture of the baby's pattern of reactivity. A more complete description of the infant would enable the nurse to interpret the infant's behavior to the parents and work with them to gain a better understanding of their baby and assist them in their parenting activities.

If a mother complains that her infant's sleeping or eating pattern is irregular the nurse working in the well-child clinic or other guidance and counseling situation might have the mother keep a record of the infant's sleeping or eating pattern for 7 days using the SAR. Such a record makes it possible for the nurse and the mother to make a more objective assessment of the problem while the mother learns more about her infant's individual patterns.

The relationship found between regularity of sleep and distractibility can be used by nurses in counseling parents. If parents feel that their infant's sleeping patterns are irregular, the nurse might make inquiries regarding the ease with which the infant is distracted or the nurse might have the parents complete the ITQ (revised). If the infant does have a tendency to be easily distracted the parents should be encouraged to decrease environmental stimuli as much as possible when attempting to get the baby to sleep and while he/she is asleep.

Regularity of the infant's sleeping pattern and the temperament of the infant in the first months of life are two important characteristics that have been shown to differentiate mothering patterns when the infant is 2-years of age. The relationship of these two variables in 3½ to 5-month-old infants has been explored in this study. More research is needed to clarify the relationship between

those variables which can potentially affect the infant's growth and development and the mother-infant interaction.

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APPENDIX A

Background Data Sheet

Code No. _____

Date of Interview:

_____

Background Data Sheet

A. Mother's Birthdate: _____

B. Mother's Education: Circle the number of the highest level of education attained.

Grade School: 1 2 3 4 5 6 7 8
High School: 1 2 3 4
College: 1 2 3 4
Post Graduate: 1 2 3 Highest Degree:_____

C. Mother living with the father of the infant:

Yes_____
No _____

D. Family Income Level: Please check one.

Less than $6000_____
$6001-$7000 _____
$7001-$8000 _____
$8001-$9000 _____
$9001-$10,000 _____
$10,001-$11,000_____
$11,001-$12,000_____
$12,001-$13,000_____
$13,001-$14,000_____
$15,001-$16,000_____
$17,001-$18,000_____
More than $18,001_____

E. Infant Sex: Male: _____ Female: _____

F. Infant Birthdate: Month_____ Day_____

G. Infant Birthweight: _____lbs. _____oz.

H. Length of Pregnancy: _____Weeks

I. Other persons besides the mother and father of the infant living in the home:

Yes_____ No_____

Please answer the following questions by placing and 'X' in the appropriate column.

		Yes	No
1.	This is my first full term pregnancy.	____	____
2.	I have been physically healthy since the birth of my baby.	____	____
3.	The baby receives the majority of its care from me.	____	____
4.	English is my basic language.	____	____
5.	I have been with my baby with no interruptions of 24 hours or more since his/her birth.	____	____
6.	I saw my baby regularly while in the hospital.	____	____
7.	The baby went home from the hospital with me.	____	____
8.	The baby was born vaginally.	____	____
9.	My labor was 24 hours or less in duration.	____	____
10.	The baby breathed without difficulty following birth.	____	____
11.	He/she required oxygen.	____	____
12.	Have you ever been hospitalized or taken medication for an emotional problem?	____	____
13.	I am not away from my baby more than four hours per day on the average.	____	____

APPENDIX B

Infant Temperament Questionnaire

Infant Temperament Questionnaire
(for 4 to 8 monht old infants)

Revised, 1977

by William B. Carey, M.D.
and
Sean C. McDevitt, Ph.D.

Child's Name: _____ Sex_____

Date of Birth: _____ Present Age_____

Rater's Name: _____ Relationship to Child_____

Date of Rating: _____

The purpose of this questionnaire is to determine the general pattern of your infant's reactions to his/her environment.

The questionnaire consists of several pages of statements about your infant. Please circle the number indicating the frequency with which you think the statement is true for your infant. Although some of the statements seem to be similar, they are not the same and should be rated independently. If any item cannot be answered or does not apply to your infant, just draw a line through it. If your infant has changed with respect to any of the areas covered, use the response that best describes the recently established pattern. There are no good or bad or right and wrong answers, only descriptions of what your infant does. When you have completed the questionnaire, which will take about

25-30 minutes, you may make any additional comments at the end.

Using the following scale, please circle the number that indicates how often the infant's recent and current behavior has been like that described by each item.

Almost Never	Rarely	Variable Usually Does Not	Variable Usually Does	Frequently	Almost Always
1	2	3	4	5	6

1.	The infant eats about the same amount of solid food (within 1 oz) from day to day.	Almost Never	1	2	3	4	5	6	Almost Always
2.	The infant is fussy on waking up and going to sleep (frowns, cries).	Almost Never	1	2	3	4	5	6	Almost Always
3.	The infant plays with a toy for under a minute and then looks for another toy or activity.	Almost Never	1	2	3	4	5	6	Almost Always
4.	The infant sits still while satching TV or other nearby activity.	Almost Never	1	2	3	4	5	6	Almost Always
5.	The infant accepts right away any change in place or position of feeding or person giving it.	Almost Never	1	2	3	4	5	6	Almost Always
6.	The infant accepts nail cutting without protest.	Almost Never	1	2	3	4	5	6	Almost Always
7.	The infant's hunger cry can be stopped for over minute by picking up, pacifier, putting on bib, etc.	Almost Never	1	2	3	4	5	6	Almost Always

Almost Never 1	Rarely 2	Variable Usually Does Not 3	Variable Usually Does 4	Frequently 5	Almost Always 6

8.	The infant plays continuously for more than 10 minutes at a time with a favorite toy.	Almost Never	1	2	3	4	5	6	Almost Always
9.	The infant accepts his/her bath any time of the day without resisting it.	Almost Never	1	2	3	4	5	6	Almost Always
10.	The infant takes feedings quietly with mild expression of likes and dislikes.	Almost Never	1	2	3	4	5	6	Almost Always
11.	The infant indicates discomfort (fusses or squirms) when diaper is soiled with bowel movement.	Almost Never	1	2	3	4	5	6	Almost Always
12.	The infant lies quietly in the bath.	Almost Never	1	2	3	4	5	6	Almost Always
13.	The infant wants and takes milk feedings at about the same times (within an hour) from day to day.	Almost Never	1	2	3	4	5	6	Almost Always
14.	The infant is shy (turns away or clings to mother) on meeting any other child for the first time.	Almost Never	1	2	3	4	5	6	Almost Always
15.	The infant continues to fuss during diaper change in spite of efforts to distract him/her with game, toy, or singing, etc.	Almost Never	1	2	3	4	5	6	Almost Always

Almost Never 1	Rarely 2	Variable Usually Does Not 3	Variable Usually Does 4	Frequently 5	Almost Always 6

16.	The infant amuses self for ½ hour or more in crib or playpen (looking at mobile, playing with toy).	Almost Never	1	2	3	4	5	6	Almost Always
17.	The infant moves about much (kicks, grabs, squirms) during diapering and dressing.	Almost Never	1	2	3	4	5	6	Almost Always
18.	The infant vigorously resists additional food or milke when full (spits out, clamps mouth closed, bats at spoon, etc.).	Almost Never	1	2	3	4	5	6	Almost Always
19.	The infant resists changes in feeding schedule (1 hour or more) even after two tries.	Almost Never	1	2	3	4	5	6	Almost Always
20.	The infant's bowel movements come at different times from day to day (over one hour difference).	Almost Never	1	2	3	4	5	6	Almost Always
21.	The infant stops play and watches when someone walks by.	Almost Never	1	2	3	4	5	6	Almost Always
22.	The infant ignores voices or other ordinary sounds when playing with a favorite toy.	Almost Never	1	2	3	4	5	6	Almost Always
23.	The infant makes happy sounds (coos, smiles, laughs) when being diapered or dressed.	Almost Never	1	2	3	4	5	6	Almost Always

Almost Never 1	Rarely 2	Variable Usually Does Not 3	Variable Usually Does 4	Frequently 5	Almost Always 6

24.	The infant accepts new foods right away, swallowing them promptly.	Almost Never	1	2	3	4	5	6	Almost Always
25.	The infant watches other children playing for under a minute and then looks elsewhere.	Almost Never	1	2	3	4	5	6	Almost Always
26.	The infant reacts mildly (just blinks or startles briefly) to bright light such as flash bulb or letting sunlight in by pulling up shade.	Almost Never	1	2	3	4	5	6	Almost Always
27.	The infant is pleasant (smiles, laughs) when first arriving in unfamiliar places (friend's house, store)	Almost Never	1	2	3	4	5	6	Almost Always
28.	The infant gets sleepy at about the same time each evening (within ½ hour).	Almost Never	1	2	3	4	5	6	Almost Always
29.	The infant accepts regular procedures (hair brushing, face washing, etc.) at any time without protest.	Almost Never	1	2	3	4	5	6	Almost Always
30.	The infant sits still (little squirming) while traveling in car seat or stroller.	Almost Never	1	2	3	4	5	6	Almost Always
31.	The infant's initial reaction to a new baby sitter is rejection (crying, clinging to mother, etc.).	Almost Never	1	2	3	4	5	6	Almost Always

Almost Never 1	Rarely 2	Variable Usually Does Not 3	Variable Usually Does 4	Frequently 5	Almost Always 6

32.	The infant keeps at it for many minutes when working on a new skill (rolling over, picking up object,etc.).	Almost Never	1	2	3	4	5	6	Almost Always
33.	The infant moves much (squirms, bounces, kicks) while lying awake in crib.	Almost Never	1	2	3	4	5	6	Almost Always
34.	The infant objects to being bathed in a different place or by a different person even after 2 or 3 tries.	Almost Never	1	2	3	4	5	6	Almost Always
35.	The amount of milk the infant takes at feeding is quite unpredictable (over 2 oz. difference) from feeding to feeding.	Almost Never	1	2	3	4	5	6	Almost Always
36.	For the first few minutes in a new place or situation (new store or home) the infant is fretful.	Almost Never	1	2	3	4	5	6	Almost Always
37.	The infant notices (looks carefully at) changes in the appearance or dress (hairdo, unfamiliar clothing) of the mother.	Almost Never	1	2	3	4	5	6	Almost Always
38.	The infant reacts strongly to foods, whether positively (smacks lips, laughs, squeals) or negatively (cries).	Almost Never	1	2	3	4	5	6	Almost Always

Almost Never 1	Rarely 2	Variable Usually Does Not 3	Variable Usually Does 4	Frequently 5	Almost Always 6

39.	The infant is pleasant (coos, smiles, etc.) during procedures like hair brushing or face washing.	Almost Never	1	2	3	4	5	6	Almost Always
40.	The infant continues to cry in spite of several minutes of soothing.	Almost Never	1	2	3	4	5	6	Almost Always
41.	The infant keeps trying to get a desired toy, which is out of reach, for 2 minutes or more.	Almost Never	1	2	3	4	5	6	Almost Always
42.	The infant greets a new toy with a loud voice and much expression of feeling (whether positive or negative).	Almost Never	1	2	3	4	5	6	Almost Always
43.	The infant plays actively with parents - much movement of arms, legs, body.	Almost Never	1	2	3	4	5	6	Almost Always
44.	The infant watches another toy when offered even though already holding one.	Almost Never	1	2	3	4	5	6	Almost Always
45.	The infant's initial reaction at home to approach by strangers is acceptance.	Almost Never	1	2	3	4	5	6	Almost Always
46.	The infant wants daytime naps at differing times (over 1 hour difference) from day to day.	Almost Never	1	2	3	4	5	6	Almost Always

Almost Never 1	Rarely 3	Variable Usually Does Not 3	Variable Usually Does 4	Frequently 5	Almost Always 6

47.	The infant continues eating solid foods without reacting to differences in taste or consistency.	Almost Never	1	2	3	4	5	6	Almost Always
48.	The infant cries when left to play alone.	Almost Never	1	2	3	4	5	6	Almost Always
49.	The infant adjusts within 10 minutes to new surroundings (home, store, play area).	Almost Never	1	2	3	4	5	6	Almost Always
50.	The infant's daytime naps are about the same length from day to day (under one half hour difference).	Almost Never	1	2	3	4	5	6	Almost Always
51.	The infant moves about much during feedings (squirms, kicks, grabs).	Almost Never	1	2	3	4	5	6	Almost Always
52.	The infant reacts (stares or startles) to sudden changes in lighting (flash blubs, turning on light).	Almost Never	1	2	3	4	5	6	Almost Always
53.	The infant can be soothed by talking or games when sleepy.	Almost Never	1	2	3	4	5	6	Almost Always
54.	The infant displays much feeling (vigorous laugh or cry) during diapering or dressing.	Almost Never	1	2	3	4	5	6	Almost Always

Almost Never 1	Rarely 2	Variable Usually Does Not 3	Variable Usually Does 4	Frequently 5	Almost Always 6

55.	The infant lies still when asleep and wakes up in same place.	Almost Never	1	2	3	4	5	6	Almost Always
56.	The infant adjusts easily and sleeps well within 1 or 2 days with changes of time or place.	Almost Never	1	2	3	4	5	6	Almost Always
57.	The infant reacts to changes in temperature or type of milk or substitution of juice.	Almost Never	1	2	3	4	5	6	Almost Always
58.	The infant watches television for more than 5 minutes at a time.	Almost Never	1	2	3	4	5	6	Almost Always
59.	The infant can be calmed for a few minutes by being picked up, played with, T.V., if fussing about soiled diaper.	Almost Never	1	2	3	4	5	6	Almost Always
60.	The infant wants and takes solid food feedings at about the same time (within 1 hour) from day to day.	Almost Never	1	2	3	4	5	6	Almost Always
61.	The infant is content (smiles, coos) during interruptions of milk or solid feedings.	Almost Never	1	2	3	4	5	6	Almost Always
62.	The infant accepts within a few minutes a change in place of bath or person giving it.	Almost Never	1	2	3	4	5	6	Almost Always

Almost Never 1	Rarely 2	Variable Usually Does Not 3	Variable Usually Does 4	Frequently 5	Almost Always 6

63.	The infant cries for less than one minute when given an injection.	Almost Never	1	2	3	4	5	6	Almost Always
64.	The infant shows much bodily movement (kicks, waves arms) when crying.	Almost Never	1	2	3	4	5	6	Almost Always
65.	The infant continues to react to a loud noise (hammering, barking dog, etc.) heard several times in the same day.	Almost Never	1	2	3	4	5	6	Almost Always
66.	The infant's initial reaction is withdrawal (turns head, spits out) when consistency, flavor or temperature of solid foods is changed.	Almost Never	1	2	3	4	5	6	Almost Always
67.	The infant's time of waking in the morning varies greatly (by 1 hour or more) from day to day.	Almost Never	1	2	3	4	5	6	Almost Always
68.	The infant continues to reject disliked food or medicine in spite of parents' efforts to distract with games or tricks.	Almost Never	1	2	3	4	5	6	Almost Always
69.	The infant reacts even to a gentle touch (startle, wriggle, laugh, cry).	Almost Never	1	2	3	4	5	6	Almost Always

Almost Never 1	Rarely 2	Variable Usually Does Not 3	Variable Usually Does 4	Frequently 5	Almost Always 6

70.	The infant reacts strongly to strangers: laughing or crying.	Almost Never	1	2	3	4	5	6	Almost Always
71.	The infant actively grasps or touches objects within his/her reach (hair, spoon, glasses, etc.).	Almost Never	1	2	3	4	5	6	Almost Always
72.	The infant will take any food offered without seeming to notice the difference.	Almost Never	1	2	3	4	5	6	Almost Always
73.	The infant's period of greatest physical activity comes at same time of day.	Almost Never	1	2	3	4	5	6	Almost Always
74.	The infant appears bothered (cries, squirms) when first put down in a different sleeping place.	Almost Never	1	2	3	4	5	6	Almost Always
75.	The infant reacts mildly to meeting familiar people (quiet smiles or no response).	Almost Never	1	2	3	4	5	6	Almost Always
76.	The infant is fussy or moody throughout a cold or an intestinal virus.	Almost Never	1	2	3	4	5	6	Almost Always
77.	The infant wants an extra feeding at a different time each day (over one hour difference).	Almost Never	1	2	3	4	5	6	Almost Always

Almost Never 1	Rarely 2	Variable Usually Does Not 3	Variable Usually Does 4	Frequently 5	Almost Always 6

78.	The infant is still wary or frightened of strangers after 15 minutes.	Almost Never	1	2	3	4	5	6	Almost Always
79.	The infant lies still and moves little while playing with toys.	Almost Never	1	2	3	4	5	6	Almost Always
80.	The infant can be distracted from fussing or squirming during a procedure (nail cutting, hair brushing, etc.) by a game, singing, T.V., etc.).	Almost Never	1	2	3	4	5	6	Almost Always
81.	The infant remains pleasant or calm with minor injuries (bumps, pinches).	Almost Never	1	2	3	4	5	6	Almost Always
82.	The infant's initial reaction to seeing doctor is acceptance (smiles, coos).	Almost Never	1	2	3	4	5	6	Almost Always
83.	The infant reacts to a disliked food even if it is mixed with a preferred one.	Almost Never	1	2	3	4	5	6	Almost Always
84.	The infant plays quietly and calmly with toys (little vocalization or other noises).	Almost Never	1	2	3	4	5	6	Almost Always
85.	The infant's fussy period occurs at about the same time of day (morning, afternoon or evening).	Almost Never	1	2	3	4	5	6	Almost Always

Almost Never 1	Rarely 2	Variable Usually Does Not 3	Variable Usually Does 4	Frequently 5	Almost Always 6

86.	The infant lies still during procedures like hair brushing or nail cutting.	Almost Never	1	2	3	4	5	6	Almost Always
87.	The infant stops sucking and looks when he/she hears an unusual noise (telephone, door bell) when drinking milk.	Almost Never	1	2	3	4	5	6	Almost Always
88.	The infant pays attention to game with parent for only a minute or so.	Almost Never	1	2	3	4	5	6	Almost Always
89.	The infant is calm in the bath. Like or dislike is mildly expressed (smiles or frowns).	Almost Never	1	2	3	4	5	6	Almost Always
90.	The infant requires introduction of a new food on 3 or more occasions before he/she will accept (swallow) it.	Almost Never	1	2	3	4	5	6	Almost Always
91.	The infant's first reaction to any new procedure (first haircut, new medicine, etc.) is objection.	Almost Never	1	2	3	4	5	6	Almost Always
92.	The infant acts the same when the diaper is wet as when it is dry. (no reaction)	Almost Never	1	2	3	4	5	6	Almost Always

Almost Never 1	Rarely 2	Variable Usually Does Not 3	Variable Usually Does 4	Frequently 5	Almost Always 6

93.	The infant is fussy or cries during the physical examination by the doctor.	Almost Never	1	2	3	4	5	6	Almost Always
94.	The infant accepts changes in solid food (type, amount, timing) within 1 or 2 tries.	Almost Never	1	2	3	4	5	6	Almost Always
95.	The infant moves much and for several minutes or more when playing by self (kicking, waving arms and bouncing).	Almost Never	1	2	3	4	5	6	Almost Always

APPENDIX C

Sleep-Activity Record

N U R S I N G C H I L D A S S E S S M E N T S L E E P / A C T I V I T Y R E C O R D Figure 1

CAREGIVERS USUAL BEDTIME 11:00 p.m.

CAREGIVERS USUAL AWAKENING 8:00 a.m.

CHILD'S NAME BOY BABY
Last Name First Name

BIRTH DATE 11/16/81

DATE OF RECORDING 3/25-3/31/81

DATE	12 NOON	1	2	3	4	5	6	7	8	9	10	X 11	X 12 MID.	X 1	X 2	X 3	X 4	X 5	X 6	X 7	8	9	10	11	24 HOUR SUMMARY No. Hrs. Night Sleep	No. Hrs. Day Sleep	No. Nght. Awak ening
3/25	1	1	.5			.75					.75	1	1	1	1	1	1	.75	1	1	.5	.	.5	1	8.75	6.0	1
3/26	.5	.25	.5			.25	.5		.75			1	1	1	1	1	1	1	1	.5		.75	1		8.5	4.5	1
3/27				.5	.25		.75				.75	1	1	1	1	1	1	1	1	.5		.75	1		8.5	4.0	1
3/28				.75	1						.5	1	1	1	1	1	1	1	1	1	1	.5			9.0	3.75	1
3/29		1	1				.75			.5	.75	1	1	1	1	1	1	1	1	.75	.75				8.75	4.75	1
3/30	.5			.75	1	.25				.5	1	1	1	1	1	1	1	1	1		.25	1	1	.75	8.00	7.00	1
3/31			.75			.25		.5	.25		.25	1	1	1	1	1	1	1	1	1			.75		9.00	2.75	0
																									TOTALS 60.5	32.75	6

S Y M B O L S

——— Sleep

— Indicates that on out of 7 days infant was sleeping more than min, in that 1 hour period.

S U M M A R Y

Average No. of hours of night sleep = 8.64

Average No. of hours of day sleep = 4.7

Average No. of night awakenings = 0.86

No. of hours in mother's night = 9.0

No. of hours of regular night sleep = 8.0

% of regular night sleep 8÷9 x 100 = 88.9 or 89%

No. of hours in mother's day = 15

No. of hours of regular day sleep = 0

% regular day sleep = 0

No. of hours of total regular sleep = 8 + 0 = 8

% total regular sleep = 8 ÷ 24 x 100 = 333%

Developed by the University of Washington, School of Nursing NCAP Project.

APPENDIX D

Infant Temperament Scoring Sheet

INFANT TEMPERAMENT QUESTIONNAIRE [Rev. 1977]

NAME Baby Boy DATE OF RATING 3/25/81 AGE 20 Weeks

ACTIVITY (low high)	RHYTHMICITY (rhyth arrh)	APPROACH (app with)	ADAPTABILITY (adap nonad)	INTENSITY (mild int)	MOOD (pos neg)	PERSISTENCE (pers non)	DISTRACTIBILITY (dist non)	THRESHOLD (high low)
4 (6) 5 4 3 2 1	1 6 (5) 4 3 2 1	5 6 (5) 4 3 2 1	6 6 5 (4) 3 2 1	10 6 5 4 (3) 2 1	2 6 5 (4) 3 2 1	3 1 2 3 4 5 6	7 6 5 (4) 3 2 1	11 1 2 3 4 5 6
12 6 5 4 (3) 2 1	13 6 5 (4) 3 2 1	14 1 2 3 4 5 6	9 6 (5) 4 3 2 1			8 6 5 4 (3) 2 1		
17 1 2 3 4 (5) 6	10 1 2 3 (4) 5 6	24 6 5 4 3 (2) 1	19 1 2 (3) 4 5 6	18 1 2 3 4 (5) 6	23 6 5 (4) 3 2 1	16 6 5 4 (3) 2 1	15 1 (2) 3 4 5 6	22 6 5 4 3 (2) 1
	28 6 5 4 3 2 1		29 6 5 (4) 3 2 1	26 6 5 (4) 3 2 1	27 6 5 (4) 3 2 1	25 1 (2) 3 4 5 6	21 6 (5) 4 3 2 1	
30 (6) 5 4 3 2 1	35 1 (2) 3 4 5 6	31 1 (2) 3 4 5 6	34 1 2 (3) 4 5 6	38 1 (2) 3 4 5 6	39 6 5 4 (3) 2 1	32 6 5 (4) 3 2 1	40 (1) 2 3 4 5 6	37 (1) 2 3 4 5 1
33 1 2 3 4 (5) 6		36 1 (2) 3 4 5 6		42 1 2 3 (4) 5 6		41 6 5 4 (3) 2 1		
43 1 2 3 4 5 (6)								
51 1 2 3 (4) 5 6	46 1 2 3 4 5 6	45 6 (5) 4 3 2 1	49 6 (5) 4 3 2 1	54 1 2 3 (4) 5 6	48 1 2 3 4 (5) 6	58 6 5 (4) 3 2 1	44 6 5 4 (3) 2 1	47 6 5 4 (3) 2 1
55 6 5 (4) 3 2 1	50 6 5 4 3 2 1		56 6 (5) 4 3 2 1				53 6 (5) 4 3 2 1	52 1 2 3 (4) 5 6
	60 6 5 (4) 3 2 1						59 (6) 5 4 3 2 1	57 1 (2) 3 4 5 6
64 1 2 3 (4) 5 6	67 1 2 3 4 5 6	62 6 (5) 4 3 2 1	65 1 2 3 (4) 5 6	70 1 2 (3) 4 5 6	61 6 5 4 3 (2) 1		68 1 2 (3) 4 5 6	69 1 2 (3) 4 5 6
71 1 2 3 (4) 5 6	73 6 5 4 (3) 2 1	66 1 2 3 (4) 5 6		75 6 5 4 3 (2) 1	63 6 5 4 (3) 2 1			72 6 5 4 (3) 2 1
		74 1 2 (3) 4 5 6						
79 6 5 4 3 (2) 1	77 1 2 (3) 4 5 6	82 6 5 (4) 3 2 1	78 1 (2) 3 4 5 6	81 6 5 4 (3) 2 1	76 1 2 3 (4) 5 6	88 1 2 (3) 4 5 6	80 (6) 5 4 3 2 1	83 1 2 3 (4) 5 6
86 6 5 4 (3) 2 1	85 6 5 (4) 3 2 1		90 1 2 3 (4) 5 6	89 6 5 (4) 3 2 1	81 6 (5) 4 3 2 1		87 6 5 (4) 3 2 1	
95 1 2 3 (4) 5 6		91 1 2 (3) 4 5 6	94 6 5 (4) 3 2 1		93 1 (2) 3 4 5 6			92 6 5 4 (3) 2 1

Total	2 1 6 3 1	2 4 2	1 5 3 1 1	4 5 2	1 3 4 2	2 2 4 2	1 4 3	3 3 3 1	1 1 1 6 1
Factor	X 1 2 3 4 5 6	X 1 2 3 4 5 6	X 1 2 3 4 5 6	X 1 2 3 4 5 6	X 1 2 3 4 5 6	X 1 2 3 4 5 6	X 1 2 3 4 5 6	X 1 2 3 4 5 6	X 1 2 3 4 5 6
Product	2 3 24 15 6	4 12 8	1 10 9 4 5	8 15 8	2 9 16 10	4 6 16 10	2 12 12	3 6 9 4	1 2 3 24 5
Sum Products	50	24	29	31	37	36	26	22	35
No Items Rated	13	8	11	11	10	10	8	10	10
Category Score	3.85	3	2.64	2.82	3.7	3.6	3.25	2.2	3.5

Instruction to scorer: 1) Check off above responses on questionnaire. 2) For category score add checks in 6 column and multiply sums by factors indicated. Resulting products are added and divided by number of items rated, producing category score. 3) Nine category scores are transferred to Profile Sheet.

APPENDIX E

Infant Temperament Profile Sheet

INFANT TEMPERAMENT QUESTIONNAIRE - PROFILE SHEET

for 4 to 8 month old infants

Revised 1977 by William B. Carey, M.D., and Sean C. McDevitt, Ph.D.

Name of Child Baby Boy Date of Rating 3-25-81

Age at Rating: 5 Months _____ Days Sex M

Category score from Scoring Sheet:

3.85 3.0 2.64 2.82 3.7 3.6 3.25 2.2 3.5

Profile: Place mark in appropriate box below.

	Activity	Rhythm.	App/With	Adapt.	Intens.	Mood	Persist.	Distract.	Thresh.
	High	arryth.	withdraw	slowly adapt. 2.82	intense	negative 3.6	low per	low dist.	low
1 SD	4.96	3.05	3.05	2.61	4.13	3.48	3.48	3.85	4.55
		3.0	2.64		3.7		3.25		
Mean	4.40	2.36	2.27	2.02	3.42	2.81	3.03	2.23	3.79
	3.85							2.2	3.5
1 SD	3.83	2.68	1.50	1.42	2.71	2.13	2.20	1.63	3.04
1	low	very rhyth.	app.	very adapt.	mild	positive	high per	high distr.	high

Diagnostic clusters:

Easy		rhyth.	app.	adapt.	mild	positive			
Diff		arryth.	withdraw	slowly adapt.	intense	negative			
STWU	low		withdraw	slowly adapt.	mile	negative			

Definition of diagnostic clusters used for individual scoring:

Easy - Scores greater than mean in no more than two of difficult/easy categories (rhythmicity, approach, adaptability, intensity, and mood) and neither greater than one standard deviation.

Difficult - 4 or 5 scores greater than mean in difficult/easy categories (rhythmicity, approach, adaptability, intensity and mood). These must include intensity and two scores must be greater than 1 standard deviation.

Slow-to-warm-up - as defined above, but, if either withdrawal of slow adaptability is greater than 1 standard deviation, activity may vary up to 4.68 and mood may vary down to 2.47.

Intermediate - all others. Intermediate high - 4 or 5 difficult/easy categories mean with one > 1 standard deviation or 2 or 3 above mean with 2 or 3 > 1 standard deviation. Intermediate low - all others intermediates.

This child's diagnostic cluster difficult Date of Scoring 4-8-81

Comments: Scorer

APPENDIX F

Consent Form for Human Research

Code Number_____

GRADUATE STUDIES DEPARTMENT
SCHOOL OF NURSING

Area Code 503 225-7838

122

3181 S.W. Sam Jackson Park Road

Portland, Oregon 97201

UNIVERSITY OF OREGON

HEALTH SCIENCES CENTER

INFORMED CONSENT FORM

I, _____ herewith
(First Name) (Middle Name) (Last Name)
agree to serve as a subject in the investigation named "Infant Temperament and Sleep Patterns" by Judy Fraser, R.N.,B.S. under the supervision of Wilma E. Peterson, R.N., Ph.D. The investigation aims at relating infant temperament characteristics to the infant's sleep-wake patterns.

The procedure to which I will be subjected will be to complete a questionnaire concerning the infant's temperament. The total time required to complete the questionnaire will be about 30 to 60 minutes. I will be expected to keep a record of my infant's sleep and activity for seven consecutive days. This will involve about 15 minutes total time per day. My participation in the study will help nurses learn more about the infant temperament as it relates to infant sleep patterns which are often of concern to parents.

The information obtained will be kept confidential. My name will not appear on the records and anonymity will be insured by use of code numbers. I understand I am free to refuse to participate or to withdraw from participation in the study at any time without effect on my relationship with or treatment at _____.
(Name of Institution)

It is not the policy of the Department of Health, Education and Welfare or any other agency funding the research project in which you are participating, to compensate or provide medical treatment for human subjects in the event the research results in physical injury. The University of Oregon Health Sciences Center, as an agency of the state, is covered by the State Liability Fund. If you suffer injury from the research project, compensation would be available to you only if you establish that the injury occurred through the fault of the Center, its officers or employees.

If you have further questions, please call Michael D. Baird, M.D. at (503) 225-8014.

I have read the foregoing.

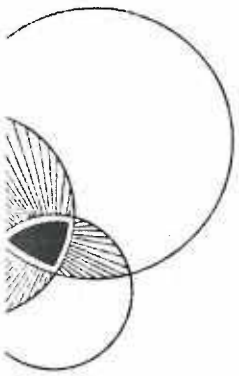
(Date)

(Subject's Signature)

(Witness' Signature)

APPENDIX G

Permission Form to use the Sleep-Activity Record



NCAST
Nursing Child Assessment Satellite Training

ner

e
ctor

April 1, 1980

Ms. Judy Fraser
924 N.E.44th Ave., Apt. 1
Portland, Oregon 97213

Dear Ms. Fraser:

Thank you for your letter of March 19 to Dr. Kathryn Barnard. She has asked me to advise you that you have her permission to use the NCASA material in your graduate studies.

Enclosed please find the NCASA manual for use with the NCASA record. The cost of the manual is $3.25. Should you also need a pad of NCASA record forms (25 sheets), that is also $3.25. If you wish us to send you the latter, please make your check in the amount of $6.50. Otherwise, please remit promptly the $3.25 for the NCASA manual. Check should be made payable to NCAT/University of Washington, andmailed to the address shown below.

Thank you.

[redacted]
Verna G. Smith
Program Assistant

Encl.

APPENDIX H

Permission Forms to use the Infant Temperament Questionnaire

319 West Front Street
Media, PA, USA, 19063

Judy Fraser
Portland, Oregon

3/25/80

Dear Ms. Fraser:

Thank you for your recent inquiry about:
(✓) the Infant Temperament Questionnaire
( ) the Behavioral Style Questionnaire

Please excuse the use of this form letter for our response. It enables us to reply more rapidly.

Enclosed is a sample of:
(✓) the Infant Temperament Questionnaire for 4 to 8 month old infants (revised 1977)
( ) the Behavioral Style Questionnaire for 3 to 7 year old children (developed in 1975)

along with the appropriate scoring and profile sheets.

Since both of these instruments were developed without any grant support, we ask that you send a contribution of $5.00 for each instrument to help us cover expenses. Thank you for your $5.00 check.

These forms may be photocopied as much as you wish. However, you must obtain our permission before making any changes in wording for format.

The category means and standard deviations for our standardization samples (203 for I.T.Q. and 350 for B.S.Q.) are to be found on the Profile Sheets. Please notice that distractibility is scored differently on the two forms. For any further information on scoring, reliability, validity and uses, please see the appropriate publications. If you have any other questions or problems, please write directly to use.

We request that you share with us the results of any study using either of these forms.

Sincerely yours,

William B. Carey, M.D.
319 West Front Street
Media, PA 19063
Telephone: (215) 566-6641

Sean C. McDevitt, Ph.D.
Psychology Department
Terry Children's Psychiatric Center
New Castle, Delaware 19720
(302) 421-6698

(Note: This is a direct copy of original letter sent to investigator. Investigator has original letter in her personal files and is available upon request).

AN ABSTRACT OF THE THESIS OF

JUDITH E. FRASER

For the MASTER OF NURSING

Date of Receiving this Degree: June 11, 1982

TITLE: INFANT TEMPERAMENT AND SLEEP PATTERNS

Approved: _____
Wilma E. Peterson, R.N.,Ph.D., Thesis Advisor

Regularity of infant sleep patterns and the ability to sleep through the night are two common concerns of parents. There is suggestive evidence that certain characteristics of parental handling have an effect on the infant's ability to sleep through the night. Few studies have examined the relationship between the infant's temperament and sleep patterns. The present study involving 41 mother-infant pairs was undertaken to ascertain if relationships were present between infant temperament, the independent variable, measured by the Infant Temperament Questionnaire (revised) and regularity of infant sleeping patterns and the ability to sleep through the night, dependent variable, measured by the Sleep Activity Record.

It was hypothesized that infants classified as "easy" would have more regular night, day, and total sleep, fewer night awakenings, and more hours of day and night sleep than infants classified as "difficult." This hypothesis

was partially supported in that infants classified as "easy" had a significantly greater percentage of total regular sleep and a significantly greater amount of night sleep hours than the "difficult" group. It was also found that the "easy" infants had a greater percentage of regular night and day sleep, fewer night awakenings, and more hours of day sleep than the "difficult" infants, however, the differences were not statistically significant. It was further hypothesized that the group of easier infants classified as "easy" and "intermediate-low" would have more regular night, day, and total sleep, fewer night awakenings, and more hours of night and day sleep than a group of more difficult infants classified as "intermediate-high," "slow-to-warm-up," and "difficult." This hypothesis was not supported.

Several significant correlations were found between individual temperamental category scores and the sleep variables. For instance, the less intense infant the greater the percentage of regular night and total sleep, while infants with high thresholds tended to have more hours of night sleep. These findings indicate a relationship between the temperamental characteristics and the regularity of sleep, number of night awakenings, and the number of hours of night sleep.

Significant correlations were also found between demographic variables and infant temperament. Older mothers

with more education tended to have infants who were less persistent and mothers who had higher incomes viewed their infants as less persistent.

Suggestions for further research are made as well as implications for practice.