EXPLANATION TO SIX- AND SEVEN-YEAR-OLD CHILDREN PRIOR TO A FINGER-PRICK CBC

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We hereby recommend that the Thesis prepared under our supervision by Anita R. Diebenow entitled "Explanation to Six- and Seven-Year-Old Children Prior to a Finger-Prick CBC"

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TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF TABLES

CHAPTER I

INTRODUCTION

In reality not every encounter a child has with a nurse is a pleasant experience for the child. Some children walk through the clinic door asking, "Am I going to get a shot?" Parents have reported that their child cries when they approach the clinic building or drive through the neighborhood in which the clinic is located. Due to their past experience and incomplete understanding, based on their current cognitive development, children sometimes watch nurses suspiciously. Nurses are frequently perceived by the child as potential performers of harmful acts to his body.

The challenge for pediatric nurses is to facilitate adaptive responses in children to stressful situations. In order to do this, nurses must be sensitive to the fears of children and be able to respond to them on an age-appropriate level of understanding. Since the child's link to the world about him is his parents, the nurse must also consider the parent-child relationship in communication with the child.

One way a child's adaptive response to stressors may be facilitated is to develop age-appropriate, educational programs to be used in preparing the child for a potentially stressful situation. This study was intended to focus on the development, implementation, and evaluation of a preparational program to be used before a finger-prick procedure to collect a blood sample for a complete blood count (CBC).

The stress theory of Hans Selye provided a conceptual framework for understanding how the actions of nurses are stressors in the external environment of children. Selye's concept of human adaptive capacity was used in understanding the need for appropriate approaches to a child before an event which produces stress for the child. With the aid of stress theory, ways of measuring the physiological effects of stress in humans were applied to evaluate nursing intervention aimed at facilitating adaptive responses of children in stressful situations with nurses.

An integral part of nursing today is concern for the security, comfort, and well-being of the people with whom the nurse interacts in health care settings. The nursing of children presents unique challenges for reducing stress which frequently accompanies health care. The

nature of the nurse-child-parent relationship has far-reaching implications for the child's present and future perception of the people in the world about him. For this reason, it is important to study the reactions children have to stressful situations with nurses and ways in which nurses may communicate more effectively with children in promoting each child's ability to adapt to stress.

Statement of Problem

The problem of this study was to determine if preparational, age-appropriate, verbal explanation by the nurse influenced autonomic nervous system responses exhibited by children who had a finger-prick procedure.

Purposes

The purposes of this study were to:

1. Determine the autonomic responses of selected six- and seven-year-old children of both sexes by measuring blood pressure (systolic and diastolic) and heart rate before a verbal explanation of the finger-prick procedure

2. Determine the autonomic responses of the children in Group A, who had received a specific verbal explanation of the finger-prick procedure, by measuring blood pressure (systolic and diastolic) and heart rate immediately following and ten minutes after the procedure

3. Determine the autonomic responses of the children in Group B, who had received a specific verbal explanation different from Group A of the finger-prick procedure, by measuring blood pressure (systolic and diastolic) and heart rate immediately following and ten minutes after the procedure

4. Compare the autonomic responses of Group A and Group B

Background and Significance

Some physicians and nurses have expressed the belief that if a child knows what will be done to him, he will cooperate better (Azarnoff 1971, Scahill 1969). With the child's cooperation, physiological measurements and examinations performed on the child will presumably be more accurate than those performed on an uncooperative child (Skipper and Leonard 1968). The informed child should also suffer fewer emotional after-effects following a traumatic encounter with a doctor or nurse (Mellish 1969). Health professionals who hold these views advocate giving a child information before the child experiences a medical or surgical event to decrease the stress for the child (Hefferman and Azarnoff 1971). In his book Gerald Caplan (1964) stated that information-giving and advanced preparation are acknowledged ways to reduce stress.

In practice, however, many physicians and nurses have reported that giving a child information about a medical or surgical procedure about to be experienced only serves to upset the child (Heffernan and Azarnoff 1971). Watson (1976) points out that nurses know from experience that different-aged children react differently to injections and that children in the same age group manifest a wide range of responses. The stress theory of Hans Selye (1950, 1956, 1974) is helpful in understanding the dynamics of a stimulus in a stressful situation and the responses made by the body to that stimulus.

According to Selye (1974), stressors are agents (bacteria, virus, poisons) or situations (pleasant or unpleasant) which produce stress. Stress is the nonspecific (biochemically stereotyped) response of the body to any demand for readjustment or adaptation made upon it. This stereotyped biochemical body response explains why different stressors may cause the same reactions. The same stimulus may produce different responses in different individuals, depending upon the inner and outer conditioning factors which determine susceptability and tolerance of the body to the stimulus. Responses are modified by numerous inner (genetic inheritance, age, past experience) and outer

(climate, drugs, diet, new knowledge) conditioning factors unique to each individual.

Research on different reactions of children to the same stressful stimuli, an injection, identifies some of the conditioning factors or relevant variables which are responsible for different reactions. These conditioning factors are (1) the emotional contagion of the child's mother during the injection procedure (Campbell 1956), (2) the age of the child (Kassowitz 1958), and (3) the memory of prior innoculations (Levy 1960).

Campbell (1956) reported that infants of mothers who received fear-arousing instructions prior to the child's injection showed more crying behavior than infants of mothers who did not receive fear-arousing instructions prior to the child's injection. Kassowitz (1958) found that members of different age groups manifested a reaction pattern which showed a changing trend from year to year. Intense reactions were observed from the age of eighteen months through the fourth year. Beginning in the fourth year, an increasing percentage of children exhibited self-control. Levy (1960) reported that during the first six months of life, the child exhibited no sign of memory of previous injections. Together, these studies indicate the importance of the child's developmental level in his

response to a painful stimulus, an injection. Developmental theory is essential in deciding what information given to the child may be useful to him in facilitating his adaptive response to a stressful event (Wolfer and Visintainer 1975).

According to Chinn's review (1974) of developmental physiology, the physical competencies of middle-age children enable them to accomplish many tasks of adulthood. As the brain has achieved most of its ultimate size by the sixth year, the child begins to approach maximum level in ability to remember and to conceptualize and form mental structures. By the seventh year the child has full capacity to imitate sounds, to articulate, and to associate auditory, mental, speech, and visual stimuli. Visual capacity reaches optimal function by six to seven years; thus, the child is able to associate incoming visual stimuli with past and present mental images and functions. The middle-aged child has achieved full voluntary control of gross and fine motor ability. The ability of the endocrine system to respond to stress increases gradually.

Chinn (1974) stated that around seven years of age, a child begins to desire social relationships outside his immediate family and culture. His attention shifts to his relationships with peers, teachers, and other significant

adults outside his family. The child's peer group influences his behavior by setting standards, which may be different from the child's family, to which the child must conform in order to be a member of the group. Significant adults influence the child's behavior by providing models that the child may use in imitating behaviors with which he is able to identify. Holme (1971) pointed out that peer influences occur in conjunction with adult influences which operate to reinforce each other.

Chinn defines inner competence as

> . . . the individual's developing awareness of self, his ability to cope as a separate person with the multitude of factors that influence him, and his acceptance and realization of self (1974, p. 10).

Gesell and Ilg (1946) pointed out that the middle-aged child vascilates between being cowardly and being brave, which is evidence for the lack of, or the presence of inner control. The child's mastery of inner control is related to how well he knows what usually happens in the world about him. His incomplete knowledge of the world about him gives rise to his fears. The fears which produce anxiety for middle-aged children seem to fall into three general categories. First, the child fears harm from imagined animals, monsters, or humans. Secondly, the child fears facing new situations

alone. Thirdly, the child fears unfamiliar visual and tactile impressions.

According to Holme (1972), the capacity to learn language is based on the child's ability to receive, interpret, and imitate verbal stimuli. As the child imitates sounds that he hears, his parents correct, explain, and reinforce his speech. Between the ages of one and one-half and four years, normal children master the basic syntax of the primary language spoken in their environment. By seven years of age the child's ability to listen and to make associations with the incoming auditory stimuli is well-developed (Chinn 1974).

Alfred Korzybski (1938) pioneered the development of a theoretical basis for verbal behavior. He pointed out that language which is similar in structure to the outside world helps us to understand the world better. We do this by saying how something behaves or what something does instead of saying that this "is" so, which only gives identity. By using an actional structure, a word only means what follows it. The words, then, give order to the external world. Korzybski calls this an actional and functional language.

The cognitive development of middle-aged children is referred to by Jean Piaget as the concrete operations

subperiod. This and the previous subperiod (preoperational) comprise the entire concrete operations period (Piaget and Inhelder 1966). The main mental activity of the preoperations subperiod is to perceive. Gradually the child's perceptions are dominated by intellectual operations. Intellectual operations include the ability to order and relate experience to an organized whole. As this change occurs, the child is able to reverse mental operations and return to the starting point. He also begins to be able to take into account another person's point of view. He is able to focus on several properties in sequence and to quickly move from one to another. During the concrete operations period, the child's mental operations still depend upon his ability to perceive concretely what has happened (Chinn 1974).

Chinn (1974) pointed out that in the middle-aged years of childhood there are many influences on learning. These influences include sensory capacity, health, intelligence, cultural identification, nature of environmental experience, personality, and emotion of the child. Hill (1971) stated that cognitive interpretations of learning are used by psychologists to make decisions about what information would be helpful to a particular child. Connectionist interpretations of learning are

used in making decisions about how to present information so that it would be applicable to children in general.

Different methods for giving information to children before a stressful procedure have been used by researchers in studying ways to reduce the child's stress response. Compton (1974) studied the effect of play therapy on preschool children who were receiving injections. Vernon et al. (1967) used a movie to provide a modeling influence to prepare children for surgical anesthesia induction. Levy (1959) utilized a child's parent to give information to the child about hospitalization.

Ways to measure the body's response to stress have been developed. These measurements are based on knowledge of the effect of stress on the autonomic nervous system (Selye 1974). During stress, the body shows changes characteristic of activation of the sympathetic branch of the autonomic nervous system and secretion of adrenalin (Rodman and Smith 1974). Thompson (1975) discussed some of the most commonly used instruments for measuring stress. A galvanometer measures a change in skin resistance (galvanic skin response) as a result of changes in sweat gland activity which is increased in stressful, threatening situations. Increases in heart rate and deviations in electrical activity, which are evidences of stress, may be measured by

an electrocardiogram. Increases in systolic and diastolic blood pressure may be measured by using a sphygmomanometer and stethoscope. The increased rate and depth of respiration, when accompanying stress, may be measured with a respiratory trace. Rees (1973) stated that sweat gland activity may be estimated indirectly by recording palmar skin conductance.

Skipper and Leonard (1968) stated that the normal variability of blood pressure and heart rate is not great in children between the ages of three years and nine years. They also stated that since children between the ages of three years and nine years have not developed effective inhibiting mechanisms under conscious control, stress was reflected in the level of these indicators.

The reactions children have to stressful situations with nurses are affected by many factors. These factors include the perception of the child based on his current developmental level, the perception of the child's parent, the parent-child relationship, and the nurse's ability to communicate on an age-appropriate level with the child and his parent.

Hypotheses

The seven hypotheses that were tested in this study were that there would be no significant difference

1. Between the experimental group (group A) and the control group (group B) on baseline measurements of blood pressure (systolic and diastolic) and heart rate before the finger-prick procedure

2. Between group A and group B measurements of blood pressure (systolic and diastolic) and heart rate immediately after the finger-prick procedure

3. Between group A and group B measurements of blood pressure (systolic and diastolic) and hear rate ten minutes after the finger-prick procedure

4. In group A measurements of blood pressure (systolic and diastolic) and heart rate at the time interval immediately after the finger-prick procedure as compared to group A baseline measurements

5. In group B measurements of blood pressure (systolic and diastolic) and heart rate at the time interval immediately after the finger-prick procedure as compared to group B baseline measurements

6. In group A measurements of blood pressure (systolic and diastolic) and heart rate at the time interval ten minutes after the finger-prick procedure as compared to immediately after the finger-prick procedure

7. In group B measurements of blood pressure (systolic and diastolic) and heart rate at the time interval

ten minutes after the finger-prick procedure as compared to immediately after the finger-prick procedure

Definition of Terms

Within the limits of this study the following terms were used as defined below.

Anxiety--a transient feeling of uneasiness and apprehension reflecting an awareness of an impending unpleasant occurrence (Reese 1973, Miller and Keane 1972).

Fear--an emotional response to a real or imaginary threat (Reese 1973).

Stress--the nonspecific response of the body to any demand made upon it (Selye 1974).

Nonspecific response--a response affecting all or most parts of a system which can be produced by many or all agents (Selye 1974).

Stressor--that which produces stress (Selye 1974).

Stimulus--any agent, act, or influence that produces a reaction in an individual (Miller and Keane 1972).

Response--any action or change of condition evoked by a stimulue (Miller and Keane 1972).

Conditioning factors--substances or circumstances which influence the response to an agent (Selye 1974).

Positive reinforcement--offering a reward for an acceptable response when it occurs for the purpose of

increasing the probability of the acceptable response reoccurring (Chaplin 1968).

Developmental theory--systematic statements of the principles or laws underlying changes in the kind or quality of human physical and mental capacities (Chinn 1974, Chaplin 1968).

Stress measurements--measurements of blood pressure (systolic and diastolic) and heart rate.

Systolic blood pressure--the pressure of blood against the walls of the blood vessels during the contraction phase of heart action (Miller and Keane 1972).

BPS--blood pressure systolic.

Diastolic blood pressure--the pressure of blood against the walls of the blood vessels during the relaxation phase of heart action (Miller and Keane 1972).

BPD--blood pressure diastolic.

Heart rate--the number of contractions of the cardiac ventricles per unit of time (Miller and Keane 1972).

HR--heart rate.

Autonomic nervous system--the branch of the central nervous system that works without conscious control (Miller and Keane 1972).

Finger-prick--technique for obtaining a small sample of blood by pricking the finger with a small, sharp instrument.

CBC--a complete blood count, comprised of hemoglobin, hematocrit, red blood cell count, white blood cell count, and differential count (French 1971).

Unopette--a plastic bottle containing a solution that destroys red blood cells from a standard amount of blood obtained with the unopette capillary tube.

Nurse--a graduate of a vocational, diploma, associate degree, or baccalaureate nursing school who is licensed by the state in which he/she is practicing.

Middle-aged child--a child of either sex between the ages of six and twelve years (Chinn 1974).

Cognitive interpretation of learning--classification of learning theory which is concerned with the cognitions (perceptions or attitudes or beliefs) that the individual has about his environment, and with the ways these cognitions determine his behavior (Hill 1971).

Connectionist interpretation of learning--classification of learning theory which concentrates on the responses that occur, on the stimuli that elicit them, and on the ways that experience changes these relationships between stimuli and response (Hill 1971).

DIF 1--the time interval from before to immediately after the finger-prick procedure.

DIF 2--the time interval from before to ten minutes after the finger-prick procedure.

DIF 3--the time interval from immediately after to ten minutes after the finger-prick procedure.

Limitations

Limitations for this study were:

1. The sample size was small
2. The sample was not representative of the general population since the subjects were selected from the practice of pediatricians whose clientele are primarily middle-class Caucasian
3. The parent's level of anxiety was not tested
4. Stress measurements reflected only physiological changes in the cardiovascular system
5. Diversional quiet activities provided for the child between the second and third stress measurements were restrictive
6. The child's perception of nurses based on his past experience was not evaluated

Delimitations

Delimitations for this study were:

1. The sample population consisted of male and female children between the ages of 6.0 and 8.0 years

2. Each child was free of health problems as reported by the parent and verified ultimately by the child's pediatrician

3. Each child spoke and understood English

4. The parent remained with his/her child throughout the period under study

5. The investigator gave all verbal explanations and obtained all stress measurements of all children

6. All stress measurements on and verbal explanations to all children in both groups occurred in the same examining room

7. Before heart rate and blood pressure measurements were made, all children received the same verbal explanation specific to those measurement procedures

8. Preparational finger-prick explanations were given in exactly the same way to each child according to the group to which the child was assigned

9. A complete set of stress measurements at all three time intervals was obtained on each child included in this study

10. Each child's right upper arm was used for all blood pressure measurements

11. None of the children included in this study received an injection during the clinic visit

Assumptions

The following assumptions were made for this study:

1. Baseline measurements of blood pressure (systolic and diastolic) and heart rate reflect normal values in six- and seven-year-old children (Skipper and Leonard 1968).

2. Childhood fears associated with clinic visits will depend on a child's developmental age, past experience, and perception of what will happen (Mellish 1969, Heffernan and Azarnoff 1971)

3. Stress experienced by children will be reduced as the child is taught by adults, is able to learn what to expect in a new situation, and is able to use his own resources to deal with the stressor (Holme 1971)

Summary

Nurses are frequently involved in stressful situations with children who are well. This is an opportunity for the nurse to facilitate the child's adaptive response to stress. Middle-aged children have physical, social, inner, and learning and thought competencies that characterize their ability to respond to stressful situations. These competencies are described in more detail in Chapter II and inferences are made about what is a stressful event for middle-aged children. Criteria for verbal explanations emerge at the end of Chapter II and

serve as a basis for constructing the two explanations used in this study. Chapter III describes how these two explanations, one based on competencies and one based on current practice of pediatric clinic nurses, are compared. The results and interpreatation of stress measurements made in this study are included in Chapter IV. Chapter V gives direction for future study based on the findings from this study.

CHAPTER II

REVIEW OF LITERATURE

The focus of this study was the development, implementation, and evaluation of a verbal explanatory program for six- and seven-year-old children before a stressful procedure. Guidance for this task was found in a wealth of theory and research in child development. Theory and research were utilized in this study to determine what information might be useful to a child in facilitating his adaptive response to stress. Criteria for preparatory verbal explanations for middle-aged children emerged from this review. The criteria were used as a tool for evaluating current practice and new approaches by the nurse in stressful situations with middle-aged children.

This chapter is divided into five sections. The sections are organized to provide pertinent information in response to the following questions: (1) What are the critical variables that affect the competencies of six- and seven-year-old children? (2) Based on the competencies of six- and seven-year-old children, what is a stressful situation? (3) What information will be helpful to six- and seven-year-old children faced with a stressful situation?

Critical Variables

Human development, like that of all other living organisms, progresses ". . . from the whole to the part, from the random to the orderly, from the general to the specific" (Beadle 1970, p. 11). Considering personality development as a holistic process, heredity and environment interact producing unique individuals whose behavior is a reflection of maturation and learning (Luthans 1973). Some theorists have conceptualized personality development utilizing a stage approach based roughly on chronological age. Stage theorists have focused on a critical variable in the developmental process which permeates all stages. In the discussion of several stage theories that follow, only the stage approximating the six- and seven-year-old level of development will be mentioned.

The analysis of stages of development can be traced back to the ancient Greeks, but Sigmund Freud formulated the first meaningful stage theory (Luthans 1973). The critical variable in Freud's theory was psychosexual development. The Oedipal stage and the following latency stage emphasized the gradual identification of the child with the parent of the same sex. Although many aspects of Freud's theory have been rejected in recent years, his concept of identification has continued to be influential

(Mischel 1971). Not only is the child's relationship with his parents an important identification process but also the child's internalization of the standards of his parents (Mischel 1971).

Erik Erikson (1963) identified eight psychosocial stages of development. The third stage corresponds with the age range from four years to eight years. According to Erikson's model, the psychosocial crisis faced at this stage if initiative versus guilt. As the child begins to explore the world of school and neighborhood with his widening repertory of skills, he may have some guilt feelings of wanting to stay dependent on his mother and near familiar surroundings (Brown and Murphy 1975). The optimal outcome of this stage is steadily increasing advances towards independence (E. Erikson 1963).

In contrast with Freud's psychosexual model of development (stressing the instinctive unconscious) and Erickson's psychosocial model (stressing ever-widening social experiences), Jean Piaget's cognitive stages are concerned with mental processes as a critical variable in the developing personality (Luthans 1973). Of the four stages Piaget describes, the preoperational stage spans two to seven years of age, and the concrete operational stage covers the ages of seven to eleven years of age. During the

preoperational age, the child begins to use symbols and language in his thought processes and to develop a concept of class or category (Luthans 1973). During the concrete operational stage, the child gradually builds up the ideas of conservation of matter, length, and weight. The idea of volume is built at a later age. The process of reasoning is inductive during the concrete operational stage (Sutterly and Donnelly 1973).

Robert Sears viewed parental child-rearing practices in the areas of feeding, toilet training, dependency, aggression, competition, and identification as the critical variable in a child's development (Maier 1969). Six- and seven-year-old children are included in the secondary motivational system in which innate drives are modified by the child's socializing environment. The child gradually learns to direct his behavior in socially acceptable ways. Optimal child-rearing is achieved as caring adults find a balance between providing too much or too little control in the specific areas of child-rearing practices listed above (Maier 1969).

In contrast with Sears' learned secondary motivational system, Robert White, who is not a stage theorist, proposed the importance of motives that are unlearned and not physiologically based. He called man's capacity to

interact effectively with his environment the competence motive. White also determined that the critical time for competence development is between the ages of six and nine years (White 1959). During this age period, the child develops needs to cross the street by himself, ride a bike, and read. This exploration, manipulation, and activity are evidences of the drive for mastery over the environment (Luthans 1973).

Competencies

Building on White's conceptualization of competency as man's capacity to interact effectively with his environment, Chinn (1974) developed a conceptual framework for viewing a child's development. She identified four areas of competency (physical, social, inner, learning, and thought) with which each unique individual interacts holistically with his total environment. As the individual interacts with his environment, Selye (1974) has focused on environmental stimuli which produce stress and are experienced by the individual. In order to discover what constitutes a stressful situation for six- and seven-year-old children, it is helpful to consider the competencies of middle-aged children as they have been observed and researched.

Neuromuscular development is one parameter for evaluating physical competencies of middle-aged children. The neuromuscular capacity of middle-aged children reflects adult capacity in type but not always in degree of refinement (Chinn 1974). Since large muscle coordination generally precedes that of small muscles, refinements of neuromuscular skill come at the end of this period (Havinghurst 1972, Scipien et al. 1975). Gesell (1946) has observed that seven-year-old children are able to tie their own shoelaces tightly. Handedness is usually well established by the sixth year (Gesell 1946), and a greater degree of muscular strength on the side of predominant function may be detected (Chinn 1974). According to Gesell (1946), six-year-olds appear to hold a pencil awkwardly, but this seems to be related to their increased awareness of the hand as a tool. The manipulation of objects seems to be more interesting than what is actually accomplished with the object. By the age of six years, the child is able to write letters of the alphabet and identify them (Chinn 1974). He also is able to draw a figure of a man with six distinct body parts (Brown and Murphy 1975).

Play preferences of this age group reflect physical competencies directly related to neuromuscular and skeletal development. They are expert tree climbers at age seven

(Gesell 1946). They ride bicycles, are learning to swim, are better batters than catchers at ball play, and enjoy hop scotch, jump rope, roller skating, and marbles (Gesell 1946). The extent to which a child engages in out-of-doors activities is a reflection of his temperament (Gesell 1946) as well as the optimal function of his circulatory and respiratory systems (Chinn 1974).

Sensory capacity is reached fully by the seventh year (Chinn 1974). The child is able to immitate sounds, articulate, and associate auditory, mental, speech, and visual stimuli. Since visual capacity reaches optimal function by six to seven years, the child is able to associate incoming visual stimuli with past and present mental images and functions. The child is able to identify small objects and temperature changes by touch without visual cues. Similarly, the child is able to identify familiar smells and tastes without visual cues (Chinn 1974).

The physical competencies of middle-aged children enable them to achieve a growing degree of mobility and independence in activities of daily living. The range of their spiraling development widens also in their desire for extrafamilial relationships. The social competencies of middle-aged children reflects this gradual but persistent

shift from family-centered interaction to interactions including age-mates and adults outside the immediate family (Chinn 1974).

Middle-aged children are traditionalists (Elkind 1974), and as such, they accept without question the authority of the family and the games and superstitions of other children. The peer group decision about the norm for dress and appearance is a powerful influence on social behavior. Middle-aged children are sensitive to the criticism and ridicule of their age-mates. For age seven, what others think, say, and do are the same (Elkind 1974).

Group plan is not well-organized by six- and seven-year-olds (Gesell 1946). It is carried out for individual ends. Two-somes in play are the rule with exclusion of a third child who may wish to join. Small groups that form have a shifting make-up, and group activity will continue as the individuals come and go. By the age of six, children are interested in playing games with rules. They are not good at games requiring strategy and foresight such as checkers, chess, and tic-tac-toe (Elkind 1974). Both sexes play together, depending only on the availability of play mates (Gesell 1946).

Although the ability to differentiate oneself from others occurs between the ages of three and four years,

social-group identification is not established until about the age of five (Goodman 1952), and awareness of membership in ethnic groups is well-established by age seven (Beadle 1970). From about the age of seven, children use ethnic labels much as adults do. They know that religious and nationality affiliations can be compatible, but they do not apply these concepts to themselves with the same understanding of adults (Beadle 1970). The classification of members of religious groups as individuals about whom evaluations are made begins by the age of seven (Radke et al. 1949).

Elkind (1974) states that identification with others and peer group influence orients the middle-aged child by experience to the morality of mutuality. In the morality of mutuality the intention rather than the amount of damage done is the main consideration in assessing blame. The morality of authority is derived from adults and is predominant in children who interact primarily with grown-ups. The morality of authority is evidenced by younger middle-aged children who believe that a misdeed is judged by its size instead of its intention. Besides this gradual shift of understanding of moral ideas from authority to mutuality, a child's honesty is dependent on specific situations. The child's failure to be honest in new

situations may be because he does not understand the wrongness of his action in this new situation.

The influence of age-mates has a profound effect on the inner competencies of middle-aged children. As the child masters intellectual and social tasks among his peers, he considers himself successful (E. Erikson 1963). The inability to master tasks in relation to his peers constitutes failure which the child equates with his total self-concept (Beadle 1970). Seven-year-old children are concerned about those areas of activity that peers, teachers, and parents choose to evaluate. Seven-year-old children want to know immediately how well their performance was graded (Elkind 1974). They are less sure about how to do something before being told and begin to grasp the role of the teacher as a guide for learning (Elkind 1974).

The turmoil of adaptation to new values and to standards of school life is frequently expressed in periods of regression in six-year-olds (Gesell 1946, Elkind 1974). Fears of real or imagined animals may be as vivid as when the child was five years old, although the child may confine his fears now to <u>big</u> animals. Sounds produced by the elements (thunder, rain, wind) or by man (sirens) are feared until he is able to localize and identify them.

The fear of even slight bodily injury produces a reaction out of proportion to the cause. This occurs with a scratch, the prick of a needle, and the sight of blood. Space fears at this age include dark rooms or poorly lit rooms in which shadows produce different forms. Time fears include the fear of being late for school (Gesell 1946)

Gesell (1946) stated that seven-year-olds are able to handle their fears differently than six-year-old children. They are able to protect themselves due to increased knowledge of the environment. They know what dentists do and are not as afraid of the dentist's chair. They are able to hold their breath under water and are not afraid of getting their faces wet. But seven-year-olds do not like to experience new situations alone. School work may be feared because of hesitancy in starting without the teacher's guidance. Seven-year-olds fear unfamiliar visual impressions. Instead of having outright fears at this age, some children are worriers. Worry is viewed as an indirect method of taking the step from the past to future orientation.

Learning, language, and thought become intermixed as a child's capacity to communicate symbolically develops (Lindsay and Norman 1972). Dale stated that " . the

child can talk about only what he knows" (1976, p. 154). Therefore, a few comments about what six- and seven-year-old children talk about are appropriate as learning and thought competencies are discussed.

Long after language is mastered, action remains a central part of a child's conceptual structure (Lindsay and Norman 1972). The integration of sensory events and motor movements plus the child's knowledge of the permanence and independence of objects are the basis of his language. Seven-year-old children define common objects based on their actions, such as "Table are for eating on; chairs are for sitting on . . ." (Lindsay and Norman 1972, p. 437).

In a study by Piaget (1952) with children in early school years, one child was given information by the experimenter and told to give this information to a second child of the same age. From his findings Piaget concluded that children of this age do not communicate information very clearly because they are unable to adapt to the role of the listener. He also concluded that children of this age do not understand information very well, even though it is adequately expressed, because of egocentric factors. He observed that whether the children were communicating or

not, they assumed they were understanding and being understood.

The ability of children and adults to communicate a single referent was studied by Glucksberg et al. (1966). One subject, the decoder, had the task of selecting one of six blocks on the basis of a verbal message provided by the other subject, the encoder. Results showed that when children are given adult messages, their selections are more accurate than the selections of adults who are given children's messages. Therefore, children are better decoders than encoders.

Jerome Brunner's view of the function of language is that

> . language provides a means, not only for representing experience, but also for transforming it. . . . Once the child has succeeded in internalizing language as a cognitive instrument, it becomes possible for him to represent and systematically transform the regularities of experience with far greater flexibility and power than before (1964, p. 4).

Elkind (1974) stated that by the age of six or seven years, a child can reason in his head. This is in part due to internalization of language and also actions. He now mentally performs trial and error activities that he had to perform before in fact. The development of reasoning abilities makes formal education possible because logic is implicit in verbal instructions.

The use of internalized language as a mediating process for learning is a major difference in the learning and thought competencies of preschool and school-aged children (Elkind 1974). The learning and thought competencies of six- and seven-year-old children overlap the end of the preoperational and the beginning of the operational stages as described by Piaget (1952).

During the preoperational stage children classify pictures of objects that differ along a variety of dimensions by grouping them according to their connection with common environmental situations. Unlike adults, children use similarities and differences in physical characteristics only if there is no other choice (Lindsay and Norman 1972). The child centers his internal representations around himself, and this egocentric viewpoint makes it impossible for him to take or understand another person's point of view. Egocentric thought restricts the child's ability to learn by communicating with others (Piaget 1952).

Around the age of seven, the child enters the stage of concrete operations. He is able to reverse mental processes and to attend simultaneously to two dimensions of mass (height and width) (Lindsay and Norman 1972). This results in the concept of conservation of quantity due to

compensation of height by width in the famous water glass problem (Piaget and Inhelder 1969). The child understands that more and same refer to the number of objects and not to the perceptual pattern of their arrangement. By seven he is able to arrange and report arrangements of things in order according to asymmetrical relationships. The child is able to explain that if the red stick is longer than the yellow one, and the yellow stick is longer than the blue one, then the red stick is longer than the blue stick (Beadle 1970).

The seven-year-old child is able to master simple addition, subtraction, and reading (Elkind 1974). "He learns the rules of manipulation, of number and space, of simple generalization, and simple abstraction" (Lindsay and Norman 1972, p. 494). School-aged children learn clock time progressing from full to quarter hours, whereas preschool children measure time from event to event (Elkind 1974).

At six, the child is aware that his dreams are thoughts. At eight, he realizes that he himself causes those thoughts (Beadle 1970). During the concrete operations stage of cognitive development, ". . . the child's thought remains rooted to concrete objects and events, centered primarily on things that exist . . ." (Lindsay and Norman 1972, p. 494).

Stress

With the review of competencies completed, it is possible to infer what elements of a situation may be stressful to a young, middle-aged child. By Selye's definition (1974) stress is the effect (pleasant or unpleasant) of a stressor (causative agent or situation) which is experienced by people. The stressor causes the individual to respond or cope with the demand (change or threat) that the stressor represents. The response to stressors is influenced by inner conditioning factors (heredity, past experience, knowledge) and outer conditioning factors (climate, drugs, diet). Stress may be helpful or harmful. A group of individuals may have a variety of reactions to the same stressor. A variety of stressors may cause the same reaction in different people. Selye labels harmful or unpleasant stress as distress. According to Chinn (1974), when a middle-aged child is exposed to environmental stimuli that interefere with his physical, social, inner, and learning and thought competencies, the child experiences stress and possibly distress.

Based on the competencies of middle-aged children in general, and six- and seven-year-old children in particular, a stressful situation may contain one or more of the following elements: (1) limitations or demands for

self-care which the child is unable to perform (Chinn 1974, Scahill 1969, F. Erikson 1971, Scipien et al. 1975); (2) separation from the familiar (Scipien et al. 1975, Gisell 1946, Chinn 1974, Scahill 1969, F. Erikson 1971); (3) a quality of newness or difference from past experience (Gisell 1946, Beadle 1970); and (4) exposure to learned dangers (Levy 1960, Campbell 1956, Scipien et al. 1975, Schactner and Singer 1962, Mischel 1971). Each of these elements will be considered individually.

The first two elements of stressful situations have been reported in nursing literature in discussions about the effects of hospitalization on middle-aged children (Chinn 1974, Scahill 1969, F. Erikson 1971, Scipien et al. 1975). Immobility due to illness or trauma poses limitations which sometimes restrict middle-aged children to dependency on others for the care of their basic biological needs. Side rails, traction apparatus, and body casts add to the feeling of vulnerability and of being at the mercy of one's environment (F. Erikson 1971). Without knowledge of a child's ability for self-care before an illness and the limitations imposed on the child due to his illness, nurses are unable to assess the child's ability to increase his participation in his own care without additional stress (Chinn 1974).

Separation from familiar surroundings is also a stressful element associated with hospitalization. The middle-aged child approaches an unfamiliar environment with apprehension for his own safety (Scipien et al. 1975). He is more able to deal with an unfamiliar environment than a younger child through the implementation and purposeful use of his advancing cognitive skills. Heightened fears and regression may occur in middle-aged children who are faced with a new situation (Scipien 1975, Gesell 1946). Six- and seven-year-old children fear facing new experiences alone (Gesell 1946).

A quality of newness or difference from past experience may be an element of a stressful situation for middle-aged children. Gesell (1946) reports that a seven-year-old child is more cautious in his approach to new performances such as climbing and playing in a treehouse. In addition to a fear of heights, he may also fear unfamiliar visual and tactile impressions. These result from a field-dependent perception (Beadle 1970). "Until children are well into the school years, . . . they need more clues to what they are seeing, hearing, testing or touching than adults do" (Beadle 1970, p. 151).

From previous experience (Levy 1960) and from the emotional contagion of mothers (Campbell 1956), children

learn which situations are dangerous. Peers tell each other about people and events that should be feared (Scipien et al. 1975). A person's cognitive appraisal of a potential stressful event affects his emotional reaction to it (Schacter and Singer 1962). In other words, ". . . a person's reactions depend on what he believes is happening or about to happen, regardless of the objective foundation of his belief" (Mischel 1971, p. 349).

Physiological measurements have been used to indicate the degree of stress in middle-aged children. Shapiro (1975) measured finger sweat prints and heart rates taken at the wrist on twelve-year-old girls in a study comparing behavior of Kibbutz and urban children receiving an injection. He stated that the verbal rating scales and behavioral observations that were also made, served to validate the physiological measures for use in monitoring stress. Blood pressure, heart rate, and temperature were measured on children between the ages of three years and nine years to study preoperative and postoperative responses to the stress of hospitalization (Skipper and Leonard 1968). The authors stated that since children between the ages of three years and nine years have not developed effective inhibiting mechanisms under conscious control, stress was reflected in the level of these indicators.

Rosenberg and Katcher (1976) concluded from their study of heart rate and physical activity of children (median age of eight years) during dental treatment that heart rate alone is not a valid index of stress in children. They reported that children with grossly observable physical activity have high heart rates. Children with no observable physical activity or only changes of facial expression have heart rate deceleration. However, behavioral responses recorded on each child by an observer using a descriptive typology of behavioral response patterns (active avoidance, passive withdrawal, tense immobility) indicate that one-third of the children had decreases in heart rate during displays of anxiety.

Information Given Prior to a Stressful Situation

Information-giving and forewarning have been used to bridge the gap between what an individual believes will happen and what in fact will happen. Janis (1958) suggested that correct predictions of future events by authority figures contributes to the development of a trusting attitude of children towards doctors and nurses. The goal of these preparatory explanations is to be as complete as possible and as reassuring as possible. A complete, non-threatening explanation provides the child with a

cognitive framework for appraising the perceptions that might be experienced. Surprise and ambiguity are prevented.

Mischel (1971) stated that while some people may benefit from information and forewarning, others may become debilitated by anticipatory anxiety. Others may find it difficult to imagine a traumatic experience before it occurs if they have had no relevant past experiences with similar dangers.

It is difficult to predict reactions to stressful situations because of the many variables to be considered (Mischel 1971). The subject has been researched by physicians, dentists, psychologists, social psychologists, and sociologists. There appears to be a dearth of research by nurses.

In 1975 Kath Luciano, a nurse, coauthored an article outlining criteria for verbal explanations to children before stressful hospital procedure. The same year a group of nurses (Johnson et al. 1975) implemented a research study to investigate the effects of two different verbal explanations to children before orthopedic cast removal. Another nurse, Madelon Visintainer (1975), coauthored a study on the effect of nursing care in reducing the preoperative and postoperative stress of children, but the content of verbal explanations was not controlled. The

following discussion of the criteria for verbal explanations (Luciano and Schumsky 1975) is based on current knowledge and research on the reactions of middle-aged children to stressful situations.

One principle of learning is that new learning must be based on previous knowledge and experience. Closely related is a principle of teaching which is that teaching requires effective communication (Pohl 1973). Since six- and seven-year-old children have a limited capacity for abstract thinking, the purpose and technique of the procedure being explained should be stated in concrete, action terms (Lindsay and Norman 1972). Using the concept of reversability, the order of events can be communicated to the child before the procedure begins. Forewarning was found by nurses (Johnson et al. 1975, 1976) to be helpful in reducing the fears of middle-aged children prior to orthopedic cast removal. The average amount of distress displayed by all children who had casts removed showed the highest distress score for the control group who had no advanced preparation. The second highest distress score was exhibited by the procedure group who had been told the order of events from an observer's point of view. Johnson et al. (1975) capitalized on the egocentric view-point by asking children who had had a cast removed to

their experience. The words, phrases, and concepts of these children were the basis for the explanation given to the experimental group in the cast removal study. The first criterion for concepts to be included in verbal explanations is the information given to the child should explain the purpose and technique of the procedure in language the child is able to understand (Luciano and Schumsky 1975).

Middle-aged children share interpretations of events with each other (Elkind 1974). Due to their incomplete understanding of the world, children have fears of bodily injury that are not based on fact (Gesell 1946). Since children depend on their senses to find out about the world around them, explanations should include sensations they will experience (Johnson et al. 1975, 1976). The Johnson et al. study (1975) supported the hypothesis that congruency between expected and experienced sensations is associated with reduced emotional response. The experimental group of children were told what sensations to expect during the cast removal. In the average amount of distress displayed by all of the children, the sensation group distress score was the lowest. The second criterion for concepts to be included in verbal explanations is the child should be told what sensations to expect, if the procedure will be painful, and how long it will last (Luciano

and Shumsky 1975). Knowledge of how long one is expected to endure a situation is included by Janis (1958) in a discussion about accurate predictions by adults to children. Janis (1958) stated that accurate predictions by adults in explanations to children produce trustworthy attitudes of children to authority figures.

The third criterion for verbal explanations is the child should be allowed to ask questions and talk about each step of the procedure. By allowing a middle-aged child to ask questions, the child's level of understanding can be assessed (Luciano and Shumsky 1975). Soliciting the child's questions invites his participation in the event which capitalizes on his physical, social, learning and thought, and inner competencies of exploration (Luciano and Shumsky 1975, Chinn 1974).

The first three criteria focus on giving information to the child that he can understand and can use to cope with a stressful procedure. The last three criteria focus on another aspect of promoting competency dvelopment of children in stressful situations. This aspect is expressed in a principle of learning which states that conditioning is a process of learning (Pohl 1973). While the latter three criteria utilize connectionist theories of learning,

the former three criteria reflect cognitive theories of learning (Hill 1971).

The fourth criterion for verbal explanations is the child should be told what is expected of him. Often medical and nursing procedures require that the child assume a certain position or change his activity level (Luciano and Shumsky 1975). By practicing the behavior expected by the nurse, the child, who is a traditionalist (Elkind 1974), will be able to actively participate in a positive way according to his level of competency. The child should be praised for his cooperation and correct behavior (fifth criterion) (Luciano and Shumsky 1975). Praise is a positive reinforcer to strengthen new behavior (Krumboltz and Krumboltz 1972).

The study by Kanfer et al. (1975) of darkness tolerance by five- and six-year-old children illustrated that verbal cues that reinforce the child's ability to control his own responses in a stressful situation (darkness) increase the child's ability to tolerate that situation longer. Because six- and seven-year-old children are able to internalize language (Dale 1976), they also begin to exercise coping self-instructions based on the verbal cues of others (Kanfer et al. 1975). During a stressful nursing procedure this may be accomplished by a sixth

criterion--the child should be reassured by continuing explanations which give the child specific things to focus on. Wolfer and Visintainer (1975) encouraged the children to count or repeat phrases during the procedure that they had practiced before the procedure.

Much has been written about development in the middle-aged years of childhood. The conceptual framework of competencies is one way to view the development of children as they interact holistically with the world around them. Based on the competencies of middle-aged children, it is possible to infer elements of situations which may be stressful for them. Pediatric nurses are in a unique position to develop verbal explanations for children to facilitate a child's adaptive response to stress. The clinical application of current knowledge may be studied so as to promote competency development in children through improved nursing care.

CHAPTER III

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

This study was conducted in three phases which were the survey, the pilot study, and the investigational phase. The purpose of the survey was to obtain elements of common explanations given by pediatric clinic nurses to six- and seven-year-old children before a finger-prick procedure. The pilot study was conducted to validate the demographic data sheet for obtaining pertinent information and to test the sequence of procedure events for clarity, ease of implementation, and cooperation between the personnel and clients. An experimental approach was used in the investigational phase of this study. The independent variable was the verbal explanation for the finger-prick procedure. The dependent variables were stress measurements of blood pressure (systolic and diastolic) and heart rate.

The Survey and Explanations

From July 13, 1976, to July 15, 1976, a survey was conducted of pediatric clinic nurses who were employed in the same urban area from which the children were selected for this study. The pediatric nurses who collect blood samples by finger-prick were located by telephone inquiry

to ten clinics. The investigator visited five clinics by appointment with the nurses. A cover letter and written consent form (appendix I) accompanied the survey form (appendix J) which was given to each nurse. The cover letter explained the purpose of the survey, invited the participation of the nurse, assured anonymity to those who volunteered to participate, and provided for written consent by the nurse who participated. Of the eleven nurses who were invited to participate, one refused. Five nurses completed the survey form while the investigator waited. The other five nurses asked the investigator to return the next day to pick up the survey form.

All ten pediatric clinic nurses included in the survey were currently employed in a pediatric clinic setting. Eight nurses had been employed in a pediatric clinic from one to four years, and two nurses had been employed over four years. The current educational level of the nurses included five graduates from vocational schools and two from diploma schools. Two nurses had a baccalaureate degree, and one had a master's degree.

The texts of the finger-prick explanation survey were evaluated by the researcher with a content analysis for how many times criteria concepts occurred. The analysis is tallied on table 1. The concepts that were mentioned by

TABLE 1

CONCEPT ANALYSIS OF VERBAL EXPLANATIONS GIVEN BY TEN PEDIATRIC CLINIC NURSES

Concept Criteria	Responses of Nurses	Tally
I. The information given should explain the purpose as well as the technique of the procedure.	A. The purpose	
	1. to see if you are eating good food	3
	2. to see if your blood is okay	2
	3. to see how healthy you are	5
	4. no reason	2
	B. The technique	
	1. I need to stick your finger	7
	2. I need to clean your finger	3
	3. I will touch your finger with this tube that looks like a straw	5
	4. I will do a magic trick	1
	5. This will be a mosquito bite	1
II. The child should be if the procedure will be painful and how long it will last.	A. What sensations to expect	
	1. will hurt	5
	2. won't hurt	1
	3. will feel like a sticker	4
	B. How long the hurt will last	
	1. not long (a second)	5
	2. none	5
III. The child should be allowed to ask questions and talk about each step of the procedure.	A. Questions mentioned	2
	B. Questions not mentioned	8

TABLE 1 (Continued)

Concept Criteria	Responses of Nurses	Tally
IV. The child should be told what is expected of him.	A. Emotions	
	1. none stated	9
	2. okay to cry	1
	B. What the child should do	
	1. hold breath	1
	2. say something (explanative)	2
	3. hold tube	2
	4. watch the blood go up the tube	2
	5. no comment	5
V. The child should be praised for his cooperation and behavior.	A. Praise	2
	B. No comment	8
VI. During the procedure he child should be reassured by continuing explanations that give the child specific things to focus on.	A. The technique	
	1. I need to stick your finger	7
	2. I need to clean your finger	3
	3. I will touch your finger with this tube that looks like a straw	5
	4. I will do a magic trick	1
	5. this will be a mosquito bite	1
	B. What sensations to expect	
	1. will hurt	5
	2. won't hurt	1
	3. will feel like a sticker	4
	C. How long the hurse will last	
	1. not long (a second)	5
	2. none	5

TABLE 1 (Continued)

Concept Criteria	Responses of Nurses	Tally
Other considerations	A. Call child by name	5
	B. Be honest	5
	C. Don't be honest	1
	D. No comment	4

at least five nurses were included in the verbal explanation for the control group (appendix C).

The ten survey tests, content analysis data, and composite explanation for group B were submitted to a panel of experts for validation. The panel of experts included a statistician, a child psychologist, and a pediatric nurse who is on the faculty of a graduate nursing program. The verbal explanation for group B was validated by the panel of experts. They unanimously agreed that the content of the group B explanation reflected the concepts given in the survey by five or more pediatric clinic nurses.

The preparational explanation for the finger-prick CBC given to the experimental group (appendix J) was formulated from developmental theory related to the competencies of middle-aged children and based on the criteria of Luciano and Shumsky (1975). The verbal explanation for Group A was submitted to a panel of experts for validation. The panel of experts included a developmental psychologist, a behavioral psychologist, and a pediatric nurse who is on the faculty of a graduate nursing program. The verbal explanation for group A was validated by the panel of experts. They unanimously agreed that the content of the group A explanation met the criteria of Luciano and Shumsky (1975) used in this study. The

developmental psychologist and the pediatric nurse agreed that from their experience the explanation was based on the competencies of six- and seven-year-old children. The behavioral psychologist indicated that the positive reinforcement given by the investigator to the children in group A was the most important element of this explanation.

The rational for the group A explanation is outlined below. The purpose of the procedure was stated by referring to the quantity of red blood cells that the child has. "How many" implies counting, an arithmetic concept. The function of red blood cells was not explained unless the child asked why the investigator wanted to know how many red blood cells he had. The procedure events were identified and numbered in sequence since six- and seven-year-old children have mastered arithmetic abstractions (Lindsay and Norman 1972). As each part of the procedure was discussed, the event was simulated on the investigator's finger first and then on the child's finger. In this way the investigator defined what would happen to the child in actions as well as in words. The integration of sensory events and motor movements are the basis for language and thought for six- and seven-year-old children (Lindsay and Norman 1972).

Six- and seven-year-old children fear bodily injury (Gesell 1946); therefore, information about the kind of discomfort to expect and how long it will last is essential. The description of discomfort associated with numbered events was limited to "will not hurt" or "will hurt." By stating sensations in the form of opposites, congruency between what the child expected and experienced could be honestly expressed. "A minute" was the unit of time that was stated to group A for how long the hurt would last. This was more accurate than "a second" as stated to group B. To compensate for the possibility that the term "minute" would not be understood by group A, the numbered sequence of events were correlated with statements about hurt. Part two was identified as "will hurt" in the sequence, and parts one, three, and four were identified as "will not hurt." In this way the children in group A were given a measurement of time correlated with hurt and expressed in terms of the events. This event to event measurement of time is understood by preschoolers (Elkind 1974).

By allowing questions to be asked by group A children, the investigator assessed how well each child was decoding the verbal explanation. Further explanation or clarification was given as needed. Since young middle-aged children sometimes act like they understand when they do

not (Piaget 1952), questions were solicited by the investigator to encourage exploration by the child. Group B children were not encouraged to ask questions.

In the verbal explanation to group A children, the investigator told each child what was expected of him. "You can help by holding your hand still." This behavior was practiced by the child during the beginning of the explanation while the investigator showed the child each part of the procedure. During the actual procedure the child was praised for his cooperation in performing correctly during each part of the procedure. Praise is a verbal expression of affection and a powerful social reinforcer (Luthans 1973). Praise was not given for cooperation by group B children.

During the procedure the numbered parts provided a specific focus for the child as the explanation was repeated, and the blood sample was collected. Since middle-aged children were able to internalize language (Elkind 1974), the numbered parts were verbal cues that the child could associate with what would happen and how he could participate ("You can help by holding your hand still.") Although events to be expected were not numbered in the group B explanation, the events were repeated in the same order as the blood sample was collected.

Pilot Study

The pilot study was conducted July 26 and 27, 1976, in the setting chosen for the actual study. The sequence of events was discussed with the office nurses before the pilot study began. They indicated that the parent and child should be approached by the investigator after the child was examined by the pediatrician for two reasons. The first reason was that all five pediatricians did not routinely order a CBC on six- and seven-year-old children. The second reason was that the established office appointment schedule would remain intact. The nurses suggested that the investigator approach parents and children in the waiting area adjacent to the laboratory.

Four children between the ages of 6.0 and 8.0 years and their parents were invited to participate. The investigator met them in the waiting room adjacent to the laboratory and explained that this study was concerned with exploring the responses of children to the collection of a blood sample by finger-prick. Each parent was given an opportunity to ask questions and to refuse or consent to participate. After the consent form was signed and the demographic data sheet was completed by the consenting parent, the investigator escorted each parent and child into the laboratory. The first two children in the pilot

study separately received all explanations according to the group to which they were assigned, stress measurements, and a finger-prick CBC. The dorsal recumbent position on a padded examining table in the laboratory was assumed by the children.

As data were collected on the first two children, it was noticed that the flow of children needing specimens collected in the laboratory was interrupted. In order to avoid disruption of the laboratory technician's work, the x-ray room across the hall from the laboratory was used for the data collection on the other two children.

It was discovered that the demographic data sheet did not request information about injections or skin tests received by the child during the visit to his pediatrician. In order to avoid all discussion of injections with parents and children, the investigator added a space on the data collection record form (appendix F) in which to note injections or skin tests the child received during the visit. The investigator obtained this information from the charge slip which was marked by the physician and was brought by the parent to the laboratory after the child's physical examination by his pediatrician. A delimitation was added to exclude from this study all children who received an injection during their visit to the pediatrician.

Children who received a Tuberculin Tine test were included in this study because it does not require the use of a needle.

In summary, the sequence of procedure events was modified to obtain the finger-prick CBC after instead of before the physical examination and to use the x-ray room instead of the laboratory or an examining room. These adjustments were the least disruptive of established clinic routine and allowed the investigator to complete all measurements on all children in the same room. Information about injections and/or Tuberculin Tine tests was included on the data collection record of stress measurements and was obtained from the charge slip. The investigator conducted all aspects of the pilot study.

The Setting

The setting for this study was in a clinic which offices five pediatricians in an urban area with a population of approximately 400,000. The pediatricians' clinic is located on the first floor of a new medical office building complex. The second floor of the building was not occupied at the time of this study. There are two children's hospitals and four general hospitals within three miles of the clinic.

The first floor of the office building is arranged so that each pediatrician has three examining rooms and an office. They share two large waiting areas for patients, a business office, and x-ray and medical laboratory facilities with a small waiting area for patients. As a result of the pilot study, it was decided to utilize the x-ray room for data collection in this study. The room measures six feet by ten feet and has pale yellow walls with an accoustical ceiling. It is located across the hall from the laboratory. The x-ray room is equipped with a six-foot table, a movable flouroscopy machine, a three-foot stool, a foot stool, a Snelley eye chart, and an anteroom for film development. The x-ray table top was padded to provide warmth for the children. The temperature of the clinic was between 70° and 74° Fahrenheit.

The sphygmomanometer, stethoscope, and finger-prick equipment tray were on one end of the table within reach of the nurse. The finger-prick equipment tray contained one individually-packaged lancet, two cleansing agent pads, a kleenex, two glass slides, two capillary tubes, one unopette, and one bandaid. Each piece of finger-prick equipment was arranged on the tray for immediate use as it was needed. Each child and parent who volunteered to participate in this study were escorted to the x-ray room

for all preparataional explanations, all stress measurements, and the finger-prick CBC.

Population

The population for this study was six- and seven-year-old children who came to their pediatrician's office for a routine physical examination which included a CBC by finger-prick and urinalysis. Data were collected on thirty-three children. Three children were omitted from this study. One child was omitted because he was a personal friend of the investigator. The other two children were omitted from the study because of health problems reported by the parents and verified by the physician. One child was receiving desensitization injections for an allergic condition which included episodes of wheezing, and the other child was receiving medication to control his hyperactive behavior.

Thirty children were selected for this study and were assigned randomly to experimental and control groups using a table of random numbers. The parents of four of these thirty children reported health problems that were not verified by the child's pediatrician. All children spoke and understood English, had not received an injection during the visit, and voluntarily allowed the investigator

to obtain all stress measurements at all three time intervals.

Tool

Several standard instruments were used to measure the dependent variables (systolic and diastolic blood pressure and heart rate) which indicate stress (Skipper and Leonard 1968). The same sphygmomanometer with a cuff size which covered two-thirds of the length of the child's upper arm was used (Leifer 1965). The rubber bladder of the cuff encircled the child's upper arm (Greenfield et al. 1976). After the cuff was wrapped securely around the child's right upper arm, the brachial artery was occluded by air pressure pumped into the cuff. The air was released slowly. Systolic pressure was recorded as the level of mercury in millimeters at which the first sound was auscultated. Diastolic pressure was recorded as the level of mercury in millimeters at which the sound changed (Sodeman and Sodeman 1974). The diaphragm on the same stethoscope was used to auscultate each child's blood pressure at the antecubital space.

Measurement was made of apical heart rate timed for one minute. The same pediatric stethoscope was used for the measurement of each child's heart rate. A separate data collection record was kept on each child of the three

stress measurements taken at three intervals for this study. The record form (appendix F) was unanimously approved by a panel of experts that included a statistician, a child psychologist, and a pediatric nurse who is on the faculty of a graduate school.

Data Collection

As a parent brought her six- or seven-year-old child to the laboratory following the child's physical examination, the investigator met them in the waiting area adjacent to the laboratory and invited their participation in this study. The investigator informed each child's parent that this study was concerned with exploring the responses of children to the collection of a blood sample by finger-prick. Since the laboratory technicians in this office collect all blood samples, the investigator assured the parent that the same technique used by the laboratory technicians would be followed. Each child's parent was told that fifteen minutes of her time was needed for this study. The investigator explained that the child's blood pressure and heart rate would be measured and recorded three times at intervals before, immediately after, and ten minutes after the finger-prick CBC. Each parent was given an opportunity to ask questions and refuse or consent to participate. Each child's parent who consented

to her child's participation in this study was guaranteed anonymity and was asked to read and sign a written consent form (appendix H) and complete the demographic data form (appendix G) before the child participated in this study. At this time each child was randomly assigned to a group, experimental or control, and the parent, child, and investigator went into the x-ray room together.

Demographic data obtained from each parent included seven areas of information germaine to this study. Questions 1 and 4 through 6 were asked to insure the delimitations of this study regarding the child's age, ability to speak and understand English, and present state of health as perceived by the parent. Questions 2 and 3 were asked since birth order and sex of siblings seem to affect a child's perception based on the modeling influences in his/her family (Watson 1976, Holme 1972). Question 7 was asked to determine the child's previous experience with blood pressure and heart rate measurements which may be added stressors in this study (Selye 1974). Questions 8 through 10 were asked to discover the child's previous experience and reaction to blood collection from the finger as perceived by the parent. Questions 12 through 15 were asked since the information given to a child by his/her parent is a factor in the child's stress reaction

to clinic visits (Heffernan and Azarnoff 1971). Questions 1 and 11 alerted the investigator to possible learning difficulties of a child. The physician's charge slip was checked to be sure the child had not received an injection on this visit to the clinic.

The supine recumbent position on the x-ray table was used for all stress measurements and finger-prick CBC for all children. The x-ray machine was positioned so that it was not in the child's line of vision as the child was lying on the table. The investigator explained the placement of the stethoscope (appendix D) to the child before the first heart rate measurement. The investigator explained the blood pressure procedure (appendix E) to the child before the first blood pressure measurement. The explanations for heart rate and blood pressure were validated by a panel of experts (a developmental psychologist, a behavioral psychologist, and a pediatric nurse who is on the faculty of a graduate nursing program).

Blood pressure measurements were taken on the child's right upper arm since measurements made on the right arm may be different from and are higher than measurements made on the left arm (WHO 1959, Birth and DePasquale 1962, Thulin et al. 1976). Each child was placed in the recumbent position with the arm slightly abducted from the lateral

chest wall. This position was suggested by Lancour (1976) for accurate measurement of blood pressure. Lancour states that "If the artery is above heart level, false low pressures may be obtained. If the artery is below the heart, false high pressures may be read" (1976, p. 774). For this reason, the sitting position with the arm slightly flexed and resting on a flat surface was not used.

Each child was given a preparational explanation of the finger-prick CBC which was determined by the group to which each child was assigned. The third finger, also referred to as the ring finger, on the left hand was used for the finger-prick on all children. Although blood samples may be obtained by pricking the great toe, the heel, the earlobe, or any finger or thumb, the second or third finger is preferred in middle-aged children (personal communication with the head of a laboratory at a children's hospital in a metropolitan area, June 2, 1976). The fingers are most accessible sites for the person collecting the blood sample on a middle-aged child. They are also most visible to the middle-aged child who is interested in what is being done to his body.

Stress measurements were made three times, at intervals before, immediately after, and ten minutes after the finger-prick CBC. Stress measurements were made on

each child in the same order. The heart rate was taken before the blood pressure measurement. The rubber bladder in the blood pressure cuff was placed directly over the brachial artery and about one inch above the point where the stethoscope was placed on the antecubital space (Lancour 1976). The blood pressure cuff was removed from the child's arm after each blood pressure measurement was made to insure an even, snug fit before the next measurement was made. Lancour states that

> If a cuff is applied loosely, both systolic and diastolic pressures are heard at higher than their true levels because ballooning in the center of the bladder decreases the effective width and creates the same effect as a narrow cuff (1976, p. 774).

Diversional activities were provided for each child between the second and third stress measurements. During this ten-minute waiting period, the children went to the restroom to obtain a urine specimen, listened to their own heart beat with the stethoscope, read the Snellen eye chart, or a combination of the above. After the third stress measurements were obtained, the laboratory technicians completed other tests requested by the child's physician such as hearing tests and screening for color blindness. At this time the investigator thanked the parent for participating in this study and told the parent

that the child's pediatrician would call the next day if the blood test was abnormal.

The investigator took the blood sample to the laboratory and labeled it with the child's name. The laboratory technicians analyzed the blood sample and recorded the data on the master laboratory book as well as on the child's chart. Each pediatrician reviewed the results of his patients' lab work at the end of that working day or at the beginning of the next working day and notified the parent if the results of the tests were abnormal.

While the child's chart was in the laboratory, and after all stress measurements were completed on each child, the investigator reviewed the child's chart for current health problems not mentioned by the parent. When a health problem was mentioned by the parent, the investigator validated it with the child's pediatrician. Validation of a child's health problem by his pediatrician excluded that child from this study.

Treatment of Data

The texts of the finger-prick explanations from the survey of ten pediatric office nurses were used to formulate the preparational explanation of the finger-prick

CBC given to the control group. The texts were evaluated using a content analysis for how many times criteria concepts occurred.

Frequency counts were obtained on all demographic data. Chi-square analysis was used to compare group A and group B for race and sex distribution. The two groups were compared for age distribution in months by the use of Student's t-test. Age was correlated with changes in each of the different stress measurements over three different time intervals by calculating Spearman rank order correlation coefficients. The mean, standard deviation, and range were determined on each member of both groups for systolic and diastolic blood pressure and heart rate at each time period. The two groups were compared using a Mann-Whitney U Test for changes in each of the stress measurements over different time intervals. Statistical significance was set at the .05 level.

CHAPTER IV

ANALYSIS OF DATA

Several methods were used to analyze data collected in this study. Frequency counts were obtained on all demographic data. The variables measured on each member of the two groups of children were compared with Student's t-test, chi-square analysis, and Mann-Whitney U-Test. The relationship between variables was assessed by calculating Spearman rank order correlation coefficients.

Thirty children of both sexes between the ages of 6.0 and 8.0 years were included in this study. Demographic data are given in table 2. All children spoke and understood English. Using Student's t-test it was found that there was no significant difference in age for the two groups. All children were in the appropriate grade according to age. Using chi-square analysis it was found that there was no significant difference between the groups for race distribution and sex distribution. Frequency counts on birth order data showed that twenty-three children were the firstborn child, four were second born, and three were third born.

TABLE 2

DEMOGRAPHIC DATA--GROUP A AND GROUP B

Item	Group A (N=15)	Group B (N=15)
Mean age	82 mos.	83 mos.
Sex		
Male	5	8
Female	10	7
Siblings		
None	1	3
One	9	7
Two	5	2
Three	0	2
Birth Order		
First	11	12
Second	3	1
Third	1	2
Race		
Black	1	1
White	14	14
Question 4		
English spoken and understood		
Yes	15	15
Question 5		
Hospitalized		
Yes	7	7
No	8	8
Question 7		
Blood pressure and heart rate measured before today		
Yes	15	14
No	0	1
Question 8		
Finger-prick before today		
Yes	15	14
No	0	1

TABLE 2 (Continued)

Item	Group A (N=15)	Group B (N=15)
Question 9		
Cried a lot	4	0
Cried a little	4	5
Didn't cry	6	9
No answer	1	1
Question 10		
Tried to run away	0	1
Wiggled in chair	4	3
Sat Still	10	9
No answer	1	2
Question 11		
Preschool	0	1
Kindergarten	7	7
First grade	7	5
Second grade	1	1
Third grade	0	1
Question 12		
Child asked parent what would happen at clinic		
Yes	11	13
No	4	2
Question 13		
Events (check-up)	12	13
Sensations (Hurst)	2	0
Events and sensations	0	0
"Shot" mentioned	5	5
"Blood test" mentioned	7	3
No answer	1	1
Question 14		
Parent told child what would happen before child asked		
Yes	3	1
No	1	1
Injection during the clinic visit		
No	15	15

TABLE 2 (Continued)

Item	Group A (N=15)	Group B (N=15)
Tuberculin tine test during the clinic visit		
Yes	3	5
No	12	10
Activity during ten minute wait		
Obtain urine specimen	11	8
Read book	1	0
Vision screening	1	4
Listen to own heart	2	3
Hematocrit	38.1	38.6

The response to question 5 indicated that in each group seven children had been hospitalized once, and eight had never been hospitalized. No child in either group had been hospitalized within the last two years. Four parents reported that their children (three from group A and one from B) had health problems. The health problems reported were hay fever, allergy, bronchitis, and a heart murmur. These four children were included because the pediatrician verified that none of the children with reported respiratory problems were having difficulty now. None of the children had ever required a medical work-up for allergies, allergy shots, or medication for allergies other than a mild antihistamine during an upper respiratory infection. The child with a heart murmur was included because the diagnosis

of a grade I/VI murmur was made during the physical examination that day and had not caused any restricted activity for the child. The pediatrician told the child's mother about the murmur in private, so the child was not aware of the problem.

Only one child in group B had not had his blood pressure and heart rate measured before this visit to the pediatrician. The same child had never had blood collected by finger-prick before this visit. In response to questions 9 and 10, it was found that fifteen out of the thirty children (53.5 percent) did not cry and nineteen out of the thirty children (70 percent) sat still the last time they had a finger-prick blood test done.

Twenty-three children reportedly asked their parent what would happen during the visit to the doctor, six children did not ask, and one parent did not answer question 12. Of the six children who did not ask, four children were given an explanation by the parent before they asked. The parents of the other two children did not offer an explanation.

The kinds of preparatory information given by parents to children in both groups is outlined under question 13 in table 2. The groups received essentially the same kinds of information in all areas except two. Two children in group A were told that they would experience "hurt."

No sensations were mentioned to group B children. Seven children in group A were told they would have a "blood test" as compared to three children in group B.

None of the children received an injection during the clinic visit. However, three children in group A and five children in group B received Tuberculin Tine tests. During the ten minute wait between the second and third stress measurements, most of the children in both groups went to the restroom to obtain a urine specimen that was requested by the pediatrician for analysis.

Changes in three stress measurements were calculated for three intervals. The first change, called difference one (DIF 1), was between stress measurements made before and immediately after the finger-prick procedure. The second change, called difference two (DIF2), was between the stress measurements made before and ten minutes after the finger-prick procedure. The third change, called difference three (DIF3), was between the stress measurements made immediately after and ten minutes after the finger-prick procedure.

Table 3 shows the mean, standard deviation, minimum, and maximum figures for all stress measurements in group A and group B. These figures indicate that there was no significant difference between the groups for

TABLE 3

STRESS MEASUREMENTS IN GROUP A AND GROUP B

Stress Measurements	Group A (N=15)				Group B (N=15)			
	Mean	Standard Deviation	Minimum	Maximum	Mean	Standard Deviation	Minimum	Maximum
Before finger-prick procedure:								
Heart rate	92.8	20.5	68	132	91.9	17.2	64	122
Blood pressure systolic	101.0	10.1	90	128	101.9	11.7	80	124
Blood pressure diastolic	62.9	9.5	48	88	65.2	9.3	50	80
Immediately after finger-prick procedure:								
Heart rate	87.7	21.0	68	140	89.6	16.0	72	122
Blood pressure systolic	100.8	7.7	84	112	102.5	10.9	84	124
Blood pressure diastolic	61.6	9.1	50	80	66.3	5.1	58	74
Ten minutes after finger-prick procedure:								
Heart rate	85.6	13.7	68	120	85.1	10.9	72	100
Blood pressure systolic	96.7	6.2	88	106	100.1	10.2	80	120
Blood pressure diastolic	60.5	8.9	50	76	64.5	6.9	48	74

stress measurements made before, immediately after, and ten minutes after the finger-prick procedure. Therefore, the first three null hypotheses were accepted. From this table figures also indicate that there was not significant difference between group A measurements before and immediately after the finger-prick procedure. Therefore, null hypothesis four was accepted. There was no significant difference between group B measurements before and immediately after the finger-prick procedure. Therefore, null hypothesis five was accepted. There was no significant difference between group A measurements immediately after and ten minutes after the finger-prick procedure. Therefore, null hypothesis six was accepted. There was no significant difference between group B measurements immediately after and ten minutes after the finger-prick procedure. Therefore, null hypothesis seven was accepted.

The Spearman rank order correlation coefficient was determined to evaluate the degree of association between age and each of the three differences for all stress measurements. These variables were correlated for the entire group of thirty as well as for each of the two subgroups, A and B. There was no significant relationship between age and the various changes in group A or B.

The Mann-Whitney U-test was used to compare the two groups on the differences for each stress measurement. There was no significant difference ($p > .10$) between group A and group B for each measurment for each time interval. However, by examining the mean scores of stress measurements at each interval (DIF 1, DIF2, DIF 3), a pattern in the direction of change is apparent between the two groups (table 4).

TABLE 4

MEAN CHANGES OF STRESS MEASUREMENTS AT THREE TIME INTERVALS

Intervals	Group A (N=15)	Group B (N=15)
From before to immediately after the finger-prick procedure:		
Heart rate	-5.07	-2.27
Blood pressure systolic	-0.27	0.67
Blood pressure diastolic	-1.33	1.07
From before to ten minutes after the finger-prick procedure:		
Heart rate	-7.20	-6.80
Blood pressure systolic	-4.40	-1.73
Blood pressure diastolic	-2.40	-0.73
From immediately after to ten minutes after the finger-prick procedure:		
Heart rate	-2.13	-4.53
Blood pressure systolic	-4.13	-2.40
Blood pressure diastolic	-1.07	-1.80

The decrease in heart rate, blood pressure systolic, and blood pressure diastolic was greater for group A than for group B at ten minutes after compared to before the finger-prick procedure (DIF 2) as well as immediately after compared to before the finger-prick procedure (DIF 1). Comparing ten minutes after to immediately after (DIF 3), heart rate and blood pressure diastolic were lower for group B while blood pressure systolic was lower for group A. These patterns indicate that group A stress measurements changed consistently over time to values lower than group B even when the direction of the change was the same in both groups.

Since twenty-three of the thirty children included in this study were first-born children, data were analyzed comparing group A first-borns (N = 11) and group B first-borns (N = 12). No significant difference was found between the groups for age or race distribution. There was a borderline significant difference between the two groups by sex ($p = 0.13$) as determined by chi-square analysis. Group A first-born children included eight females and three males. Group B first-born children included five females and seven males.

The Spearman rank order correlation coefficient was determined to evaluate the degree of association

between age and each of the three differences for all stress measurements. These variables were correlated for each of the subgroups of first-born children, A and B. For the first-born subgroup B, age was related to blood pressure systolic for DIF 1 ($p = .08$) and blood pressure diastolic for DIF 3 ($p < .005$) (table 5). The Mann-Whitney U test was repeated to compare the groups on the differences for each stress measurement (table 6). Group B showed borderline significant differences at heart rate for DIF 3 ($p = .10$). This indicates that the first-born in group B showed a decrease over that time interval while in group A there was a slight increase.

Based on data analyzed, significant differences between the two groups were few. The seven null hypotheses were accepted. A pattern in the direction of change of stress measurements at three intervals indicated that group A stress measurements changed consistently over time to values lower than group B. This pattern was evident even though the direction of change was the same for both groups. Some borderline significant differences were found between first-born children.

TABLE 5

AGE RELATED TO STRESS VARIABLES FOR FIRST-BORN CHILDREN IN GROUP A AND GROUP B

Age Related to	Group A (N = 11)		Group B (N = 12)	
	Correlation Coefficient*	Probability**	Correlation Coefficient*	Probability**
Heart rate for DIF 1	-0.40	0.23	0.08	0.80
Blood pressure systolic for DIF 1	-0.25	0.55	0.52	0.08
Blood pressure diastolic for DIF 1	-0.03	0.94	-0.24	0.50
Heart rate for DIF 2	-0.34	0.30	-0.01	0.99
Blood pressure systolic for DIF 2	-0.08	0.80	0.25	0.44
Blood pressure diastolic for DIF 2	0.07	0.85	0.77	0.81
Heart rate for DIF 3	0.15	0.70	0.03	0.93
Blood pressure systolic for DIF 3	0.22	0.52	-0.17	0.61
Blood pressure diastolic for DIF 3	0.11	0.74	0.76	0.004

*Spearman rank order correlation coefficient.

**Probability of observing a correlation coefficient this large or larger when there is no relationship.

TABLE 6

MEAN CHANGES OF STRESS MEASUREMENTS FOR FIRST-BORN CHILDREN AT THREE TIME INTERVALS

Intervals	Group A (N=11)	Group B (N=12)
From before to immediately after the finger-prick procedure:		
Heart rate	-5.45	-0.17
Blood pressure systolic	0.73	1.83
Blood pressure diastolic	-0.18	1.17
From before to ten minutes after the finger-prick procedure:		
Heart rate	-3.27	-4.67
Blood pressure systolic	-2.55	-0.50
Blood pressure diastolic	-2.73	-1.75
From immediately after to ten minutes after the finger-prick procedure:		
Heart rate	2.18	-4.50 (p=.10)
Blood pressure systolic	-3.27	-2.33
Blood pressure diastolic	-2.55	-2.92

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

This chapter includes a summary of this study and conclusions that were made as a result of it. The implications of this study are primarily for pediatric nurses who interact with children in stressful situations in health care settings. Recommendations are made for further study based on the analysis of data and conclusions.

Summary

The experimental design used in this study enabled the investigator to compare the physiological stress measurements of two groups of children who had a finger-prick CBC as part of a routine physical examination by the child's pediatrician. The experimental group (group A) was prepared for a finger-prick CBC with verbal explanation based on the competencies of middle-aged children and a criteria for verbal explanations that was co-developed by a nurse (Luciano and Shumsky 1975). The control group (group B) was prepared for a finger-prick CBC with a verbal explanation developed by the investigator from a survey of ten pediatric clinic nurses. Thirty children between the

ages of 6.0 and 8.0 years participated in this study and were assigned randomly to one of the two groups. All children were free of health problems as reported by the parent and ultimately verified by each child's pediatrician, spoke and understood English, and had not received an injection during the clinic visit. All children received the same verbal explanations prior to the first blood pressure and heart rate measurement made by the investigator. Stress measurements were made on all children at three intervals, before, immediately after, and ten minutes after the finger-prick CBC. Stress measurements and the finger-prick CBC were conducted the same way on all children. Diversion provided for all children during the ten minute wait between the second and third stress measurements limited their physical activity. Laboratory technicians analyzed the blood sample that was collected and labeled by the investigator. Each child's pediatrician notified the parent by telephone if the CBC was abnormal.

Conclusions

The reason that there was no significant difference between stress measurements of group A and group B children at three intervals in this study may have been due to the characteristics of the sample of children included in this study. The sample size was small (N = 30),

and was composed primarily of middle-class Caucasian children. In addition, twenty-eight of the thirty children received an explanation from the parents before the clinic visit about events to be expected. The sample was clearly not representative of the general population, but it was representative of the clientele of the clinic in which this study was conducted.

The verbal explanations given to the two groups of children may not have contained enough critical conceptual differences to influence stress measurements in the groups. As compared to the group A explanation, the group B explanation did not solicit questions from the children, did not tell the children what was expected of them, and did not give positive reinforcement for cooperation. Both explanations included an identification of sensations to be expected.

The longer length of the explanation given to group A children may have been responsible for lower stress measurements for group A than group B even when the direction of change was the same for both groups at the three intervals. Questions were solicited from group A children and were answered by the investigator. This also required more time.

The complexity of the stress syndrome effect on physiological measurements may have been responsible for the lack of significant differences between the two groups. According to stress theory (Selye 1974), the same stressor (finger-prick CBC) may produce the same or different responses in the same or different individuals. In addition, the finger-prick CBC, as a stressor, represented a short period of stress as compared to the length of the entire clinic visit, or a period of hospitalization due to illness.

The inter-relationship between heart rate, blood pressure, and muscle activity may have been another reason why no significant differences were found between the two groups. Ten of the children in group A and nine children in group B sat still during their last blood test as reported by the parent. Although a muscle activity rating scale was not used in this study, increasing degrees of control over overt body responses to fear were expected (Kassowitz 1958). Therefore, cardiovascular physiologic measurements alone may not be reliable indicators of the stress experienced by children who are able to control their muscle activity (Rosenberg and Katcher 1976).

Since one person, the investigator, gave all explanations and made all stress measurements, the findings

of this study were not free of bias. The same bias affected both groups.

The significant differences found in comparing group A and group B first-born children indicated that in spite of the amount of time spent with verbal explanations, birth order and sex were important influences on a child's response to stress. Significant differences in several stress measurements at several intervals found in group B first-borns may have been due to the higher ratio of females to males in group A first-borns as compared to group B first-borns. The literature has pointed out that middle-aged children identify more with the parent of the same sex and that first-born children have more adult modeling influences than children in other birth orders (Watson 1974, Holme 1972). The limited number of significant differences found and the small sample size prevented conclusions about distinct differences in stress responses between male and female children.

The results of this study were inconsistent with several studies that have shown that preparatory information reduces stress in children (Levy 1959, Skipper and Leonard 1968, Wolfer and Visintainer 1975, and Johnson et al. 1975). Of these studies, only one (Johnson et al. 1975) directed preparatory information to a well child

in a clinic setting. The Johnson et al. study (1975) and this study were consistent in one way. Both illustrated that different verbal explanations result in different degrees of stress reactions in children. The Johnson et al. study (1975) found significant differences in distress scores and heart rate. This study found a pattern in the mean changes of stress measurements between the two groups.

Implications

The implications of this study are primarily directed toward pediatric nurses who interact with children in stressful health care situations. The findings of this study indicate that there is no relationship between the verbal explanations given by the nurse and the stress measurements of the children. This indicates that both explanations are effective in facilitating the stress response of the children to a finger-prick CBC. It may further reflect the adequacy of current practice by the pediatric clinic nurses who were surveyed. Since all except two children received an explanation by the parent before the clinic visit, the findings seem to indicate that congruency between parents' and nurses' explanations is a factor in the stress response of children. Therefore, the nurse should give accurate information to the child's

parent and help the parent explain this to his child on an age-appropriate level of understanding.

The pattern of mean changes in stress measurements indicate that group A values decreased more over time than group B values. The implication is that there was something different about the two groups. It is known that there were no significant differences between the two groups for age, race, sex, birth order, health status, recent hospitalization, and parental preparation. The most significant difference between the explanations given to the two groups is that group A explanation contained criteria concepts that necessitated spending more time with the child. This suggests that when children have been prepared by the parent for a stressful situation with a nurse, the quality and quantity of time the nurse spends with the child tends to reduce the child's autonomic response in the stressful situation.

The findings for first-born children in subgroups A and B suggest that birth order and sex are important influences on a child's response to stress. This knowledge is useful for the design of future studies concerned with children in stressful situations.

Recommendations

As nurses continue to study children's reactions to brief stressful situations in health care settings, several recommendations are made based on this study. Behavioral as well as physiological measurements should be made to evaluate the degree of stress experienced. Physiological measurements should include more than one body system affected by stress.

Further study is needed to more clearly delineate the relationship between birth order, sex, age, and preparatory information (parental and nurse) as it affects a child's response to a stressful situation. By expanding on the design used in this study, four groups controlled for age and the kind of preparatory information (events) given by the parent could be prepared by the nurse using the same explanation (sensations). The four groups could be first-born males, first-born females, later-born males, and later-born females.

The sample selected for this study included representation from primarily middle-class Caucasian children. Further study of children's stress responses as mediated by verbal explanations should include children from a variety of socioeconomic classes and races.

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APPENDIX A

TEXAS WOMAN'S UNIVERSITY
COLLEGE OF NURSING
DENTON, TEXAS

98

DALLAS CENTER
1810 Inwood Road
Dallas, Texas 75235

HOUSTON CENTER
1130 M.D. Anderson Blvd.
Houston, Texas 77025

AGENCY PERMISSION FOR CONDUCTING STUDY*

THE PEDIATRIC ASSOCIATES OF FORT WORTH

GRANTS TO Anita R. Diebenow, R.N.

a student enrolled in a program of nursing leading to a Master's Degree at Texas Woman's University, the privilege of its facilities in order to study the following problem:

The problem of this study will be to determine if a pre-hematocrit, age-appropriate, verbal explanation by the nurse will influence autonomic nervous system responses exibited by children who will have a finger-prick hematocrit.

The conditions mutually agreed upon are as follows:

1. The agency (may) (~~may not~~) be identified in the final report.
2. The names of consultative or administrative personnel in the agency (may) (~~may not~~) be identified in the final report.
3. The agency (wants) (~~does not want~~) a conference with the student when the report is completed.
4. The agency is (willing) (~~unwilling~~) to allow the completed report to be circulated through inter library loan.
5. Other: _____

1. Steve Dewey MD
2. a Stanley Ellett MD
3. W Friedman, MD
4. Jay Murphy on. D.
5. Ann Rogers

Date 2 July 76

Signature of Agency Personnel

Anita R. Diebenow
Signature of Student

Tommie L Wallace
Signature of Faculty Advisor

*Fill out and sign three copies to be distributed as follows: Original -- Student; first copy -- agency; second copy -- T.W.U. College of Nursing.

GMIS - 110

APPENDIX B

FINGER-PRICK CBC EXPLANATION FOR

EXPERIMENTAL GROUP A

Verbal Explanation by Nurse	Actions of Nurse
(Child's name), I am going to take tiny drops of blood from your finger and put them in these tubes that look like straws and on these pieces of glass that look like windows. This will tell me how many red blood cells you have.	Talk to the child on his eye level. Show capillary tubes and glass slides to child. Allow time for child's comments or questions.
There are 4 parts to this test. Parts numbered 1, 3, and 4 do not hurt. Part 2 does hurt. Before I take the tiny drops of blood from your finger, I want to show you how I will do it. You can help by holding your hand still. Do you have any questions?	Talk to the child on his eye level. Allow time for the child's questions or comments.
The first part will not hurt when I clean your finger with this piece of wet, cold cotton and dry it with a kleenex. Do you have any questions?	Cleanse and dry child's third finger on his left hand. Allow time for child's comments or questions.
The only part that will hurt for a minute is the second part when I prick your finger with this lancet. A drop of blood will be on your finger. You can help by holding your hand still. Do you have any questions?	Show lancet to child. Touch lancet to tip of nurse's finger and then to child's finger without penetrating the skin. Allow time for child's comments or questions.

Verbal Explanation by Nurse	Actions of Nurse
The third part will not hurt when I put one of these little tubes that looks like a glass straw on your finger. The drop of blood on your finger will go up inside the tube. When the blood gets up to this line on the tube, the tube is full. I will fill three of these tubes and put one drop of blood on each glass slide. Do you have any questions?	Touch capillary tube and slides to nurse's finger and then to the child's finger. Point out the line on the capillary tube. Allow time for the child's comments or questions.
The fourth part will not hurt when I put a bandaid on your finger. Would you like to have a bandaid? Do you have any questions?	Show bandaid to child. Allow time for child's comments or questions.

The nurse will then proceed to do the actual finger-prick CBC by saying and doing the following:

Remember, there are several parts to this test. The first, third, and fourth parts do not hurt. The second part does hurt. You can help by holding your hand still.	Talk to the child on his eye level.
First, I will clean your finger with this piece of wet, cold cotton and dry it off. You surely are helping by holding still.	Cleanse and dry child's third finger on left hand.
Second, I will prick your finger with this lancet. It will hurt for a minute. You surely are helping by holding your hand still.	Prick child's finger with lancet.

Verbal Explanation by Nurse	Actions of Nurse
Next comes the third part when I put the drop of blood into the little tube. Watch the blood go up the tube. You surely are helping by holding your hand still. When the blood gets to the line, the tube, will be full. (Repeat "Watch . . . full." two times as each tube is filled.) Now I will put one drop of blood on each piece of glass.	Touch unopette capillary tube to finger to fill it with blood. Mix this blood with solution in unopette container. Touch two more capillary tubes to finger (one at a time) and fill to the black line. Touch one glass slide to finger to obtain one drop of blood and spread the blood with the edge of the other glass slide. (Repeat.)
The fourth part is the bandaid. Would you like for me to put a bandaid on your finger?	Wipe excess blood from finger with kleenex and apply bandaid if child wants one.
Thank you for helping by holding your hand still.	

APPENDIX C

FINGER-PRICK CBC EXPLANATION FOR

CONTROL GROUP B

Verbal Explanation by Nurse	Actions of Nurse
(Child's name), I am going to prick your finger to get a little bit of blood to see how health you are.	Speak to child on his eye level.
I'll clean your finger. Then I'll stick your finger to make it bleed a little. It will hurt for a second.	Show cleansing agent pad and lancet to child.
I'm going to put the blood in these little tubes that look like straws and on these two pieces of glass. The tubes and glass don't hurt.	Show capillary tubes and slides to child.
Then I'll put this bandaid on your finger to make it feel better.	Show bandaid to child.

The nurse will then proceed to do the actual finger-prick CBC by saying and doing the following:

Now I will clean your finger.	Clean third finger on left hand with cleansing agent and dry with kleenex.
This will hurt just a second.	Prick the third finger on the child's left hand with the lancet.
Now I'll put the blood in the tubes and on the glass.	Touch unopette capillary tube to finger to fill it with blood. Mix this blood with solution in unopette container.

Verbal Explanation by Nurse	Actions of Nurse
	Touch two more capillary tubes to finger (one at a time) and fill to the black line. Touch one glass slide to finger to obtain one drop of blood and spread the blood with the edge of the other glass slide. (Repeat.)
Now I'll put a bandaid on your finger.	Wipe excess blood from finger with kleenex and apply bandaid.
That's all.	

APPENDIX D

PREPARATIONAL EXPLANATION FOR HEART RATE

MEASUREMENT ON ALL CHILDREN

Verbal Explanation by Nurse	Actions of Nurse
I am going to listen to your heart with this stethoscope. Has anyone ever listened to your heart with a stethoscope before? Have you ever heard it? Would you like to hear it with my stethoscope now? If you have any questions about how I will listen to your heart, you may ask me.	Talk to child on his eye level. Show stethoscope to child. Allow time for child's response to questions. Allow child to listen to his own heart beat if he wants to. Continue with explanation even if child has had his heart auscultated before today.
I want to show you how it is done. One end of the stethoscope goes in my ears.	Place earpieces in nurse's ears.
The other end goes on your chest. Do you have any questions?	Place diaphragm on child's 4th or 5th left intercostal space at or just medial to the midclavicular line. Allow time to answer child's questions.
You can help by holding still while I count how many times your heart beats in a minute. Do you have any questions?	Talk to child on his eye level. Answer any questions.

The nurse will then proceed to measure the child's heart rate.

APPENDIX E

PREPARATIONAL EXPLANATION FOR BLOOD PRESSURE MEASUREMENT ON ALL CHILDREN

Verbal Explanation by Nurse	Actions of Nurse
I am going to take your blood pressure. This is going to tell me how hard your heart is working. Have you ever had your blood pressure taken before today? If you have any questions about what I say or do, you may ask me.	Talk to child on his eye level. Allow time for child's response. Continue with explanation even if child has had his blood pressure taken before today.
I want to show you the blood pressure machine and how it works. This is the cloth that I will wrap around your arm in a minute.	Show cloth part of the cuff.
Inside the cloth is a rubber tube that fills up with air--like when you blow up a balloon.	Show rubber bladder inside the cloth.
When I pump air into the cuff, it sounds like this.	Squeeze hand pump so child hears air sound.
When the rubber part is on your arm and fills with air, it will feel like I am squeezing your arm.	Nurse gently squeezes child's upper arm.
When the cuff is on your arm, I will be listening to your heart beat in your arm.	Place diaphram of stethoscope on child's antecubital space of dominant arm.
When the cuff is on your arm, you may watch the silver stuff go up and down in the tube.	Pump air into the cuff so that mercury moves in the tube.

Verbal Explanation by Nurse	Actions of Nurse
You can help by holding your arm still. Do you have any questions?	Answer any questions. Talk to child on his eye level.

The nurse will then proceed to measure the child's blood pressure.

APPENDIX F

DATA COLLECTION RECORD

Date:	Birthdate:	Group:
Time:	Age in Months:	Number:

Injections or skin tests given:

Measurements before finger-prick: HR- BP-

Measurements immediately after finger-prick: HR- BP-

Measurements ten minutes after finger-prick: HR- BP-

Child's activity during 10-minute wait:

Hematocrit results: _____%

Child's name_____ Parent_____

APPENDIX G

DEMOGRAPHIC DATA FORM

1. What is your child's birth date, sex, and race?

   birth date_____ sex_____ race_____

2. How many brothers and sisters does your child have?

   brothers_____ sisters_____

3. What is your child's position in the birth order of all your children?

   first_____
   second_____
   third_____
   fourth_____
   fifth_____
   sixth_____

4. Does your child speak and understand English?

   yes_____ no_____

5. Has your child ever been hospitalized?

   yes_____no_____

   If yes, why was your child hospitalized and when?

6. Does your child have any health problems now that you are aware of?

   yes_____no_____

   If yes, what are they?

7. Has your child had his/her blood pressure and heart rate measured by a doctor of a nurse before today?

   yes_____no_____

8. Has your child had blood collected from his/her finger for a blood test before today?

   yes_____no_____

9. If you answered yes on question 8, what was your child's reaction on that occasion?

   cried a lot_____
   cried a little_____
   didn't cry_____
   other_____ (please explain)

10. If you answered yes on question 8, how did your child cooperate with the person who was doing the blood test?

   tried to run away_____
   wiggled in the chair_____
   sat still_____
   other_____ (please explain)

11. What level of schooling did your child complete in May of this year?

   pre-school_____
   kindergarten_____
   first grade_____
   second grade_____

12. Did your child ask you what would happen on this visit to the clinic today?

   yes_____no_____

13. If you answered yes on question 12, what did you tell your child?

14. If you answered no on question 12, did you tell your child what would happen before he/she asked?

   yes_____no_____

15. If you answered yes on question 14, what did you say?

APPENDIX H

CONSENT FOR A CHILD TO ACT AS A SUBJECT FOR

RESEARCH AND INVESTIGATION

I have been informed by Anita Diebenow, R.N. of her study in regard to children's responses to a finger-prick procedure used to collect a blood sample for a hematocrit. I understand that this blood test is part of the physical examination given at this office. I hereby authorize Anita Diebenow, R.N. to perform the following procedure on my child, _____, who is a minor (age _____):

1. Explain to my child how his/her blood pressure and heart rate will be measured using a sphygmomanometer (blood pressure machine) and a stethoscope

2. Measure my child's blood pressure and heart rate before, immediately after, and ten minuts after the finger-prick procedure

3. Explain to my child how blood will be collected for the test by pricking the ring finger on his/her left hand

4. Collect blood for the blood test by pricking my child's finger

Anita Diebenow, R.N. has explained to me that my child will experience discomfort when his/her finger is pricked for this blood test. I understand that the finger-prick procedure explained above is done to determine if my child is anemic. I understand that a venipuncture is an alternate procedure to collect blood for blood tests on children. An offer to answer all of my questions regarding this study has been made to me. I understand that I may terminate my participation in this study at any time. I will stay with my child during my child's participation in this study. I understand that neither my name of my child's name will be used in this study. I understand that I will

be told the results of this blood test according to the established procedure followed in this office.

Parent or Guardian_____

Relationship_____

Address_____City_____

Phone_____Date_____

Witness_____Date_____

APPENDIX I

COVER LETTER FOR SURVEY FORM

July, 1976

Dear Nurse:

I am a graduate student in nursing at Texas Woman's University. I would like to invite your participation in a survey I am conducting as part of my master's thesis.

The purpose of this survey is to find out how pediatric office nurses explain a finger-prick procedure to six- and seven-year-old children. From the explanations gathered through this survey, a composite explanation will be formulated. The composite explanation will be used as part of a study I am conducting this summer on the effect of nursing explanations on a child's reaction to a finger-prick procedure.

If you agree to participate in this survey, please use the top of the following page to write the explanation you give to six- and seven-year-old children before they have a finger-prick procedure. Also, please comment on other considerations you have found helpful in communicating with a six- or seven-year-old child who must have a finger-prick procedure. Please fill out the demographic information at the bottom of the following page. Your name will not be used in any release of the data obtained from this survey.

If you agree to participate in this survey, please read and sign the enclosed consent form. I would appreciate having the consent form today. I would appreciate receiving your explanation form by July 15, 1976. A self-addressed, stamped envelope is enclosed for your convenience.

Thank you for your cooperation. I will be happy to share the results of this study with you after December 1, 1976. My home phone number is 817-738-4029. If you have any questions, please feel free to call me.

Sincerely,

Anita R. Diebenow, R.N.

Enclosure

CONSENT FOR PEDIATRIC CLINIC NURSES TO ACT AS A SUBJECT FOR RESEARCH AND INVESTIGATION

I have received an oral and written description from Anita Diebenow, R.N. of the survey of pediatric office nurses that she is conducting. I agree to participate in this survey by filling out the demographic data requested and by writing the explanation I give to six- and seven-year-old children before a finger-prick procedure. I understand that Anita Diebenow will share the results of her study with me upon my request after December 1, 1976. Anita Diebenow has offered to answer my questions about this survey and its relationship to her study. I understand that my name will not be used in any release of data obtained from this survey.

NAME_____ TITLE_____

ADDRESS_____ CITY_____

PHONE_____ DATE_____

WITNESS_____ DATE_____

APPENDIX J

SURVEY OF PEDIATRIC OFFICE NURSES

The explanation I give to a six- or seven-year-old child before I prick the child's finger to collect a blood sample for a hematocrit is:

Other considerations I have found useful are:

I am currently employed in a pediatric office setting.

Yes_____ No_____

I have been employed in a pediatric office setting for _____ years in which one of my responsibilities has been to collect blood by pricking a child's finger.

My current educational level in nursing is:

Vocational school
Associate degree
Diploma school
Baccalaureate degree
Master's degree