

A STUDY OF THE RELATIONSHIP
BETWEEN PERINATAL RISK
FACTORS AND
TEMPERAMENT
IN CHILDREN

By

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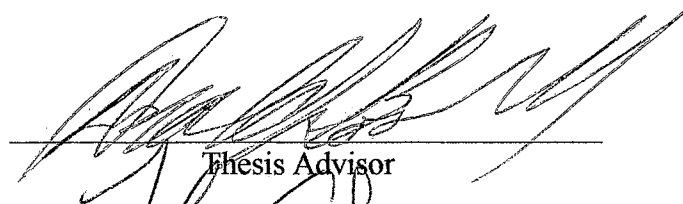
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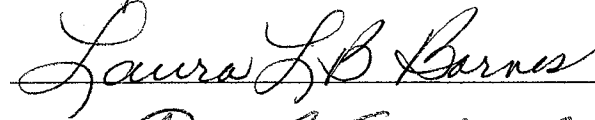
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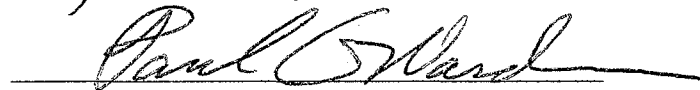
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CHAPTER 1

INTRODUCTION

School psychologists have consistently focused their assessments on intellectual ability, achievement, and behavioral problems. It is important for school psychologists to understand the causative mechanisms and linkages operating early in development so that they can provide a realistic picture of developmental trajectories to parents and teachers. School psychologists must be able to identify risk factors and supply sophisticated developmental explanations for the types of problems they discuss with parents and teachers. In child psychology, there has been more emphasis in the past on diagnosing psychopathology than on prevention. The emphasis is now moving toward the earlier identification of children at risk to facilitate preventive interventions. In planning for the prevention of psychiatric disorders in children, it is essential to take into account the child's temperamental traits. A common theme in the research involving temperament has been to examine how specific temperamental traits relate to behavioral syndromes.

Temperament in young children has been linked to the development of later personality traits. Bass and Plomin (1986) defined temperament as inherited personality traits present early in childhood. There is a growing body of literature that discusses the development of temperament beginning with birth. The construct of temperament, seen as early emerging traits that are the basis for later developing personality, presents an opportunity for exploring birth effects before the more complex structure of personality emerges.

Temperament has been shown to be an important factor in a child's success in school, developing successful relationships, managing stressful events, and recognizing potential problematic behaviors and psychopathology. In recognizing the importance of childhood temperament, attention should be given to possible risk factors which if present, increase the likelihood of developing emotional or behavioral disorders in children. The probability of developing psychopathology may be increased by the number of risk factors present as opposed to the presence of any one factor in particular (Grizenko & Fisher, 1992). Relatively few studies have investigated the relationship between risk factors occurring during the perinatal period in relation to temperamental traits. The studies that have been conducted have looked at one to two risk factors in isolation in predicting temperamental characteristics. A number of studies to date have suggested that difficulties during the perinatal period are correlated with the development of temperamental traits.

Purpose of the Study

The purpose of the present study was to examine how perinatal factors are related to temperament in children ages 3 to 7. When examining this correlation, the perinatal factors were considered in isolation. In addition, the cumulative effects of the perinatal factors were determined.

Significance of the Study

Information regarding the interrelationship of perinatal risk factors and temperament can be useful in predicting the likelihood of a child developing a "difficult" temperament. By examining perinatal risk factors as potentially

causal effects of temperamental traits, we may be better able to explain behavioral differences in children. Knowledge of this relationship could provide professionals information as to the potential likelihood of the development of childhood behavioral maladjustment. Being able to predict the onset of disruptive behavior at an earlier age may represent a pathway to earlier prognosis and intervention. Knowledge about the extent to which we can predict childhood adjustment/behavioral problems from data available in infancy is of importance. Because of the high cost of treating psychopathology in children, it would be of great benefit to society to prevent difficulties before they begin. Intervention may be more successfully implemented in the early childhood, when the parent-child interaction is more malleable. Early intervention may also increase the child's success in school.

Definition of Terms

The following definitions are operational terms utilized in this study. Temperament and the five characteristics of temperament are defined by Martin, 1995 as:

Temperament: "A set of traits that are a subset of the broader construct of personality, but are distinguished from personality in that they (a) appear earlier in development, with most being apparent during the first year of life. (b) are grounded in the biology of the individual, (c) are conceptualized to be distinct from motivation, and (d) are the building blocks from which other personality traits are constructed through experience and maturation" (Martin, 1995).

Activity level: Gross motor vigor and control of motor activity.

Adaptability: The speed and ease of adjustment to a new environment.

Approach/Withdrawal: A measure of the initial behavioral tendency in response to new social situations.

Emotional intensity: Variation in the vigor with which negative emotions are expressed.

Distractibility: Ease with which a socialization agent can distract the child from an inappropriate behavior.

Task persistence: Attention span and the ability to continue working on a difficult learning task.

Perinatal Risk Factors: Deviations from the normal pregnancy, labor, and delivery.

Research Questions

The present study attempted to answer the following questions.

1. Is there a relationship between birth weight and temperament?
2. Is there a relationship between length of pregnancy and temperament?
3. Is there a relationship between length of labor and temperament?
4. Is there a relationship between maternal age at birth and temperament?
5. Is there a relationship between use of forceps and temperament?
6. Is there a relationship between birth presentation and temperament?
7. Is there a relationship between length of time from membrane rupture to start of labor and temperament?
8. Is there a relationship between type of anesthesia and temperament?
9. Is there a relationship between Cesarean birth and temperament?

10. Is there a relationship between induced labor and temperament?
11. Is there a relationship between temperament and the cumulative effects of birth weight, length of pregnancy, length of labor, maternal age, use of forceps, birth presentation, length of time from membrane rupture to start of labor, type of anesthesia used, Cesarean delivery, and induced labor?

Basic Limitations

This study was subject to the following limitations:

1. The generalization of findings were limited by the population characteristics. Subjects for the study were drawn from a population representing a limited geographical area. Therefore, the results most likely cannot be generalized beyond the subjects in the selected area.
2. The retrospective approach to perinatal data collection relied on parent memory which was subject to faulty recall and bias.
3. The samples were restricted to the age range of three through seven. Therefore, results cannot be generalized to other age levels.
4. The generalization of findings were limited by the small sample size.

CHAPTER 2

REVIEW OF THE LITERATURE

The purpose of this chapter is to review the literature pertinent to the development of temperament and its relationship to events experienced at birth. Specifically, the following areas will be addressed: temperament research by Thomas and Chess, Thomas and Chess Goodness of Fit concept, the influence of temperament, relationship between temperament and school adjustment, temperament and perinatal events, preterm birth and temperament, birthweight and temperament, and length of labor and temperament.

Temperament Research by Thomas and Chess

The study of child temperament can be said to have begun with the New York Longitudinal Study initiated in the 1950's by Thomas and Chess. Thomas and Chess defined temperament as a behavioral predelineation or style that manifests itself initially along nine key dimensions but is modified over time by the child's psychosocial environment, particularly his/her interactions with key caregivers (Thomas & Chess, 1977). The nine categories identified by Thomas and Chess were: a) rhythmicity of biological functions, b) activity level, c) approach to or withdrawal from new stimuli, d) adaptability, e) sensory threshold, f) predominant quality of mood, g) intensity of mood expression, h) distractibility, and i) persistence/attention span (Goldsmith et al. 1987). In the New York Longitudinal Study, children were followed and assessed from early infancy to 10 years of age in an attempt to develop valid ways of describing and assessing temperament.

The New York Longitudinal Study suggested that some temperamental attributes played a significant role in the genesis and evolution of behavior disorders in children (Thomas & Chess, 1977). They found that the "easy - difficult" cluster of temperamental traits assessed in early childhood were found to predict emotional and behavioral problems in later childhood and adolescence and they also found a significant correlation with maladjustment and/or psychiatric disorder in adulthood (Martin, 1994; Cowen, Wyman, & Work, 1992). Thomas and Chess used the term "difficult" temperament to designate a specific cluster of temperamental attributes (irregularity of biological functions, withdrawal from the new, slow adaptability, intensity of mood, and relatively frequent negative mood) to designate a specific cluster of temperament attributes, which make child rearing more difficult for most parents. The term "easy" temperament designated a specific cluster of temperamental attributes (regularity, positive approach to new stimuli, high adaptability to change, and mild/moderate intense mood, usually positive) which were used to characterize children who were considered less difficult to rear (Goldsmith et al. 1987).

Thomas and Chess Goodness of Fit Concept

Thomas and Chess (1977) concluded that the effects of temperament dimensions depend upon whether or not there was "goodness-of-fit" between the child's behavior repertoire and the characteristics of a specific situation. They suggested that goodness-of-fit results when there is agreement between the child and the environment and the environment is consistent with the child's capacities, characteristics, and style of behaving. A "badness-of-fit" between the family and social group and institutions may manifest itself in a

child's behavior (Lucco, 1991). Temperament consists of dimensions or dispositions that underlie behavior and influences how one person, for example, would respond differently than another person to the same environmental situation, depending on the "fit" between the person and the environment.

The Influence of Temperament

The influence of temperament appears to be bidirectional; that is, the effect of a particular environment's influence will be influenced by the child's temperament (Goldsmith et al., 1987). At the same time, the child's temperament will affect the judgments, attitudes, and behavior of the individual in his/her environment. Temperament is expressed as a response to an external stimulus, opportunity, expectation, or demand. It is a dynamic factor that mediates and shapes the influence of the environment on the individual's psychological structure (Goldsmith et al., 1987). This explains why a similar stimulus may evoke different behaviors in different individuals. Problematic behavior will be more likely to occur when a child must interact with an environment which is not a good fit for his/her behavior.

An important approach to understanding the development of behavior problems in children involves the inclusion of multiple factors that work interactively to affect the parent-child relationship. Difficult child temperamental traits may serve to elicit negative parenting and lead to angry and aggressive parent-child relationships (Keenan & Shaw, 1994). Children's temperamental characteristics influence the ways in which other people respond to them. Lee and Bates (1985) found that difficult infants

elicited more confrontations with their mothers as well as a greater tendency for these to result in conflict. Stevenson-Hinde and Hinde (1986) found that children with more negative moods were more likely to have mothers who were irritable (Rutter, 1987). Rutter (1987) found that children with adverse temperament characteristics were more likely to be the target of parental criticism.

The array of outcomes that have been found to be related to temperament characteristics is broad, including such diverse classes of behavior as psychopathology, parent-child interaction, peer relationships, vulnerability to psychological stress, adjustment to school, and teacher-child relationships. It has been demonstrated that temperamental differences are important in terms of the implications for later development and for psychiatric risk. Graham and Stevenson (1986) maintained that temperament represents subclinical manifestations of psychiatric disorders (Rutter, 1987). A study by Maziade et al. (1990) supported the view that an extremely difficult temperament is a precursor of behavioral disorders. Thomas, Chess, and Birch (1968) identified a significant relationship between a child's temperament, the hospitality of the environment to the child's temperament and the development of childhood psychopathology (Lucco, 1991). The association between an extremely difficult temperament and the appearance of clinical disorders in children has also been well documented in random samples of the general population in Quebec, Canada (Maziade et al., 1990).

Temperament may influence or moderate in part how a child responds to stressful events. Therefore, temperament characteristics may function as either protective or risk factors during stressful conditions (Maziade et al.,

1990). Temperamental dimensions reported by parents interacted with children's perceptions of stress in predicting teacher reports of behavior problems (Rende & Plomin, 1992). Preschool children vary in their temperamental characteristics and this variability is reflected in behavioral problems seen in the classroom setting. Martin, Nagle, and Paget (1983) hypothesized that certain temperamental traits in children elicit predictable responses in the classroom environment. Keogh and Burstein (1988) found that differential patterns of interaction between students and teachers existed and that these were influenced by temperament. Pullis and Cadwell (1982) found that temperament was an important factor in predicting teacher's classroom management strategies. Based on the results of such research, temperament characteristics in the school environment seem to be closely related to teacher ratings of behavioral adjustment and the frequency of socialization problems (Mobley & Pullis, 1991).

Relationship between Temperament and School Adjustment

Children's adjustment within the classroom is largely influenced by their ability to initiate and maintain adequate interpersonal relationships (Skarpness & Carson, 1986). Certain dimensions of temperament have been shown to influence children's social interactions with adults and peers. Positive temperament characteristics have been associated with higher numbers of interactions with peers (Keogh & Burstein, 1986). Negative temperament characteristics commonly results in increased social isolation. Socialization skills are correlated with academic achievement. Data indicated that social isolation plays an important role in the decision to drop out of school (Martin, 1994).

In correlational studies between child temperament and school adjustment, researchers have found that differences in temperament characteristics among children is related to interactions with teachers and peers and academic success (Mobley & Pullis, 1991). Several studies document a significant association between difficult temperament and poor school performance. Keogh and Pullis (1980) found that teacher's appraisals of a student's temperament affected how the teacher perceived the student's achievement and the time and energy required with the individual student. Chess et al. (1984) reported an association between difficult temperament in the preschool years and school achievement in adolescence (Boudreault & Thivierge, 1986). Scholom et al. (1980) found a significant relationship between parent reports of difficult child temperament and later school adjustment problems including learning disabilities. Difficult temperamental traits affect teachers' perceptions and expectations as well as parent-child interactions.

Stability of Temperament

The establishment of patterns of continuity and stability in temperament over time is critical to the validity of the whole concept of temperament. When reviewing the literature which examines the stability of temperament, the findings showed variability in estimates depending on such factors as age and sex of child, the continuity of the factors assessed for stability, time between ratings, laboratory versus questionnaire methods, and the particular dimension or factor being measured. In some of the questionnaire-based studies of temperament, continuity of structure has been assumed but not demonstrated. Other studies attempted to establish the stability of temperament characteristics. A study by Scarpa et al. (1995)

demonstrated support for the notion of stability of inhibited/uninhibited temperament. Guerin and Gottfried (1994) conducted a study which provided evidence of developmental change and stability in temperament. However, their results were qualified by the specific temperament dimension as well as the period. They found that overall, with advancement in age from infancy through preadolescence, children's temperament is best characterized as showing less developmental change (as indexed by mean ratings on the temperament dimensions) and greater cross-time stability (as evidenced by the relative position or rank ordering of children across time). Pedlow et al. (1993) examined changes in the level of stability of temperament over 44-52 to 88-99 months of age. They reported that six temperament factors (Approach, Rhythmicity, Persistence, Irritability, Cooperation-Manageability, and Inflexibility) showed substantial continuity over time. They found Approach to be consistent from infancy onward. Rhythmicity exhibited continuity from infancy through 8 years of age. Irritability and Cooperation-Manageability were present in infancy and in toddler age groups. Persistence also showed continuity from 32-36 through to 88-99 months of age. Stifter and Fox (1990) provided data which indicated that infant reactivity, specifically infant crying and irritability, was predictive of social interaction during the 2nd and 3rd years of life.

Temperament and Perinatal Events

A number of studies to date have suggested that difficulties during the perinatal period are correlated with the development of temperamental traits. Perinatal risk factors refer to deviations from the normal pregnancy, labor, and delivery. Pasamanick and Knobloch (1966) held that a child's later developmental states could be predicted from biological perinatal

complications. Ucko's (1965) longitudinal study found that boys with asphyxia at birth were later more negative in approach to new experiences, adapted more slowly and had a lower threshold for sound stimuli than did other boys. A study by Pheiffer et al. (1985) reported that cerebral depression (e.g., severe hypotonia, absence of reflexes) was related to perinatal asphyxia. Chandole et al. (1992) found that the records of children with behavior disorders showed more complications in pregnancy, as well as in the perinatal period. Pollack et al. (1966) surveyed five earlier articles and concluded that obstetrical complications place infants at increased risk for later developing psychosis. Gray, Dean, & Rattan (1987) showed that high-risk infants were more likely later to experience cognitive, neurodevelopmental, and behavioral problems.

Perinatal events such as vacuum extraction, small-for-gestational-age, respiratory distress syndrome, low birth weight, type of delivery, length of pregnancy, maternal age, use of forceps, type of anesthesia, induction of labor and length of labor have been correlated with temperamental traits. A study conducted by Persson-Biennow et al. (1988) examined the relationship between temperament and delivery by vacuum extraction. His sample included children ages 6 months to 2 years. He found that vacuum-extracted children had a significant lower threshold for stimuli than did the standardization sample at two years of age. Watt (1987) conducted a study comparing small-for-gestational-age infants to "normal" infants. His sample examined temperament ratings between the two groups at ages 6 months and 20 months. He found that small-for-gestational-age infants were less approaching and more intense than preterm and "normal" infants. He also found that the percentage of infants rated as easy in the whole sample

remained constant over the 14 months. Research by Plunkett et al. (1989), studying infants ages 12 to 18 months, found that premature infants with respiratory distress syndrome had more difficult temperaments than their full-term counterparts. Hartsough and Lambert (1985) in comparing hyperactive children to control groups, found that mothers of hyperactives reported more frequently than control mothers that their children were born at gestational age "ten months or later". In a study by Washington et al. (1986) which examined infants ages 3 to 12 months, the only feature which distinguished between infants rated as easy and those rated as difficult was the type of delivery. More infants delivered by caesarian section were reported to be difficult on a temperament assessment.

Induction of Labor

Few studies to date have examined the relationship of induced labor to later temperamental characteristics exhibited. One study by Batchelor et al. (1991) found that "medical induction of labor" was a significant contributing factor in creating childhood emotional disorders. His report however does not mention which method of "medical induction" is used.

Use of Forceps During Birth

The use of forceps during birth has been linked to later difficulties. Emerson (1989) stated that "many children with aggressive behaviors also have birth traumas which involve an overuse of medical interventions". The use of forceps during delivery was included in his referral to "medical interventions." Cheek (1975) discusses chronic headaches in adults as related to use of forceps during birth.

Anesthesia and Temperament

Many different types of anesthesia are used during delivery. Differences in infant temperament have been observed in relation to different types of anesthesia used. Sepkoski et al. (1992) demonstrated that through day 28 postpartum there were significant differences on the Neonatal Behavior Assessment Scales (NBAS) depending upon the type of anesthesia used during delivery. The NBAS measures decrement or habituation of the orienting response, measures of social interaction, and effects on sucking and feeding. Standley et al. (1974) found that three-day old infants demonstrated decreased motor maturity and increased irritability with the use of regional anesthetics. Eishima (1991) stated that neonates exposed to any type of anesthesia showed weaker habituation to sound, stronger muscular tension, more resistance to cuddle, and fewer smiles in comparison to a group not exposed to anesthesia.

Maternal Age and Temperament

Maternal age at the time of birth has been linked to aspects of temperament in children. In a study conducted by Hartsough and Lambert (1985) maternal age was found to be a significant discriminator between hyperactive and control groups. A higher percentage of the mothers of the hyperactive children (16%) than mothers of the control group children (7%) were under age 20 at the birth of the child.

Preterm Birth and Temperament

Preterm infants appear to display important temperamental qualities that may differentiate them from healthy, full-term infants. Studies have demonstrated that prematurity affects temperament. In a study by Garcia-

Coll et al. (1992) a behavioral assessment of infant temperament was used to measure the effects of perinatal high-risk factors on infant temperament and on temperament change over time. This study included infants ages 3 to 7 months. Their results indicated that preterm infants were less sociable than full term infants at age 3 months. The preterm infants were less approaching than the full-term controls. Low to moderate stability between 3 and 7 months was observed for sociability, soothability, and neutral responses. They concluded that high-risk factors contribute to initial individual differences in infant temperament and suggested that change over time might be influenced by the recovery process from perinatal insults.

A study by Hertzog and Mittleman (1984) found that preterm infants (born 34 to 37 weeks from conception) scored lower on the temperament scale of irritability than full-term controls. Brain damage is known to increase the risk of behavior problems and preterm infants are frequently exposed to damaging perinatal events (Goldberg, Corter, Lojkasek, & Minde, 1991). Premature infants have been found to be more difficult during the early months of life than healthy, full-term infants (Plunkell, Cross, & Meisels, 1989). Washington et al. (1986) found a high percentage of preterm infants rated as difficult compared to normal full-term infants. Sanson et al. (1991) reported that difficult temperament when associated with male sex, perinatal stress, and/or prematurity resulted in between 29% and 44% of cases having later adjustment problems. This research also noted that a high percentage of children with perinatal stress were above the criterion on the hyperactive-distractible subscale. Field et al. (1982) reported that preterm and post-mature infants rated more adversely than control group infants on temperament assessments.

Birth Weight and Temperament

Several studies have examined the relationship between birth weight and temperament. Goldberg et al. (1991) reported a high rate of behavior problems in infants with low birthweights. Drillien (1964) found that her low birthweight group demonstrated more behavior problems at age five than appropriate weight peers (Goldberg, Corter, Lijkasek, & Minde, 1991). Hertzog and Mittleman found that low birthweight children were more intense, less adaptable, less distractible and had higher sensory thresholds (Watt, 1987).

Length of Labor and Temperament

The longer and more difficult a labor is the greater the stress to the baby. Certain abnormalities in the duration of labor have been correlated with higher rates of CNS damage (Chandole et al., 1992). Psychiatric disorders occur more frequently among children with known brain damage (Goldberg et al., 1991). Parnes et al. (1982) found that 67% of the schizophrenic group possessed a history of perinatal complications. Hartsough and Lambert (1985) discovered a link between length of labor and hyperactivity in children. In their study, twenty-five percent of the mothers of the hyperactive group reported labors that exceeded 13 hours, while labors of this length or longer were reported by 16% of mothers of the control group.

Summary

Although the majority of the research studying the relationship between perinatal risk factors and temperament show significant relationships, a few studies have failed to find significant relationships. Roth

et al. (1984) and Oberklaid et al. (1985) failed to observe differences in temperament ratings between preterms and full-term infants. Grizendo and Fisher (1992) felt that demographic characteristics and family environment were more powerful predictors of psychosocial outcomes than perinatal stress. Minde, Webb, and Sykes (1968) examined birth records and found no difference in the severity of perinatal complications between hyperactive children and their matched counterparts. Earls and Jung (1988) found the contributions of prenatal and perinatal factors to be negligible by the age of 3. Despite the few reports that found no association between perinatal risk factors and temperament, the majority of the research found seemed to indicate some sort of correlation between perinatal risk factors and temperament development.

CHAPTER 3

METHODOLOGY

Subjects

A sample of 752 were asked to participate in the study. One-hundred parents of children ages 4-7 responded yielding a response rate of 13.3%. Demographic information regarding the sample is reported in Table 1. The subjects, parents of a child age 4-7, were recruited from the Kindergarten Center and three elementary schools in Sand Springs, Oklahoma. Additional parents of 4-year-old children were recruited from three pre-school programs in Sand Springs. All students, ages 3 through 7, attending these seven schools were asked to participate in the study.

Table 1

Demographic Information of the Sample (n = 100)

<u>Variable</u>	<u>n</u>
Sex of Child:	
Male	54
Female	46
Age of Child:	
3-year-olds	0
4-year-olds	10
5-year-olds	37
6-year-olds	24
7-year-olds	29

Table 1 (continued)

Variable	n
Race of Child:	
African American	0
Hispanic American	4
Native American	5
White/Caucasian	90
Asian American	1
Relationship to person completing this form to the child:	
Biological mother	93
Biological father	5
Grandparent	1
Adoptive mother	1
Education of person completing form:	
Did not graduate from high school and have no GED	5
Graduated from high school or have GED	24
Some college or vocational training	48
Graduated from college	18
Some graduate school	1
Have a masters, doctoral, or professional degree	4

Table 1 (continued)

Variable	n
Financial Circumstances of person completing form:	
Cannot always meet the basic needs of my family	6
Do not feel financially secure but can meet the basic needs of my family	18
Reasonably financial secure and can meet basic needs and can afford small luxuries	45
Financially secure and can afford some luxuries	31

Procedure

Parent information packets containing a letter to the parent (see APPENDIX A), parental consent form (see APPENDIX B), child and family background information (see APPENDIX C), and Temperament Assessment Battery for Children--Revised were sent home with 752 children, ages 3 through 7, along with a self-addressed stamped envelope which was used for returning the signed consent form, completed background information, and the TABC-R rating scale. The children who received a parent information packet attended a school in the Sand Springs area. The schools which participated in the study included the Sand Springs Schools Kindergarten Center, Pratt Elementary, Limestone Elementary, Angus Valley Elementary, Broadway Baptist Preschool, Lake Country Preschool, and the Salvation

Army Day Care. All children, ages 3 through 7, who attended one of the participating schools were given a parent information packet to take home. Of the 752 packets sent, 100 responses were received.

Ten perinatal factors (birth weight, length of pregnancy, length of labor, maternal age, use of forceps, birth presentation, length of time from membrane rupture to start of labor, type of anesthesia used, Cesarean delivery, and induced labor) were examined and analyzed as to which factors or combination of factors are related to each temperament characteristic on the TABC-R (Activity level, Adaptability, Inhibition, Negative Emotionality, and Task Persistence).

Pearson product-moment correlations were computed to examine the relationship between each of the five temperament scales of the TABC-R and each perinatal factor in isolation. A series of multiple regression analyses were used to analyze the cumulative effects of the perinatal events in relation to each of the five temperament scales of the TABC-R. Perinatal factors that were nominal and ordinal data were coded. Table 2 reports the code assigned to the perinatal factors along with the number of subjects per level of each coded variable. With the exception of length of pregnancy, the variables in Table 2 are nominal; length of pregnancy is ordinal. Due to uncodeable responses the numbers per level do not necessarily add up to 100 for each variable.

Table 2

Codes Assigned to Perinatal Factors:

<u>Variable:</u>	<u>Code:</u>	<u>Number per level</u>
Length of Pregnancy		
Preterm	1	12
Full Term	2	77
Overdue	3	11
Use of Forceps		
No forceps used	0	81
Forceps used	1	14
Birth Presentation		
Head First	0	87
Breech	1	6
Type of Anesthesia Used		
Spinal Block or No Anesthesia Used	0	73
Inhaled General of Injected General	1	24
Type of Birth		
Vaginal Birth	0	79
Cesarean Birth	1	21
Induced Labor		
No	0	71
Yes	1	29

Table 3 reports the means and standard deviations of the continuous independent variables. The number of subjects per level equals 100 for each variable.

Table 3

Means and Standard Deviations of the Continuous Independent Variables

<u>Variable</u>	<u>Mean</u>	<u>Standard Deviation</u>
Birth Weight	7.455	1.335
Length of Labor	8.988	10.178
Maternal Age	25.530	4.836
Membrane Rupture	10.027	83.951

The purpose of this study was to examine how perinatal events are related to temperament. Table 4 compares the sample means and sample standard deviations obtained on the TABC-R to national norm means and national norm standard deviations on the TABC-R. The similarity of these scores indicated that the sample obtained appears to be representative of the population at large.

Table 4

National Norm Means, National Norm Standard Deviations, Sample Means, and Sample Standard Deviations (SD) using the Temperament Assessment

Battery for Children-Revised (TABC-R)

<u>Temperament Characteristic</u>	<u>National Mean</u>	<u>National SD</u>	<u>Sample Mean</u>	<u>Sample SD</u>
Activity Level	32	10	34.2	10.86
Adaptibility	48	7	47.9	8.80

Table 4 (continued)

Temperament Characteristic	National Mean	National SD	Sample Mean	Sample SD
Inhibition	31	12	32.5	11.73
Negative Emotionality	35	11	38.7	14.08
Task Persistence	44	7	43.9	8.13

Instrumentation

The Temperament Assessment Battery for Children (TABC) was designed by Roy P. Martin (1988). The Temperament Assessment Battery for Children-Revised (TABC-R) is a reformulated and renormed version. The TABC-R is based on current temperament research and on factor analytic study of the TABC. The TABC and the TABC-R were developed as a measure of broad behavioral tendencies of children ages 3 through 7.

Martin (1995) defined the construct of temperament, as utilized in this measure, as "a set of traits that are a subset of the broader construct of personality, but are distinguished from personality in that they (a) appear earlier in development, with most being apparent during the first year of life, (b) are grounded in the biology of the individual, (c) are conceptualized to be distinct from motivation, and (d) are the building blocks from which other personality traits are constructed through experience and maturation".

The TABC-R questionnaire is a modification of the Thomas, Chess, and Korn Teacher Temperament Questionnaire (Thomas & Chess, 1977) and is patterned after the Thomas and Chess model of the structure of early childhood temperament. The parent form contains items which are rated on a

seven point scale based on the frequency of occurrence of the behavior described in the item. The TABC-R parent form consists of 51 items and requires approximately 15 minutes to complete.

Martin (1995) designed the TABC-R to assess five characteristics: Activity Level - gross motor vigor and control of motor activity; Adaptability - the speed and ease of adjustment to a new environment; Inhibition - a measure of the initial behavioral tendency in response to new social situations; Negative Emotionality - variation in the vigor with which negative emotions are expressed; and Task persistence - attention span and the ability to continue working on a difficult learning task (Martin, 1995).

A high score on the Activity scale indicates a strong tendency to engage in vigorous movement. A high score on the Adaptability scale indicated greater ease and speed of adjustment. A high score on the Inhibition scale indicates a strong approach or outgoing tendency. A high score on the Negative Emotionality is indicative of intense emotional expression. A high score on Task Persistence is indicative of longer attention span and a tendency toward continuation of attention toward difficult tasks.

The internal consistency reliabilities for the five parent scales of the TABC-R are: Activity .81; Adaptability .69; Inhibition .85; Negative Emotionality .81; and Task Persistence .64. Martin, Nagle & Paget (1984) found the teacher form TABC scores to be correlated with scholastic achievement. The TABC has also been shown to differentiate between ADHD, Emotionally/Behaviorally Disordered and "normal" children (Love, 1993).

Analysis of Data

Statistical analyses of all data were carried out on a IBM computer using The System for Statistics (SYSTAT) package. Pearson product moment correlational analyses were used to analyze the relationships between the five temperament scales of the TABC-R and each perinatal factor in isolation. Multiple regression analyses were used to analyze the cumulative effects of the perinatal events in relation to the five temperament scales of the TABC-R. In order to lower the probability of committing Type I errors due to multiple comparisons, an alpha level of 0.01 was used to test all hypotheses.

CHAPTER 4

RESULTS

Individual Correlation Results

Research Question 1

Is there a relationship between birth weight and temperament?

In order to answer this question the following null hypothesis was tested:

Null Hypothesis One: There is no relationship between birth weight and each of the five temperament scales of the TABC-R.

Results of the correlational analyses yielded no significant relationships between birth weight and the five temperament scales of the TABC-R. Therefore, the researcher failed to reject Null Hypothesis One. Results of the analyses are reported in Table 5.

Table 5

Pearson Correlation Between Birth Weight and the Five Temperament Scales of the TABC-R

Scale	r	F-ratio	p-value
Activity Level	0.100	0.980	0.325
Adaptibility	0.005	0.003	0.958
Inhibition	0.006	0.004	0.949
Negative Emotionality	0.033	0.104	0.748
Task Persistence	0.081	0.652	0.421

Research Question 2

Is there a relationship between length of pregnancy and temperament?

In order to answer this question the following null hypothesis was tested:

Null Hypothesis Two: There is no relationship between length of pregnancy and each of the five temperament scales of the TABC-R.

Results of the correlational analyses yielded no significant relationships between length of pregnancy and the five temperament scales of the TABC-R. Therefore, the researcher failed to reject Null Hypothesis Two. Results of the analyses are reported in Table 6.

Table 6

Pearson Correlation Between Length of Pregnancy and the Five Temperament Scales of the TABC-R

Scale	r	F-ratio	p-value
Activity Level	0.079	0.612	0.436
Adaptability	0.071	0.501	0.481
Inhibition	0.024	0.057	0.812
Negative Emotionality	0.133	1.763	0.187
Task Persistence	0.085	0.710	0.402

Research Question 3

Is there a relationship between length of labor and temperament?

In order to answer this question the following null hypothesis was tested:

Null Hypothesis Three: There is no relationship between length of labor and each of the five temperament scales of the TABC-R.

Results of the correlational analyses yielded no significant relationships between length of labor and the five temperament scales of the TABC-R. Therefore, the researcher failed to reject Null Hypothesis Three. Results of the analyses are reported in Table 7.

Table 7

Pearson Correlation Between Length of Labor and Each of the Five Temperament Scales of the TABC-R

Scale	r	F-ratio	p-value
Activity Level	0.122	1.473	0.228
Adaptability	0.046	0.204	0.653
Inhibition	0.071	0.500	0.481
Negative Emotionality	0.120	1.429	0.235
Task Persistence	0.021	0.042	0.838

Research Question 4

Is there a relationship between maternal age at birth and temperament?

In order to answer this question the following null hypothesis was tested:

Null Hypothesis Four: There is no relationship between maternal age and each of the five temperament scales of the TABC-R.

Results of the correlational analyses yielded no significant relationships between maternal age and the five temperament scales of the TABC-R. Therefore, the researcher failed to reject Null Hypothesis Four. Results of the analyses are reported in Table 8.

Table 8

Pearson Correlation Between Maternal Age and Each of the Five Temperament Scales of the TABC-R

Scale	r	F-ratio	p-value
Activity Level	0.134	1.782	0.185
Adaptability	0.075	0.557	0.457
Inhibition	0.058	0.328	0.568
Negative Emotionality	0.115	1.312	0.255
Task Persistence	0.081	0.642	0.425

Research Question 5

Is there a relationship between use of forceps and temperament?

In order to answer this question the following null hypothesis was tested:

Null Hypothesis Five: There is no relationship between use of forceps and each of the five temperament scales of the TABC-R.

Results of the correlational analyses yielded no significant relationships between the use of forceps and the five temperament scales of the TABC-R. Therefore, the researcher failed to reject Null Hypothesis Five. Results of the analyses are reported in Table 9.

Table 9

Pearson Correlation Between Use of Forceps and Each of the Five Temperament Scales of the TABC-R

Scale	r	F-ratio	p-value
Activity Level	0.132	1.644	0.203
Adaptibility	0.139	1.840	0.178
Inhibition	0.021	0.042	0.838
Negative Emotionality	0.040	0.148	0.701
Task Persistence	0.074	0.516	0.475

Research Question 6

Is there a relationship between birth presentation and temperament?

In order to answer this question the following null hypothesis was tested:

Null Hypothesis Six: There is no relationship between birth presentation and each of the five temperament scales of the TABC-R.

Results of the correlational analyses yielded no significant relationships between the birth presentation and the five temperament scales of the TABC-R. Therefore, the researcher failed to reject Null Hypothesis Six. Results of the analyses are reported in Table 10.

Table 10

Pearson Correlation Between Birth Presentation and Each of the Five Temperament Scales of the TABC-R

Scale	r	F-ratio	p-value
Activity Level	0.017	0.027	0.869
Adaptibility	0.070	0.446	0.506
Inhibition	0.030	0.080	0.778
Negative Emotionality	0.067	0.415	0.521
Task Persistence	0.186	3.272	0.074

Research Question 7

Is there a relationship between length of time from membrane rupture to start of labor and temperament?

In order to answer this question the following null hypothesis was tested:

Null Hypothesis Seven: There is no relationship between length of time from membrane rupture to start of labor and each of the five temperament scales of the TABC-R.

Results of the correlational analyses yielded no significant relationships between length of time from membrane rupture to start of labor and the five temperament scales of the TABC-R. Therefore, the researcher failed to reject Null Hypothesis Seven. Results of the analyses are reported in Table 11.

Table 11

Pearson Correlation Between Length of Time from Membrane Rupture to the Start of Labor and Each of the Five Temperament Scales of the TABC-R

<u>Scale</u>	<u>r</u>	<u>F-ratio</u>	<u>p-value</u>
Activity Level	0.092	0.837	0.362
Adaptibility	0.025	0.061	0.806
Inhibition	0.074	0.545	0.462
Negative Emotionality	0.039	0.152	0.698
Task Persistence	0.073	0.524	0.471

Research Question 8

Is there a relationship between type of anesthesia and temperament?

In order to answer this question the following null hypothesis was tested:

Null Hypotheses Eight: There is no difference between type of anesthesia and each of the five temperament scales of the TABC-R.

Results of the correlational analyses yielded no significant relationships between type of anesthesia and the five temperament scales of the TABC-R. Therefore, the researcher failed to reject Null Hypothesis Eight. Results of the analyses are reported in Table 12.

Table 12

Pearson Correlation Between Type of Anesthesia and Each of the Five Temperament Scales of the TABC-R

Scale	r	F-ratio	p-value
Activity Level	0.033	0.101	0.751
Adaptibility	0.012	0.014	0.905
Inhibition	0.091	0.802	0.373
Negative Emotionality	0.062	0.368	0.546
Task Persistence	0.029	0.080	0.778

Research Question 9

Is there a relationship between Cesarean birth and temperament?

In order to answer this question the following null hypothesis was tested:

Null Hypothesis Nine: There is no relationship between Cesarean birth and each of the five temperament scales of the TABC-R.

Results of the correlational analyses yielded no significant relationships between Cesarean birth and the five temperament scales of the TABC-R. Therefore, the researcher failed to reject Null Hypothesis Nine. Results of the analyses are reported in Table 13.

Table 13

Pearson Correlation Between Cesarean Birth and Each of the Five Temperament Scales of the TABC-R

Scale	r	F-ratio	p-value
Activity Level	0.058	0.329	0.567
Adaptibility	0.015	0.023	0.879
Inhibition	0.069	0.474	0.493
Negative Emotionality	0.170	2.913	0.091
Task Persistence	0.027	0.069	0.793

Research Question 10

Is there a relationship between induced labor and temperament?

In order to answer this question the following null hypothesis was tested:

Null Hypotheses Ten: There is no relationship between induced labor and each of the five temperament scales of the TABC-R.

Results of the correlational analyses yielded no significant relationships between induced labor and the five temperament scales of the TABC-R. Therefore, the researcher failed to reject Null Hypothesis Ten. Results of the analyzes are reported in Table 14.

Table 14

Pearson Correlation Between Induced Labor and Each of the Five Temperament Scales of the TABC-R

Scale	r	F-ratio	p-value
Activity Level	0.115	1.306	0.256
Adaptibility	0.033	0.106	0.746
Inhibition	0.127	1.596	0.209
Negative Emotionality	0.079	0.620	0.433
Task Persistence	0.052	0.270	0.604

Multiple Regression Results

Prior to presenting results, a correlational matrix among independent variables is presented in Table 15 and discussed.

Table 15

Pearson Correlation Matrix of Independent Variables

	<u>Birth Wt.</u>	<u>L. of Preg.</u>	<u>L. of Labor</u>	<u>Mater. Age</u>	<u>Forceps</u>
Birth Weight	1.000				
L. of Preg.	0.358	1.000			
L. of Labor	0.033	0.126	1.000		
Mater. Age	0.148	-0.187	-0.157	1.000	
Forceps	0.180	-0.056	0.046	-0.038	1.000
Birth Pres.	-0.201	-0.205	-0.146	-0.085	-0.110
Memb. Rupt.	-0.173	-0.240	-0.012	0.018	-0.054
Anesthesia	0.073	-0.046	0.097	-0.034	0.069
Cesarean	-0.034	-0.139	-0.056	-0.107	-0.169
Induced	0.043	-0.090	0.006	-0.085	0.041

	<u>Birth Pres.</u>	<u>Memb. Rupt.</u>	<u>Anesthesia</u>	<u>Cesarean</u>	<u>Induced</u>
Birth Pres.	1.000				
Memb. Rupt.	-0.026	1.000			
Anesthesia	-0.013	0.207	1.000		
Cesarean	0.649	-0.042	0.048	1.000	
Induced	-0.061	0.166	0.062	0.041	1.000

Birth weight and Length of Pregnancy are significantly correlated. Typically as the length of the pregnancy increases, birth weight also

increases. Birth Presentation and Cesarean births are also significantly correlated. Breech babies often require Cesarean births. No other significant correlations were found among the independent variables.

Research Question 11

Is there a relationship between temperament and the cumulative effects of birth weight, length of pregnancy, length of labor, maternal age, use of forceps, birth presentation, length of time from membrane rupture to start of labor, type of anesthesia used, cesarean delivery, and induced labor?

In order to answer this question the following null hypothesis was tested:

Null Hypothesis Eleven: There is no relationship between the cumulative effects of birth weight, length of pregnancy, length of labor, maternal age, use of forceps, birth presentation, length of time from membrane rupture to start of labor, type of anesthesia used, Cesarean delivery, and induced labor to each of the five temperament scales of the TABC-R.

Results of the multiple regression analyses yielded no significant relationships between the cumulative effects of birth weight, length of pregnancy, length of labor, maternal age, use of forceps, birth presentation, length of time from membrane rupture to start of labor, type of anesthesia used, Cesarean delivery, and induced labor and the five temperament scales of the TABC-R. Therefore, the researcher failed to reject Null Hypothesis Eleven. Results of the analyses are reported in Tables 16, 17, 18, 19, and 20.

Table 16

Results of Regression for Dependent Variable Activity Level

<u>VARIABLE</u>	<u>STD COEF</u>	<u>T</u>	<u>P(2 TAIL)</u>
Birth Weight	-0.072	-0.556	0.580
Length of Pregnancy	-0.086	-0.660	0.511
Length of Labor	0.119	1.042	0.301
Maternal Age	-0.019	-0.154	0.878
Use of Forceps	-0.157	-1.343	0.183
Birth Presentation	0.050	0.328	0.744
Membrane Rupture	-0.178	-1.491	0.140
Anesthesia	0.075	0.649	0.519
Cesarean Birth	-0.045	-0.298	0.767
Induced Labor	0.140	1.224	0.225

ANALYSIS OF VARIANCE

<u>SOURCE</u>	<u>SS</u>	<u>DF</u>	<u>MEAN-SQUARE</u>	<u>F-RATIO</u>	<u>P</u>
REGRESSION	880.109	10	88.011	0.692	0.729
RESIDUAL	9543.530	75	127.247		

Table 17

Results of Regression for Dependent Variable Adaptability

<u>VARIABLE</u>	<u>STD COEF</u>	<u>T</u>	<u>P(2 TAIL)</u>
Birth Weight	-0.060	-0.453	0.652
Length of Pregnancy	0.136	1.018	0.312
Length of Labor	-0.069	-0.591	0.556
Maternal Age	0.038	0.312	0.756
Use of Forceps	0.174	1.459	0.149
Birth Presentation	-0.104	-0.670	0.505
Anesthesia	-0.011	-0.093	0.926
Cesarean Birth	0.046	0.298	0.767
Induced Labor	0.018	0.157	0.876

ANALYSIS OF VARIANCE

<u>SOURCE</u>	<u>SS</u>	<u>DF</u>	<u>MEAN-SQUARE</u>	<u>F-RATIO</u>	<u>P</u>
REGRESSION	355.669	10	35.567	0.392	0.947
<u>RESIDUAL</u>	<u>6810.656</u>	<u>75</u>	<u>90.809</u>		

Table 18

Results of Regression for Dependent Variable Inhibition

<u>VARIABLE</u>	<u>STD COEF</u>	<u>T</u>	<u>P(2 TAIL)</u>
Birth Weight	0.027	0.200	0.842
Length of Pregnancy	-0.053	-0.396	0.694
Length of Labor	-0.023	-0.196	0.845
Maternal Age	-0.079	-0.643	0.522
Use of Forceps	0.010	0.084	0.934
Birth Presentation	-0.034	-0.215	0.831
Membrane Rupture	-0.042	-0.344	0.732
Anesthesia	-0.113	-0.959	0.341
Cesarean Birth	-0.018	-0.114	0.909
Induced Labor	-0.139	-1.186	0.239

ANALYSIS OF VARIANCE

<u>SOURCE</u>	<u>SS</u>	<u>DF</u>	<u>MEAN-SQUARE</u>	<u>F-RATIO</u>	<u>P</u>
REGRESSION	485.973	10	48.597	0.326	0.972
RESIDUAL	11182.550	75	149.101		

Table 19

Results of Regression for Dependent Variable Negative Emotionality

<u>VARIABLE</u>	<u>STD COEF</u>	<u>T</u>	<u>P(2 Tail)</u>
Birth Weight	0.040	0.308	0.759
Length of Pregnancy	-0.170	-1.284	0.203
Length of Labor	0.101	0.871	0.386
Maternal Age	-0.068	-0.559	0.578
Use of Forceps	-0.091	-0.773	0.442
Birth Presentation	0.096	0.624	0.534
Membrane Rupture	-0.094	-0.779	0.439
Anesthesia	-0.058	-0.497	0.621
Cesarean Birth	-0.192	-1.259	0.212
Induced Labor	0.106	0.919	0.361

ANALYSIS OF VARIANCE

<u>SOURCE</u>	<u>SS</u>	<u>DF</u>	<u>MEAN-SQUARE</u>	<u>F-RATIO</u>	<u>P</u>
REGRESSION	1056.223	10	105.622	0.514	0.875
<u>RESIDUAL</u>	<u>15414.114</u>	<u>75</u>	<u>205.522</u>		

Table 20

Results of Regression for Dependent Variable Task Persistence

<u>VARIABLE</u>	<u>STD COEF</u>	<u>T</u>	<u>P(2 TAIL)</u>
Birth Weight	0.085	0.670	0.505
Length of Pregnancy	-0.007	-0.053	0.958
Length of Labor	-0.037	-0.329	0.743
Maternal Age	0.074	0.627	0.533
Use of Forceps	-0.092	-0.804	0.424
Birth Presentation	-0.351	-2.348	0.022
Membrane Rupture	-0.054	-0.463	0.644
Anesthesia	-0.105	-0.935	0.353
Cesarean Birth	0.163	1.098	0.276
Induced Labor	0.019	0.169	0.866

ANALYSIS OF VARIANCE

<u>SOURCE</u>	<u>SS</u>	<u>DF</u>	<u>MEAN-SQUARE</u>	<u>F-RATIO</u>	<u>P</u>
REGRESSION	675.471	10	67.547	1.038	0.420
RESIDUAL	4878.669	75	65.049		

CHAPTER 5

DISCUSSION

It is important for school psychologists to understand causative mechanisms and linkages operating early in development as they can provide a realistic picture of developmental trajectories to parents and teachers. School psychologists must be able to identify risk factors and supply sophisticated developmental explanations for the types of problems they discuss with parents and teachers. The purpose of this study was to investigate the relationship of perinatal events and temperament. Pearson product-moment correlational analyses and multiple regression analyses were utilized to determine whether any of the relationships stated in the eleven research questions were statistically significant.

A sample of 752 parents of children age 3 to 7 were asked to participate in the study. One-hundred parents responded, yielding a response rate of 13.3%. This response rate is extremely low and is a major limitation in this study. Any generalization of these findings must be made with caution. The relationships between perinatal events and the five temperament scales of the TABC-R (Activity Level, Adaptability, Inhibition, Negative Emotionality, and Task Persistence) were examined. Ten perinatal factors which included: birth weight, length of labor, length of pregnancy, type of anesthesia used, use of forceps, maternal age, birth presentation, type of delivery, induced labor, and length of time from membrane rupture to start of labor were considered in this study. Each of the five temperament scales of the TABC-R were examined separately to determine any correlations with

specific perinatal events. Pearson product-moment correlational analyses were used to examine the relationship between each of the five temperament scales of the TABC-R and each perinatal factor in isolation. Multiple regression analyses were used to examine the cumulative effects of perinatal events on each of the five temperament scales of the TABC-R. The results of this investigation indicated that there are no significant correlations between the five temperament scales of the TABC-R and perinatal events among this sample.

Several hypotheses are offered as to why this investigation failed to support the current literature which suggests a significant relationship between perinatal events and temperament. One hypothesis is that the parent reports of perinatal problems are more reliable when the events are recent. It is also possible that parent report questionnaires are not an effective means of describing temperamental dimensions. Parents may not perceive their children as having problematic behaviors despite their responses to a particular questionnaire. Guerin and Gottfried (1994) expressed concern in their study regarding the validity of parent reports/perceptions of temperament and the psychometric adequacy of temperament scales. It may be that the perception is individualistic and based on many factors. Some of the children's behaviors in the present study may have seemed very problematic to an outside observer, yet the parent may have learned to adapt to their child's particular demands thus rating the child as "easy".

Parent report measures may be an inadequate means of capturing meaningful temperamental processes, because parents cannot accurately reflect upon the transactional history they have been partners to during the

child's early years. Family factors, such as family closeness, characteristics of the baby, and the interpersonal relationship between the child and family over time, may be more important to child outcome than the initial stresses experienced at birth. There is an important relationship between parent-child interaction and infants' future behavior patterns. Medoff-Cooper (1986) examined mother-infant interaction influences on the development of temperament manifestations. Their research emphasized that the infants' behavioral style and maternal responsiveness interact to influence the behaviors of the infants. Belsky et al. (1991) noted that the well-resourced mother capable of initiating and maintaining harmonious interactions with her infant enables the infant to develop skills to regulate his or her own affection distress. The results of the study by Belsky et al. (1991) underscores the emerging recognition that family factors, patterns of infant-affect regulation, and individual differences in infant-mother attachment security are intertwined in a manner likely to effect the future development of the child. Responsive parent-child relationships are essential to developing infants. Parents who are generally more tolerant may be better able to adjust to a wider range of temperament characteristics and hence provide a "good fit" for their children.

Another proposed hypothesis is that temperament, at least early on in life, is not a fixed construct but a reflection of the changing transaction between caretakers and infants accompanying growth and development. There is at present little or no data available on the relative stability of parental perceptions as distinct from the stability of children's observable behaviors. The majority of the literature examining perinatal events and their relationship to temperament contains studies which include subjects months

or younger. It is possible that differences in neonatal, biological risk are not strongly associated with persistent patterns of behavioral regulation and expression beyond the early months.

Some studies suggest that a great deal of change is observed in a child's temperament during the early years of life. Belsky et al. (1991) reported that their study provided substantial evidence that continuity and discontinuity in at least the emotionality aspects of temperament are related to parental, marital, and infant factors measured before the infant's birth or during the neonatal period early in the first year. The degree of instability evident in the study by Belsky et al. (1991) raises the possibility that temperament characteristics change a great deal across the first years of life. Guerin and Gottfried (1994) conducted a study examining the stability of temperament. Their results provided evidence of developmental change and stability in temperament. However, their findings were qualified by the specific temperament dimension as well as the period. They found that with the advancement of age from preschool to middle childhood more of the dimensions of temperament showed invariance. They found more change, as indicated by significant differences in mean ratings of temperament, was detected when children were preschoolers as opposed to when they became elementary school-aged children. Prior (1992) reported that when examining the stability of temperament, stability is strongest when temperament is measured between relatively brief time intervals. He reported correlations ranging from a low of .25 across the first 5 years of life to a high of .82 at the five to seven age level.

Pedlow et al. (1993) reported significant correlations in the temperament ratings obtained over a period of time. However, they cited several reasons for using caution in interpreting their findings. They noted that they could not rule out the interpretation that their observed stability levels were at least partially caused by a stable environment. They also noted that it was possible that the parents' experience of repeatedly reporting on their children's temperament and behavior may have acted to change the parent's perceptions of the children's temperament.

Summary

The results of this investigation do not support the current research that suggests a relationship between perinatal events and temperament. It is possible that as a child develops, the diminishing effects of the perinatal experience allow changes in the manifestation of temperament. Environmental factors may play a crucial role in the development of a child's temperament. Favorable sociocultural and familial circumstances may compensate for difficult perinatal insults. Sociocultural, environmental, and familial factors may be critical to understanding the temperamental development of children. Only when judged in relationship to social, familial, and environmental factors, can the true etiological significance of medical factors be accounted for.

A cautious approach should be made in assuming that temperament is a single concept or even an unequivocal interactive parameter of development. Discontinuities in infant temperament might be interpreted as a function of developmental change or environmental influences. Temperament might best be conceptualized as a set of flexible parameters of

responsivity and behavior potential which contributes to and is shaped by interaction with the environment. This investigation provides generally optimistic findings, in suggesting that infants who experience difficulty at birth are no more likely to have problematic temperamental characteristics than infants who are born without perinatal complications.

Recommendations for Further Research

1. A longitudinal study which examines the relationship between perinatal events and temperament during infancy then again during early childhood. This would establish the stability of the parent's temperament rating of the child. It would also reduce error due to memory recall of perinatal events.
2. Teacher versus parent perspective of the child's temperament could be examined to determine if similar profiles of temperament are obtained.
3. Future studies are recommended to further examine the issue of construct validity of temperament rating instruments. The information obtained from these studies will be valuable in promoting understanding about why relationship findings concerning temperament and other infant behaviors differ so greatly in the literature.
4. Studies should be conducted which provide a method of controlling for environmental factors so that biological influences on the behavior of high-risk children can be examined more accurately.

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APPENDIXES

APPENDIX A
LETTER TO PARENT

Sand Springs Schools

Main and Broadway - P.O. Box 970 - Sand Springs, OK 74063-0970
Telephone (918) 245-3206
Fax (918) 241-1900

Administration

GEORGE M. PADEN
SUPERINTENDENT OF SCHOOLS
(918) 245-3206

JULIA A. MARTIN
ASSISTANT SUPERINTENDENT
FOR INSTRUCTION
(918) 245-8506

JAMES R. JOHNSON
ASSISTANT SUPERINTENDENT
FOR SPECIAL SERVICES
(918) 245-3384

Dear Parent,

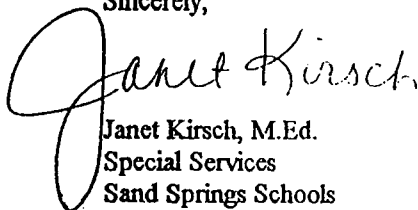
Your child's school has been chosen to participate in a research project the purpose of which is to examine the correlation between perinatal risk factors and temperament in children. As the coordinator of this project I would greatly appreciate your participation.

The project involves having you complete a questionnaire about the typical behavior of your child. The questionnaire takes about 15 minutes to complete. You are also asked to provide family background information. The questionnaire and the Child and Family Background Information form are enclosed.

Enclosed you will also find two copies of a consent form that explains in more detail what the project is about, and how you indicate your consent to participate, or your decision not to participate. Further, the consent form indicates how you can contact me if you have further questions.

I hope your busy schedule allows you to participate, but whether or not that is possible, I thank you for considering this project.

Sincerely,



Janet Kirsch, M.Ed.
Special Services
Sand Springs Schools

APPENDIX B
PARENTAL CONSENT FORM

PARENTAL CONSENT FORM

I, _____ agree to participate in research titled "A Study of the Relationship Between Perinatal Risk Factors and Temperament". I understand that this participation is entirely voluntary; I can withdraw my consent at any time without penalty and have the results of the participation, to the extent that it can be identified as mine, returned to me, removed from the research records, or destroyed.

The following points have been explained to me:

1. The reason for this research is to examine the correlation between perinatal risk factors and temperament in children.
2. The procedures are as follows: Children ages 3 to 7 years old from the Sand Springs area have been contacted to participate in this research. Participating schools have allowed this letter to be sent to you as a potential participant. Enclosed you will find two copies of a consent form. If you wish to participate, you will return one copy of the form signed (you keep the other) in the enclosed self-addressed envelope that has been provided.

The information obtained will not be seen by any school employee other than the research coordinator, Janet Kirsch, and principal investigators, Dr. Don Boswell and Dr. Roy Martin.

3. The instrument you are completing, known as the Temperament Assessment Battery for Children-Revised, is a measure of the emotional style or typical emotional response of young children in social situations.
4. No discomforts or stresses by you or your child are expected as a result of this research.
5. No risks are foreseen as a result of this research.
6. The results of this participation will be confidential, and will not be released in any individually identifiable form without your prior consent unless otherwise required by law. Further, the school personnel will not know whether you agreed to participate or not. It is necessary for the project coordinator in the school to know your name and the name of your child so that the coordinator can keep track of the information on your child. However, your child's name will only be known by the coordinator.
7. The coordinator will answer any questions you might have about this research. The coordinator can be reached by mail at the address on the return envelope or by calling 245-1874 between the hours of 8:00 a.m. and 4:00 p.m.

I understand that participation is voluntary, that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time without penalty after notifying the project coordinator.

I may contact Janet Kirsch at 245-1874. I may also contact University Research Services, 001 Life Sciences East, Oklahoma State University, Stillwater, OK 74078; Telephone: (405) 744-5700.

I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: _____ Time: _____ (a.m./p.m.)

Signed: _____
Signature of Subject

Signature of Program Coordinator Date

APPENDIX C

CHILD AND FAMILY BACKGROUND INFORMATION

CHILD AND FAMILY BACKGROUND INFORMATION

Before beginning this brief questionnaire, please tell us a few things about your child and about you.

1. Child's Sex: M or F (circle one) 2. Today's Date: _____ 3. Child's Birth Date: _____

4. Relationship to person completing this form to the child: (check one)

- | | | |
|--|--|--|
| <input type="checkbox"/> Biological Mother | <input type="checkbox"/> Biological Father | <input type="checkbox"/> Stepmother |
| <input type="checkbox"/> Stepfather | <input type="checkbox"/> Foster Mother | <input type="checkbox"/> Foster Father |
| <input type="checkbox"/> Adoptive Mother | <input type="checkbox"/> Adoptive Father | <input type="checkbox"/> Grandparent |
| <input type="checkbox"/> Guardian | <input type="checkbox"/> Other _____ | |

5. Ethnicity/race of child: (check primary identification)

- | | |
|--|---|
| <input type="checkbox"/> African American | <input type="checkbox"/> White (Caucasian) American |
| <input type="checkbox"/> Hispanic American | <input type="checkbox"/> Asian American |
| <input type="checkbox"/> Native American (American Indian) | <input type="checkbox"/> Other _____ |

6. Education of Parents: (check one)

- Mother:**
- Did not graduate from high school and have no GED
 - Did graduate from high school, or have GED
 - Some college or vocational training
 - Graduated from college
 - Some graduate school
 - Have a masters, doctoral, or professional degree

- Father:**
- Did not graduate from high school and have no GED
 - Did graduate from high school, or have a GED
 - Some college or vocational training
 - Graduated from college
 - Some graduate school
 - Have a masters, doctoral, or professional degree

7. Financial Circumstances: (Please check the paragraph below that best describes your financial circumstances. It is realized that the description will not fit your circumstances exactly as described. you may omit this part of the questionnaire if you would prefer.)

I (or my partner) receive public assistance payments, or I can only find work on a part-time basis. Therefore, I cannot always meet the basic needs of my family for food, housing or medical care.

I am (or my partner is) employed in a steady job but I make just enough money to meet my basic needs for food, housing, and medical care. I do not feel financially secure, and have very little left over for luxuries for the family (such as a late model car, family vacations, eating out at nice restaurants.)

I feel reasonably financially secure, and can meet basic needs for food, housing, and medical care, and can afford small luxuries (new clothing, eating out at a nice restaurant).

I feel financially secure, and am fortunate enough to be able to afford some luxuries, such as a new car or family vacations.

8. This child's weight at birth was _____ pounds and _____ ounces.
9. This child was: (Check one)
 _____ Preterm _____ Full Term _____ More than 2 weeks overdue
10. The approximate length of labor with regular contractions was _____ hours.
11. The mother's age at the time of this child's birth was _____ years.
12. Were forceps used during the delivery? _____ yes _____ no _____ unsure
 (check one)
13. What was the direction of the child at the time of delivery? (check one)
 _____ head first presentation _____ side presentation
 _____ breech presentation _____ unsure
14. What was the approximate length of time which passed from membrane rupture (breaking of water) to the start of labor? _____
15. What type of anesthesia was used during the delivery? (check all that apply)
 _____ inhaled general anesthesia _____ injected general anesthesia
 _____ spinal block _____ unsure
 _____ no anesthesia was used
16. Was the birth _____ vaginal or _____ cesarean? (check one)
17. Was the labor induced? _____ yes _____ no (check one)

APPENDIX D
INSTITUTIONAL REVIEW BOARD APPROVAL

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 05-08-95

IRB#: ED-95-082

Proposal Title: A STUDY OF THE RELATIONSHIP BETWEEN
PERINATAL RISK FACTORS AND TEMPERAMENT IN CHILDREN.

Principal Investigator(s): Don Boswell, Janet Kirsch

Reviewed and Processed as: Expedited

Approval Status Recommended by Reviewer(s): Approved

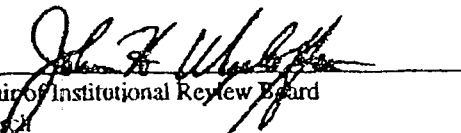
ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD
AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING
THE APPROVAL PERIOD.

APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A
CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD
APPROVAL.

ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR
APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval
are as follows:

Signature:


Chair of Institutional Review Board

Date: May 15, 1995

cc: Janet Kirsch

2

VITA

Janet Kay Kirsch

Candidate for the Degree of

Doctor of Philosophy

**Thesis: A STUDY OF THE RELATIONSHIP BETWEEN PERINATAL
RISK FACTORS AND TEMPERAMENT IN CHILDREN**

Major Field: Applied Behavioral Studies

Biographical:

Personal Data: Born in Conway, Arkansas, June 16, 1961, the daughter of Jerry and Audrey Bartley.

Education: Graduated from Conway High School, Conway, Arkansas, in May 1979; received Bachelor of Science in Education from the University of Arkansas, Fayetteville, Arkansas, in June 1984; completed requirements for the Master of Education degree at Northeastern State University, Tahlequah, Oklahoma, in August 1987; completed requirements for Doctor of Philosophy at Oklahoma State University, Stillwater, Oklahoma, in December 1996.

Professional Experience: Secondary Science Teacher, Hughes Public Schools, Hughes, Arkansas, August 1984 to June 1985; Secondary Science Teacher, Glenpool Public Schools, Glenpool, Oklahoma, August 1985 to June 1987; School Counselor, Little Rock School District, Little Rock, Arkansas, August 1990 to August 1994; School Psychologist, Sand Springs Public Schools, August 1994 to present.