This is to certify that the

thesis entitled

Coping Responses and Adaptational Outcomes of

Children Undergoing Orthopedic Surgery

presented by

Paul M. Robins

has been accepted towards fulfillment
of the requirements for

Ph.D. degree in School Psychology

Don E. Hamachek

Major professor

Date February 14, 1986

COPING RESPONSES AND ADAPTATIONAL OUTCOMES OF CHILDREN UNDERGOING ORTHOPEDIC SURGERY

By

Paul M. Robins

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

College of Education

Department of Counseling, Educational
Psychology, and Special Education

1986

ABSTRACT

COPING RESPONSES AND ADAPTATIONAL OUTCOMES OF CHILDREN UNDERGOING ORTHOPEDIC SURGERY

By

Paul M. Robins

This study examined the relationships between coping responses and adaptational outcomes of children undergoing elective orthopedic surgery. Knowledge of these relationships is needed in order to prevent possible negative reactions due to hospitalization and surgery.

A sample of 27 children, ages 6 through 17, undergoing orthopedic surgery at a large, urban children's hospital participated in the study. The Roberts Apperception Test for Children, used to measure surgical coping responses, was administered preceeding and following surgery. The Revised Behavior Problem Checklist, used to measure surgical adaptation, was administered prior to discharge and one month following discharge. The Personality Inventory for Children, used to measure cognitive functioning and premorbid adjustment, was administered immediately prior to surgery.

Eight hypotheses related to children's responses to

hospitalization and surgery were developed and tested. Descriptive case analyses were also presented. Children who scored higher on measures of surgical coping generally did not exhibit better surgical adaptation than those who scored lower. However, children who perceived appropriate and constructive limits placed on their behaviors exhibited better surgical adaptation one month later. In addition, children who used greater numbers of coping responses exhibited less anxiety and withdrawal after surgery.

Children's coping responses did not significantly differ preceeding surgery versus following surgery. Children with higher cognitive functioning, shorter periods of hospitalization, and fewer hospital admissions did not exhibit better surgical adaptation. Girls did not show better surgical adaptation than boys, nor did older children show better surgical adaptation than younger children. Children with better premorbid adjustments showed more positive long-term surgical adaptations than did children with poorer premorbid adjustments.

The results suggested that the majority of children demonstrated significant "stress resistance." Factors contributing to such resistance and implications for children at risk for developing psychological complications were discussed.

ACKNOWLEDGMENTS

Writing a dissertation is much like running a marathon: ultimately, it is a very lonely experience, but aid is essential along the route in order to keep going. I have been fortunate, for a number of individuals helped me complete the project.

Don Hamachek functioned as my academic advisor and dissertation chairperson. His utterly pragmatic approach in all phases of the research helped me learn that the dissertation, although a necessity, was only a starting point in my career. I appreciated his prompt and careful readings of the manuscripts and his support for my developing abilities as a researcher and psychologist.

Steve Raudenbush helped me design the study and analyze the data. His questions encouraged me to increasingly clarify my research hypotheses, while his expertise as a methodologist, but more importantly as a teacher and scholar, helped me make sense of sometimes overwhelming amounts of data. Our work sometimes occured over long distance telephone; he was both responsive and responsible and was very appreciated.

Harvey Clarizio and Martha Karson also functioned as committee members. Harvey's academic expertise and input during long individual discussions, especially

during my early years of graduate study, stimulated my academic growth and competence. Martha helped me develop and expand my clinical skills and believe in the process of psychotherapy and change.

The staff at Children's Hospital of Michigan assisted me in the nuts and bolts of the research. Particular appreciation is expressed to Steve Spector, Director of Psychology Training. He helped me further refine the study and was instrumental in obtaining the subject population. Joseph Fischhoff, Chief of Psychiatry, kindly read and critiqued my proposal, and sponsored the research. Appreciation is extended to Richard LaMont, Chief of Orthopedic Surgery, and David Aronson, Assistant Chief of Orthopedic Surgery, as they graciously agreed to support the research with their private and clinic patients. Pat Newman, Department of Orthopedics, and her office staff helped me recruit and track subjects, despite many other job obligations.

I am indebted to the children and parents who participated in the study. Despite anxiety and physical discomfort they shared their experiences with me in order to possibly help other children facing similar operations.

My parents have always encouraged and supported my goals, both academic and personal. Their belief in me has never dimmed.

Finally and most important, to Robin I am most

thankful. She shared with me on a daily basis both the victories and defeats of the dissertation process. Her love, caring, encouragment, and competence helped provide the emotional groundwork so necessary in order for me to see the finish line.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

THE PROBLEM

Introduction

Hospitalization affects millions of children yearly. Three and a half to four million children under 15 years of age are hospitalized each year and one third of all young people will be hospitalized once or more by the time they become adults (Prugh & Jordan, 1975). The psychological effects of hospitalization on children has long been an area of inquiry (cf., Vernon, Foley, Sipowicz, & Schulman, 1965, for review). Children view hospitalization as a very stressful experience (Coddington, 1972; Dohrenwend & Dohrenwend, 1980), and as many as 20-36% of hospitalized children show demonstrable emotional difficulties after hospitalization (Cook, 1967; Davenport & Werry, 1970).

Very little research has examined the correlations between surgical coping responses and adaptational outcomes in children undergoing surgery using psychometrically sound instruments. It is not enough to know what goes wrong in the lives of children (Blom, 1958; 1984). Much can also be learned by studying how children successfully cope with the stresses associated with hospitalization and surgery.

Statement of the Problem

Children experience many emotional problems due to hospitalization, as documented in the pediatric literature (Prugh & Jordan, 1975). Aspects of the hospitalization experience itself are stressful for children (Cook, 1967; Prugh & Jordan, 1975; Rutter, 1983; Willis, Elliot, & Jay, 1982; Wolff, 1973; Wright, Schaefer, & Solomons, 1979). Furthermore, surgical procedures add to the perception of stress (Kliman, 1968; Vernon et al., 1965; Wolff, 1973; Wright et al., 1979).

Yet, the vast majority of children do not experience long-term psychological upset following hospitalization and surgery. In fact, some children experience psychological benefit from the experience (Lambert, 1984; Vernon & Shulman, 1964). What characteristics differentiate these children from those who do not cope so well? More specifically, are there cognitive strategies used by successful copers that differentiates them from nonsuccessful copers?

Need for the Study

There is a need for this study because of the following three points:

(1) Although the research on stress and coping over a 20 year period is voluminous, most studies are based on adult samples. Except for a few doctoral dissertations, research on how children cope with

surgery as it occurs is scarce.

(2) Previous research investigating children's adaptation to surgery has focused strictly on trait or personality factors of children (Lazarus et al, 1980; Monat & Lazarus, 1977). An investigation of cognitive processes that mediate the impact of surgery and affect postsurgical adaptation in pediatric populations might contribute to our knowledge of how children themselves actively cope with a very stressful experience. Cognitive processes can be learned (Spivack, Platt, & Shure, 1976) and are more amenable to intervention than personality traits.

(3) This study investigates how normal, nonreferred children cope with a severe stressor, i.e., their sense of mastery (Anthony, 1974) or competency (Garmezy, 1983). Too often research has focused on children coping poorly with a specific stressor. Pediatric surgery patients face a very disturbing experience over which they have little control. An empirical investigation describing the relationships between surgical coping responses and postsurgical adaptation aids in understanding the strategies both good and poor copers use (Garmezy, 1983; Rutter, 1983). The information can be used by pediatric psychologists, physicians, nursing staff, and other hospital personnel as empirical groundwork to plan and structure more effective interventions for children experiencing

surgery.

Purpose

The primary purpose of this research is to study the relationships between coping responses and adaptational outcomes of hospitalized school-aged children undergoing elective orthopedic surgery. The coping responses of children successfully adapting to hospitalization and surgery will be compared with the coping responses of children not adapting as well. An interactional stress model, emphasizing cognitive, situational (e.g.,length of hospital stay and number of previous hospital admissions) and personality variables (e.g., presurgery intellectual functioning and premorbid adjustment) will be employed.

The central hypothesis of this study is that cognitive processes act as mediators of stress in children undergoing hospitalization and surgery, such that children who score higher on measures of surgical coping exhibit better postsurgical psychological adaptation. In addition, it is hypothesized that cognitive processes, individual differences, and situational variables all affect children's surgical adaptation.

Theory

The Concept of Stress

Coping responses and adaptational outcomes in children undergoing surgery can best be understood by a stress and coping model. The application of this model to the process of pediatric surgery has several advantages. One, it offers a dynamic and interactive framework for the study of children's functioning in a hospital setting. Two, there is practical utility in the stress and coping model in its focus on the adaptive process, as opposed to psychopathology. Three, the model is consistent with current naturalistic approaches to research on pediatric hospitalization and surgery in that stress is defined as an event that is subsequently appraised by the individual, resulting in coping responses. The present section is theoretical and briefly presents the concepts of stress, coping, and adaptation. Included are: a) the concept of stress, b) interactionism as applied to stress, including coping and adaptation, and c) a cognitive stress model within an interactional framework, upon which the present research is based.

There are three main variations in use of the concept of stress (Lazarus & Launier, 1978): a) stress as a form of stimulus, b) stress as a response condition, and c) stress as a psychological state. Many researchers define stress as a form of stimulus, a

condition or conditions that disrupt or endanger well-established personal and social values. Dohrenwend and Dohrenwend (1980), among others, conceptualize stress as a series of life events, either inherent in the life cycle or occuring naturally, e.g., marriage, change of jobs, illness, separation, and death. Such events are said to produce change in life patterns or activities of the individual for better or for worse. Stress is used to describe situations characterized as new, intense, quickly changing, and sudden (Appley & Trumbull, 1977). Numerous researchers have studied stress associated with life events and have developed scales to assess the impact of such changes (e.g., Coddington, 1972; Hefferin, 1982; Holmes & Rahe, 1967). An unsettled issue at this time is whether change per se or the perceived desirability of the change is the actual basis for the stressfulness of life events.

Other researchers define stress as a response condition (e.g., Selye, 1976). The presence of emotional activity is used post-facto to define the existence of stress. Stress here refers to any response, bodily or behavioral, which deviates from normative value for the individual or an appropriate reference group (Appley and Trumbull, 1977). Selye (1976), the "father" of stress research, refers to the physiological manifestations of stress. His model, the "general adaptation syndrome" (GAS), exemplifies a total

commitment to the concept of physiological nonspecificity of stress responses (Monat & Lazarus, 1977).

A third group of researchers, most notably Lazarus (Lazarus, 1966, 1977; Lazarus & Launier, 1978) and Sarason and Sarason (1981) refer to stress as a psychological or mental state describing adaptive commerce between the person and environment, and emphasize possible cognitive factors leading to the evaluation of threat and consequent stress responses. Here, the individual's interpretation and evaluation of stimuli functions as the basis for a response to the stress experience (Scott, Oberst, & Dropkin, 1982). Emotions and physiological responses are viewed as by-products of cognition. Cognitive processes determine the quality and intensity of an emotional reaction which Lazarus (1977) sees as the mediating variable between the event and the response.

Each position regarding stress described above has its adherents and detractors. A stimulus or life events based definition is incomplete, for a given situation may or may not be stressful to a person. For example, why does stress occur in some people but not to others exposed to the same stimulus? Except for sudden, life endangering situations (Appley, 1977; Monat & Lazarus, 1977) it is seldom that a particular stimulus is a stressor to all individuals exposed to it. A definition

which is strictly response based is also incomplete, inasmuch as an individual may exhibit increased autonomic nervous system activity at one moment in time, but fail to do so in the same situation at another moment in time. What accounts for the difference in the physiological response to stress? Finally, a cognitive appraisal approach assumes an internal mechanism not readily visible to either the individual or an observer, which, because the processes must be inferred, causes certain problems when it comes to defining and assessing stress.

The picture is further complicated in reference to the concept of stress as applied to children. Children's tolerance for stress is lower than adults; they have fewer options available and thus are more vulnerable to the effects of stress (Chandler, 1982). Children are in the process of developing controls that tend to be more established in adults. Their cognitions also are egocentric and centered, making awareness of multiple perceptions difficult (Ginsburg & Opper, 1979). Cause and effect relationships demand a certain level of cognitive development, i.e., concrete operations, something which preschool aged children generally do not possess. Children's problem-solving strategies are less planful; they are less apt to be organized sequentially, are more redundant, and future events are less likely to be taken into account (Maccoby, 1983). The concept of

stress as applied to children thus raises many issues in terms of definition and assessment that are unresolved at this time.

For purposes of this research, definitions of stress and coping are based on an interactional model, which focuses on the interplay between the person and environment, and which is understood and explained within a cognitive framework (Lazarus, 1966; Lazarus & Folkman, 1984; Lazarus & Launier, 1978; Sarason & Sarason, 1981).

"Psychological stress in a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984, p. 19). Coping, a related term, refers to "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141).

Interactionism as Applied to the Concepts of Stress and Coping

All interactional theories make important common statements. The essential differences between the theories center on the amount of emphasis on person, environment, and/or process variables. Heuristically, interactional theories are useful insofar as they each

maintain that a variety of events can occur simultaneously within and outside of a person and that an event can only be understood in relation to the sequence or pattern of which it is a part.

The consequence of stress cannot be understood merely in terms of the stressful event (Holroyd & Lazarus, 1982) or trait factors of the person alone. Rather, stress is best described in terms of an interaction between the person and the environment (Laux & Vossel, 1982). An individual's cognitive appraisal of a stressful event is crucial to understanding how that person may respond to the stress, or, for that matter, whether stress is perceived at all (Magnusson, 1982).

Prediction from trait measures regarding how a person actually will cope with specific threat situations is very poor (Lazarus, Cohen, Folkman, Kamer, & Schaefer, 1980). General coping traits assume a stable pattern or style of coping in most stressful situations, but since coping styles show little generalizability within persons and between situations, traits are usually poor predictors of how a person will cope with a given stresssor (Monat & Lazarus, 1977). Lazarus and Cohen (1974) found that trait measures did not predict how people coped with children.

Children, due to the very nature of their cognitive, affective, and physiological development, do not demonstrate stable personality characteristics. To

fully understand children's behavior, one must consider both the developmental characteristics of the child and the environmental context in which behavior occurs (Achenbach, 1974; Quay & Werry, 1974). Unfortunately, most research investigating children's coping responses and adaptational outcomes to hospitalization and surgery have assumed a trait model, thereby limiting the fruitfulness of much research already completed.

A Cognitive Stress Model Within an Interactional Framework

Although stress has been defined as a stimulus, a response, and a hypothetical state, a generally agreed on view is that stress is an state, i.e., an interaction between the person and the environment that is appraised by the person as taxing or exceeding the resources of the person (Lazarus & Folkman, 1984). If stress can be understood in cognitive terms, differential reactions to stressful situations might be better understood.

Figure 1 depicts the model of stress developed for purposes of this study. It is based on a theory of interactionism, whereby stress is defined as the interaction between the individual, his or her resources and capabilities, and the demand(s) of the situation. Stress, thus theorized, is an ongoing process as the individual moves through situations and time. It is a chain of events involving two related processes: coping responses and adaptational outcomes. The model and

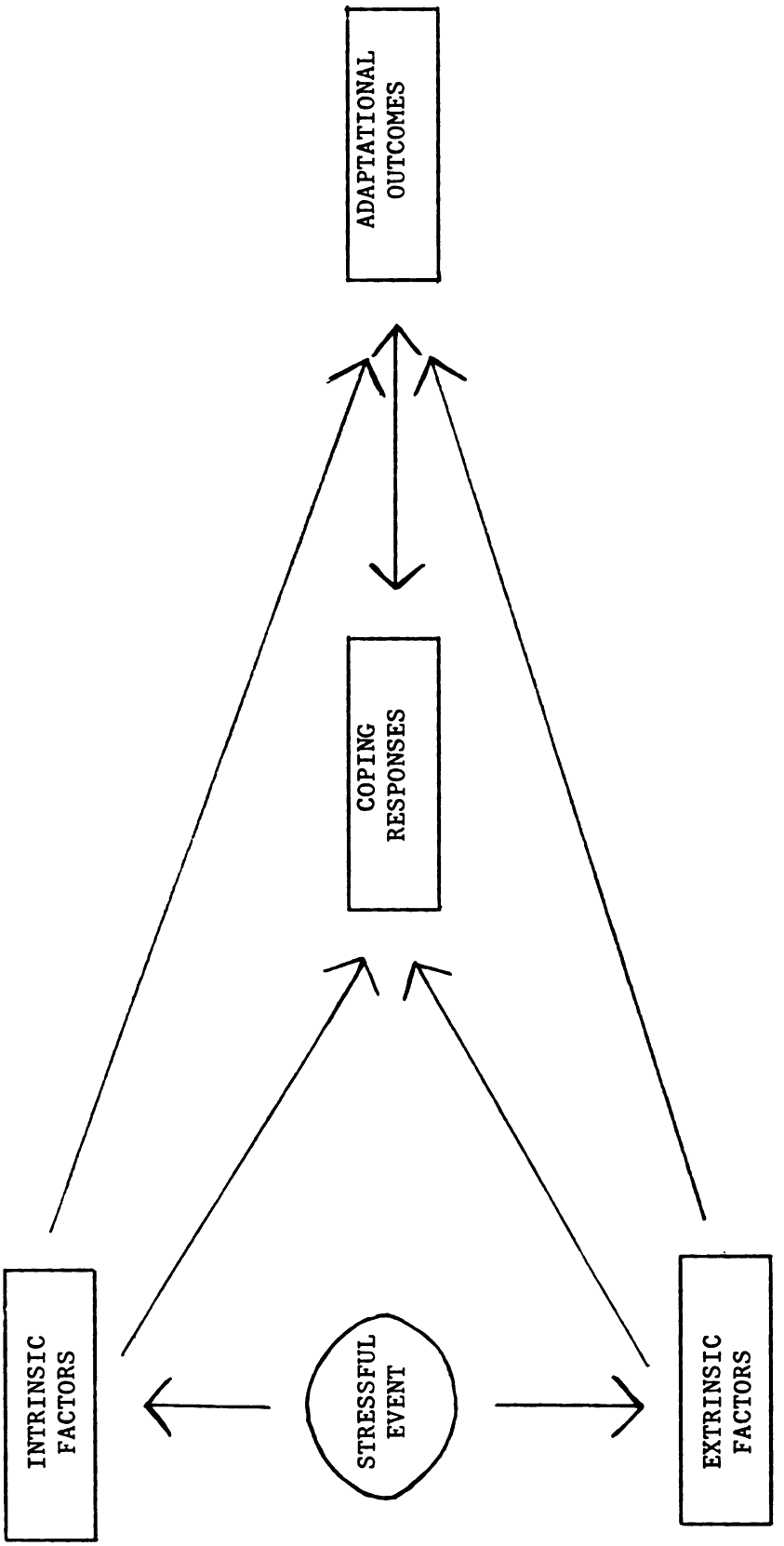


Figure 1

An Interactional Model of Stress, Coping, and Adaptation

related terms are more fully described below.

Coping responses. Coping is here used as a superordinate heading that refers to the cognitive processes involved in appraisal. Coping responses refer to "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are apprasied as taxing or exceeding the resources of the person" (Lazarus & Launier, 1984, p.141). Coping processes are purposeful, require effort, and result in adaptation, the result of efforts to maintain integrity by establishing a balance between environmental demands and the power to deal with these demands (Sutterly & Donnelly, 1982).

Moos and Billings (1982) and Moos & Tsu (1977) have been instrumental in conceptualizing and measuring coping resources and processes. Coping responses can be classified into three broad domains: a) appraisal-focused coping, b) problem-focused coping, and c) emotion-focused coping.

Cognitive appraisal refers to how environmental events are perceived by the individual. It is the mental process of placing any event in one of a series of evaluative categories related either to its significance for well-being or to the person's available coping resources and options (Lazarus & Launier, 1978; Wrubel, Benner, & Lazarus, 1981). It is the central factor in the selection and utilization of coping

responses (Moos & Billings, 1982).

Problem-focused coping refers to attempts to modify or eliminate the source of stress, deal with the consequences of the problem, and/or try to change the self. Examples include seeking information or advice, taking problem solving actions, and developing alternative strategies to create new sources of satisfaction.

Emotion-focused coping refers to attempts to manage the emotions aroused by the stressor and achieve equilibrium. Examples include using avoidance, strategies that direct efforts to control the emotion, resigned acceptance, and emotional discharge (Moos & Billings, 1982; Moos & Tsu, 1977).

Adaptation. Adaptation refers to the psychological, physiological, and social results of coping responses for the individual and can be positive or negative (Lazarus & Folkman, 1984). Integrity is maintained by establishing a balance between environmental demands and the individual's appraisal of his/her resources. White (1976) refers to "strategies of adaptation;" living systems strive for adaptational compromise that preserves and permits them to grow or to increase in both size and autonomoy.

There is increasing evidence that coping responses are related to adaptational outcomes and more specifically how successful people are in dealing with

physical health or illness (Lazarus & Folkman, 1984; Levine, 1983). That stress, emotion, and coping are causal factors in illness is a widely supported premise (e.g., Jemmott & Locke, 1984). The use of strategies such as logical analysis, cognitive redefinition, information seeking, reliance on self, and problem solving are positively related to indexes of adaptation (Haan, 1977; Vaillant, 1977). These coping responses moderate the relationship between stressful events and indexes of negative mood and physical symptoms (Billings & Moos, 1981).

There is a need to further explore relationships between children's surgical coping responses and postsurgical psychological adaptation. Such an understanding may further the search for predictable relationships between the two and foster the development of more effective interventions prior to the onset of the stressor.

Definition of Terms

Stress: Psychological stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being.

Coping: Constantly changing cognitive and behavioral efforts to magage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person.

Adaptation: The psychological results of coping responses, achieved by establishing a balance between environmental demands and the individual's appraisal of his or her resources.

Appraisal-Focused Coping: An evaluative process that determines why and to what extent a transaction between the person and the environment is stressful.

Problem-Focused Coping: Attempts to manage or alter the problem with the environment causing distress.

Emotion-Focused Coping: Attempts to regulate the emotional responses to the problem causing distress.

Hypotheses

Eight main hypotheses will be investigated using an interactional model of stress. These hypotheses are stated generally in this section and in research form in Chapter III. The hypotheses to be investigated are:

1) Children who score higher on measures of surgical coping will exhibit better post- and long-term surgical adaptation than those who score lower.

2) The number of coping responses used by children will significantly differ preceeding surgery versus following surgery.

3) Children with higher intellectual functioning will show better post- and long-term surgical adaptation than children with lower intellectual functioning.

4) Children with better premorbid adjustment will show better post- and long-term surgical adaptation than children with less positive premorbid adjustment.

5) Different age children will show different post- and long-term surgical adaptation.

6) Girls will show better post- and long-term surgical adaptation than will boys.

7) Children with longer periods of hospitalization will exhibit less successful post and long-term surgical adaptation than will children with shorter periods of hospitalization.

8) Children with numerous prior hospital admissions will exhibit less successful post- and long-term surgical adaptation than will children with fewer prior hospital admissions.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this literature review is to present research relevant to children's responses to hospitalization and surgery as conceptualized from a stress and coping model. The three broad areas covered are: a) stress and children, b) hospitalization and surgery as specific stressors in childhood, and c) the structure of coping responses. Both a general summary of stress research and conclusions drawn from the pediatric research reviewed are provided.

Stress and Children

Children normatively encounter stressful experiences and display adjustment difficulties in the course of growing up. In a developmental context, childhood consists of a long series of challenges to cope with reality demands if one is to be happy and successful (Chandler, 1982). Children's reactions to stressors are very much linked to changes in their cognitive functioning. It is necessary to view childhood stress from a developmental context, for "the consequences of an event are dependent upon the structural readiness of the organism" (Kagan, 1983,

p.192).

In addition to normative stressors, children encounter psychological emergencies of childhood (Kliman, 1968), including family crises such as birth, death, illness, and hospitalization (Arnstein, 1960). The severity of behavioral disturbances depends on age, psychological resources, and familial and social support (Chandler, 1982).

One prominent line of research has looked at life events as stressors in child and adulthood. Life events are a potential source of stress to which all children are exposed. Dohrenwend and Dohrenwend (1980) describe three characteristics of stressful life events: change in life patterns or activities of the individual, undesirability, and upsettingness. Life stress in adults has been found to relate to a wide range of variables suggestive of adult physical health and adjustment problems (Johnson, 1982).

The Schedule of Recent Experiences (SRE), developed by Holmes and Rahe (1967) has been employed in much of the adult life stress research. It assesses cumulative change and allows respondents to indicate events experienced during a designated period and provides a method of weighting the impact of these events on the individual.

The most well-known and widely used life stress measure for younger age groups is the Life Events

Record, developed by Coddington (1972). It is similar to the SRE, as it consists of a listing of various events that were judged to be frequently experienced by children and adolescents. Serious illness requiring hospitalization of a child was ranked sixth for preschool age groups and eighth for elementary school age groups out of a possible 36 life stressors (Coddington, 1972).

Kania (1979) and Wilcox (1979) have supported the links between the number and recency of stressful life events and psychological distress in both adults and children. However, there are several limitations associated with life change unit scales germane to this review. One, these scales yield only an overall index of life stress and do not provide for separate scores reflective of positive and negative life change. There continues to be a controversy whether positive and negative life changes affect children in similar ways (Mueller, Edwards, & Yarvis, 1977; Zeiss, 1980) For example, is a promotion from third grade stressful in the same manner as an undersired event, such as failing third grade? It is the undersirable quality of life events that is most important in understanding their stressfullness (Johnson, 1982).

Two, the individual's cognitive appraisal of the event determines the events impact on the person (Goldstein, 1973; Sarason & Sarason, 1981). "The

assessment of life stress using simple life events scales alone is destined to be replaced by multifactorial models encompasing individual differences and situational contexts as well" (Perkins, 1982, p.327). Future research needs to focus on determining the nature of those individual differences that mediate the impact of stressors using an interactional framework (Johnson, 1982).

Factors that can contribute to a stressful life experience for children are both internal and external to the child. Internal factors include congenital organicity, personality functioning, and perceptions of the child that are mistaken, unhelpful, and/or self-defeating (Chandler, 1982; Humphrey & Humphrey, 1981; McNamee, 1982). It is the failure or perceived failure of the environment to meet the needs of the child that often is an internal source of stress. For example, distortions in parent-child relationships are frequent sources of stress for children (Chandler, 1982). Self-concerns of children also can be stress inducing, including those associated with meeting personal goals, changing values, experiencing success, and concern about personal competence and ability (Humphrey & Humphrey, 1981).

External factors that contribute to stress are normal life events and psychological emergencies which all children experience to some degree. The child

vulnerable to stressful events lacks inner resources or social support and shows extreme reactions (Chandler, 1982). It is both the nature of the problem, e.g., environmental, medical, and psychological factors, and its severity that produces stress in children (Chandler, 1982).

Children's response to stress also can be viewed as dependent upon both internal and external factors. Much research has examined the impact of personality dimensions in children and their response to stress. For example, Chandler (Chandler, 1982; Chandler & Lundahl, 1983) has developed a circumplex model of personality in an attempt to explain children's response to stress. An activity level dimension (active versus passive) and an introversion-extroversion dimension result in four patterns in response to stress, including dependent, impulsive, passive-aggressive, and repressed responses.

There is a large and growing body of literature that examines the role of social supports as external factors that affect children's response to stress. There is general agreement that the presence and use of a wide variety of social resources facilitates children's adjustment to stressful life events (e.g., Elder, 1979; Garmezy, 1983; Kania, 1979; Lefcourt, Martin, & Salch, 1984; Milgram, 1982; Rutter, 1979; Wruber, Benner, & Lazarus, 1978). In reality, both

internal and external factors most likely interact. Neither knowledge of personality factors or social supports alone adequately predicts how an individual child will react to a stressful event (Johnson, 1982; Rutter, 1983).

The sources and effects of stress on children are multi-factored and must be viewed within a developmental framework. Life events research, although providing much data to support the conclusion that stress does affect children, is limited, for moderator variables are not adequately accounted for and hence predictions are difficult to make. It is increasingly clear that cognitive coping strategies mediate the impact of a stressful event and affect adaptational outcomes. The next section specifically reviews hospitalization and surgery as specific stressors in childhood.

Hospitalization and Surgery as Stressors in Childhood

Hospitalization and surgery are specific and dramatic stressors in childhood and adolescence (Lambert, 1984; Vernon, Foley, Sipowicz, & Schulman, 1965; Vernon, Schulman, & Foley, 1966). Many children manifest signs of psychological distress before, during, and/or after hospitalization (Wright, Schaefer, & Solomons, 1979). Noted behavioral disurbances include regressive behaviors such as increased dependency, loss of toilet training, excessive fears, sleep and eating

disturbances, perceptual-motor lags, learning difficulties, school discipline problems, depression, conversion and dissociative reactions, aggression toward authority figures, separation anxiety, fears of going to bed, and tics and mannerisms (Melamed, Robbins, & Groves, 1982; Prugh & Eckhardt, 1980; Vernon et al., 1965; 1966; Wright et al., 1979). Furthermore, operations have been singled out by the majority of investigators as leading to psychological upset (Lambert, 1984; Skipper & Leonard, 1968).

Rutter (1983) concluded that the limited number of longitudinal studies performed supported the result that many preschool childen exhibited emotional disturbance at the time of hospital admission and that such disturbance persisted for some months after the child returned home. Although there is a wide range of reported disturbances, researchers report that about 10% to 35% of the problems precipitated by the hospital experience lead to serious long-term disturbances (Melamed el al., 1982). A hospital is stressful for reasons intrinsic to hospital care and medical procedures, apart from other factors (Rutter, 1983).

Burstein and Meichenbaum (1979) examined the relationship involving children's level of anxiety and defensiveness throughout their hospitalization and surgery. They found that hospitalization for minor surgery was highly stressful for children, evidenced by

high anxiety levels both prior to and after the surgery.

Sturmer and Rothbaum (1980) examined the effects of venipuncture on emotional indicators in children's human figure drawnings. Male and female children, patients in a private general hospital, were studied. Outcome measures included Koppitz's Human Figure Drawing. The children were assigned to four experimental groups: preparation for venipuncture, no preparation for venipuncture, venipuncture, and no venipuncture. Results indicated that emotional indicants were induced by stress associated with venipuncture and increases in emotional indicants were mediated by the psychological meaning of the stressful event. Children who were prepared for the venipuncture did not show an increase in the number of emotional indicants, implying that both the effect of the current stress and the child's understanding of the stress must be assessed.

On the other hand, Davenport and Werry (1970) examined the effect of general anesthesia, hospitalization and surgery upon the behvior of 145 children, ages 1-15 years, compared with same-aged controls. No overall differences between treatment and control groups regarding behavioral adjustment were found. However, the hospital stays were limited to three days or less. In addition, a strictly linear model of causality was used.

Kashani, Venzke, and Millar (1981) found higher

rates of depression in children admitted to the hospital for orthopedic procedures, primarily surgery. One hundred children between the ages of 7 and 12, admitted to a surgical hospital, were interviewed pre and postsurgery. Their medical charts were also reviewed. Depression was diagnosed in 23 children using DSM III diagnostic criteria.

There has recently been increased research demonstrating that psychological factors influence the course of illness and bodily response to stress. Melamed et al., (1982) in a review of the literature, concluded that psychological factors have been shown to influence recovery from pediatric surgery. Psychological factors such as patients' expectations and anxiety about recovery, trait anxiety, coping style, and health locus of control are seen to influence postoperative indexes (Burstein & Meichenbaum, 1979; Cohen & Lazarus, 1973; Ray & Fitzgibbon, 1981; Spielberger, Auerbach, Wadsworth, Dunn, & Taulbee, 1973).

There are numerous reasons why hospitalization and surgery are stressful for children. One major stress associated with hospitalization is fear related to separation from parents (Lambert, 1984; Melamed et al., 1982; Prugh & Eckhardt, 1980; Ray & Fitzgibbon, 1981; Vernon et al., 1965, 1966; Willis, Elliot, & Jay, 1982; Wolff, 1973; Wright, Schaefer, & Solomons, 1979). Also

significant are the distress of unfamiliar surroundings (Melamed et al., 1982; Wright et al., 1979), anxiety about painful or unanticipated medical procedures (Melamed et al., 1982; Wright et al., 1979), restrictions on physical activity or immobilization (Willis et al., 1982; Wright et al., 1979), forced dependency, and loss of control, autonomy, and competence (Lambert, 1984; Melamed et al., 1982; Vernon et al., 1965; Wright et al., 1979). Furthermore, specific aspects of surgical procedures have been cited as variables, including preoperative medication, transport to the operating room, and anesthesia induction (Lambert, 1984). Hospitalization as a stressor is unique, as it pairs several sources of stress simultaneously, e.g., separation with illness, anxiety without outlet, and suddeness (Cook, 1967; Moos & Tsu, 1977).

Unfamiliarity as a source of stress receives considerable support from investigations of psychological preparation (Vernon et al., 1965). It is generally believed that preparing the child for surgery and hospitalization decreases the incidence of psychological distress in the posthospital period, although notable exceptions are present (e.g., Bronheim, 1982; Sturmer & Rothbaum, 1980).

Melamed et al. (1982) reviewed studies concerning preparation of the child and parents for procedures

involved in hospitalization. Although the research reviewed had many methodological and theoretical shortcomings, appropriate psychological treatments proved effective for preparing children for hospitalization and medical procedures. Such treatments included traditional puppet therapy, behavioral programs, modeling procedures, systematic desensitization, and exposure therapy. In addition, studies focusing on contextual variables such as parent involvement, nursing involvement, and home preparation were reviewed, demonstrating the relative efficacies of various preparation procedures. Many of the stresses associated with hospitalization were reduced when preparation reduced the anxiety associated with unfamiliarity.

Separation is an important source of stress and has a real effect which is distinguishable from the effects of illness. The disturbing effects of short separation are most evident during hospitalization, but also persist for several weeks following hospitalization. Long term traumatic sequelae are much less frequent (Cook 1967; Rutter, 1983; Wolff, 1973; Wright et al., 1979).

Parent-child contacts during hospitalization are helpful in reducing the level of stress experienced by both parents and child (Peterson, Mori, & Carter, 1985). For example, Prugh and Eckhardt (1980) and Prugh and

Jordon (1975) demonstrated that children who were not separated from their parents during hospitalization showed less emotional upset through use of liberal visiting and parental participation in the care of the hospitalized child. Although separation is most critical for the child 6 months to 4 years of age (Rutter, 1983), separation is also a critical factor associated with stress for children through adolescence (Maccoby, 1983). Greater attention needs to be given to age factors, discussed below, and hospitalization as a stressful event.

Age factors appear to be significantly related to the stress of hospitalization. Vernon et al. (1966) evaluated changes in 387 children's behavior following hospitalization. A 28 item questionnaire was filled out by parents a week after discharge. Age was significantly related to one or more types of behavioral responses. The age period of greatest risk with respect to hospital admission is about 6 months to 4 years. Children below the age of 6 or 7 months have not yet developed selective attachments, while children above the age of 4 years are less vulnerable because they have cognitive skills necessary to cope with the separation and medical procedures involved in hospital admission (Rutter, 1983).

Lambert (1984), in a review of the literature, found that developmental factors affect the school-age

child's reactions to hospitalization and surgery, including cognitive ability, view of illness, separation from a peer group, and the child's need to maintain control and strive toward independence. Curry and Russ (1985), in a study of children's coping responses to stressful dental procedures, found that as children mature they utilize greater number and variety of cognitive responses to cope.

Hyson (1983) specifically analyzed the developmental differences in emotional responses and coping behaviors of children during a visit to the doctor. Forty-eight children, eight girls and eight boys in each of three age groups, 6 to 12 months, 18 to 36 months, and 42 to 60 months, were observed during a well-child checkup using a behavioral coding system. Results indicated that the pattern of coping depended on age. Hyson concluded that as children develop, coping behavior becomes increasingly realistic, anticipatory, and goal directed. Memory development was important in developing responses to potentially stressful events.

However, some studies show that age per se does not constitute a significant explanation for age-related differences (Burnstein & Meichenbaum, 1979; Goggin, Lansky, & Hassanein, 1976; Zeltzer, Ellenberg, & Rigler, 1980). No associations between the age of the child and outcome variables were found.

It is thus unlikely that there is any linear

increase or decrease with age in vulnerability to stress (Maccoby, 1983), although a curvilinear relationship may exist (Vernon et al., 1966). Children evidence age progressive growth of self-appraisal and other cognitive strategies. School aged children begin to develop skills at monitoring their own thought processes and performances. In addition, there is increasing avoidance of premature closure (Maccoby, 1983). The increasing use of metacognitive processes and problem-solving skills (Maccoby, 1983; Shure, 1981) in children fosters increasingly enduring rather than temporary problem solutions. Yet, metacognitive processes might also foster greater anxieties in children about events which they can now forsee but feel unable to protect themselves against (Maccoby, 1983). The issue of age, as related to the stress of hospitalization, is an area not yet fully addressed in the pediatric literature.

Conclusion

In conclusion, hospitalization and surgery are very stressful experiences for children. Many behavioral disturbances, both short and long-term, are noted in the literature. There are numerous reasons why hospitalization and surgery are stressful for children, including fears related to separation, unfamiliarity, and pain. The child's age, gender, and length of hospitalization are seen to affect recovery from surgery. In addition, there is research demonstrating

that psychological factors affect children's recovery from surgery such that preparation for surgery and medical procedures has demonstrable results. Data derived from studying how children cope with hospitalization and surgery may provide information that is relevant to many other situations in which children must cope with life stress.

The Structure of Coping Responses

The following major section reviews studies that investigated the structure of coping responses, emphasizing cognitive processes. Included are two specific sections: a) common coping responses, and b) the relationships between coping responses and adaptational outcomes.

Common Coping Responses

There are a number of recently completed descriptive studies (Ilfeld, 1980; Pearlin & Schooler, 1978; Taylor, 1983) that lay a foundation for research on cognitive processes as mediators of stress in children, as they describe three common coping responses and strategies people use in stressful situations. One, action strategies are responses that change the situation and help people gain a sense of mastery. Acquiring information is a common behavioral effort at gaining a sense of mastery. Two, some responses control the meaning of an experience after it occurs, e.g., "count your blessings" and "we're all in the same boat."

Such responses are analogous to rationalization and/or avoidance. Three, other responses control stress after it emerges and help people maintain their self-esteem. "Time solves all," "it was meant to be," "everything works out for the best," and downward comparisons, in which the self is compared to those less fortunate, help with self-protection against threat.

Various coping strategies used by school-age children have been described. Tesler and Savedra (1981) observed 33 children, ages 6-12 years, at specific stress points during hospitalization. The following coping strategies were identified: inactive, precoping or orienting, and active coping, which included attempts to control, cooperation, and resistance. Orienting, seeking support from others, expression of feelings, and intellectualization have also been forwarded as coping techniques children undergoing hospitalization and surgery use (Knight, Atkins, Eagle, Evans, Finkelstein, Fukushima, Katz, & Weiner, 1979; Youssef, 1981).

Curry and Russ (1985) identified adaptive coping strategies employed by children undergoing stressful dental procedures. Eighteen children, 8 through 10 years of age, were observed during dental treatment and interviewed thereafter. Nine functional classifications of coping were derived: Information-Seeking; Support-Seeking; Direct Efforts to Maintain Control; Reality-Oriented Working Through; Positive Cognitive

Restructuring; Defensive Reappraisal; Emotion-Regulating Coping Cognitions; Behavior-Regulating Coping Cognitions; and Diversionary Thinking. Two coping measures were then developed, based on the above classificatins, using behavioral observations during dental treatment and an interview immediately following treatment. Thirty children, ages 8 through 10, participated in this second phase. Results indicated that children used a variety of coping responses, and there was a relationship between age and type of coping strategy used. Both situational and person variables played an important role in determining coping patterns. Limitations included a small sample size and retrospective and self-report data from children.

Active cognitions play an essential role in the appraisal of and subsequent coping with stressful situations. When individuals experience stressful situations they respond with cognitively adaptive efforts that enable them to achieve a level of adaptation that is equal to or exceeds a previous level of psychological functioning (Taylor, 1983). These cognitions help individuals form and maintain a set of illusions by looking at the known facts in a particular light in order to maintain the most positive picture possible (Curry & Russ, 1985). Avoidance and illusion may be cognitive processes that serve essential adaptive functions (Alloy & Abramson, 1979; Taylor, 1983).

Breznitz (Turkington, 1984) maintains that a sense of hope is essential for successful adaptation to stressful situations. Hope always involves hard, active work and consists of selecting the positive aspects of a situation and developing them, as opposed to keeping out the negatives. Active, cognitive processes in stressful situations may lead to positive adaptational outcomes. The coping responses described above fit into the general categories appraisal-focused coping, problem-focused coping, and emotion-focused coping outlined in Chapter 1.

The Relationships Between Coping Responses and Adaptational Outcomes

The efficacy of coping responses for both children and adults depends both upon the demands of the situation and the personality characteristics of the person. For example, Shapiro (1973) and Kalb (1977) studied the effects of the cognitive control of leveling-sharpening on the response of children to stress. Shapiro proposed that there was a reorganization of the cognitive control of leveling-sharpening under the stress situation of surgery that would return to prestress levels of functioning following the surgery. Results supported the hypothesis. Children used cognitive strategies of leveling during stressful situations but demonstrated an increased ability to sharpen immediately after surgey

and three weeks postsurgery.

Kalb (1977) also studied the adaptive value of cognitive shifts in leveling-sharpening of pediatric surgery patients. Coping effectiveness was measured by physiological distress, psychological distress, and recovery rate. Results indicated that children undergoing stressful situations tended to shift toward leveling cognitive strategies. Both authors concluded that there was a great deal of individual variation in the cognitive control of leveling-sharpening both within and between children.

Cohen and Lazarus (1973) studied the relationship between coping styles and recovery from surgery. Surgical patients, 21 through 60 years of age, both male and female, completed interviews, dispositional measures, and a life events inventory. Their recovery to surgery was measured by the number of days in the hospital, number of pain medications, number of minor complications, and number of negative psychological reactions. Results indicated that patients using an avoidant coping style recovered faster from their operations than did vigilant patients on two of the four recovery measures. They concluded that knowledge of threatening aspects of surgery, if uninterrupted by denial, could result in a more complicated postoperative recovery.

The most adaptive response to stress may be a task

orientation that directs the individual's attention to the task at hand rather than emotional reactions (Sarason & Sarason, 1981). Vaillant (1977) presented evidence suggesting that pervasive personal preoccupations are maladaptive in various areas and that successful adaptation is associated with a task orientation and suppression of other cognitions. A growing set of studies suggest that passive acceptance, helplessness, and depression result in higher mortality rates, as opposed to anger, complaining, or fighting to control one's circumstances (Lazarus & Folkman, 1984).

Ray and Fitzgibbon (1981) found that high levels of cognitive arousal, rather than high levels of emotional arousal were related to successful postsurgical adaptation. Cholecystectomy patients were given measures of psychological adjustment and physical recovery indices over repeated measures. Patients with high cognitive arousal scores reported less pain at the postoperative interview, received fewer medications for pain and sleeplessness, and were most quickly discharged.

There is also support for the hypothesis that a varied repetoire of coping responses is more effective than a more limited one. Pearlin and Schooler (1978) found that a variety of coping responses were more effective in ameliorating the effects of stress than any single response. Effective coping depended not only on

what subjects did, but also on how much they did. Curry and Russ (1985) found that the greater the stressful demands, the more cognitive coping responses were elicited in children. Rutter (1983) states that successful coping depends on flexibility, adaptability, and an adequate range of strategies and tactics in children undergoing hospitalization. Lazarus and Folkman (1984) suggest that there is a curvilinear relationship between the range of coping strategies used and adaptational outcome and that further serious investigation is warranted.

Simultaneous consideration of both extrinsic and intrinsic factors is essential in order to adequately investigate the relationships between surgical coping responses and postsurgical adaptation. According to an interactional stress model, variables external to the person and internal characteristics interact in an ongoing fashion. There is much research to support the interactive effects of various types of individual differences and particular environmental situations in affecting adaptation to stress (e.g., Cohen & Larzarus, 1973; Fluger, 1981; Seal, 1973; Shapiro, 1973).

Extrinsic factors. Stress accumulation is an important extrinsic factor that affects adaptation. The simple accumulation of stressful events determines, in part, the extent of stress and subsequent psychological adjustment. For example, Bellotti (1983) investigated

the effects of stress accumulation on the psychological adjustment of 405 adolescents ages 12 through 15 years. Coddington's Life Events Scale for Adolescents was used. The data supported the conclusion that the number of stressful events experienced by the individual was related to psychological adjustment. Adolescents who experienced a greater number of stressful life events had significantly lower levels of psychological adjustment, as measured by a personality test. In addition, there were significantly higher levels of psychological adjustment for adolescents whose stress events occured in the more distant past. There appeared to be a time factor involved in stress accumulation and psychological adjustment.

The length of the child's hospitalization has been addressed in the majority of studies reviewed. For example, Vernon et al. (1966) found that children hospitalized for longer periods of time demonstrated poorer adaptation than children hospitalized for shorter periods. However, only one study focused specifically on long term hospitalization (Rie, Broverman, Grossman, & Olga, 1968). Although it is implied that there is a relationship between length of hospitalization and severity of the child's reaction, it has not yet been adequately addressed empirically.

There is also continued debate whether previous hospitalization positively or negatively affects the

degree of emotional upset during or following subsequent hospitalizations (Lambert, 1984). Rutter (1983), commenting on his own epidemiological studies, found that the effect of repeated hospital admissions in provoking emotional disturbance was significant and concluded that there was a potentiating intearactive effect of a combination of chronic stressors.

Intrinsic factors. In addition to extrinsic factors, instrinsic variables affect cognitive appraisal and hence coping responses. Relevant variables reviewed are: a) age, b) gender, and c) personality and intellectual functioning, including mastery, competency, and problem-solving skills.

The effects of age have already been discussed with respect to the effects of hospitalization. Age factors were seen as significantly although not unequivocally related to the stress of hospitalization. Children between 6 months and 4 years appeared to be particularly vulnerable to distress during hospitalization; younger infants and older children appeared less vulnerable (Rutter, 1983; Vernon et al., 1965). The growth of cognitive strategies such as self-appraisal, problem-solving skills, and avoidance of premature closure (Maccoby, 1983) are developmentally related and affect the impact of stress on children. As children mature, they utilize a greater number and variety of cognitive responses to cope (Curry & Russ, 1985).

There appears to be gender differences in response to most kinds of stress events, as boys are more vulnerable (Rutter, 1983). Rutter also notes a tendency for males to show more adverse effects with respect to the effects of hospital admission, although the results are not as dramatic as in other stress events such as the birth of a sibling, divorce, day care, and parental discord.

Lambert (1984) reviewed studies that investigated whether gender affects children's responses hospitalization and surgery. Results suggested that boys used physical aggression and controlling behaviors and girls used verbal aggression and precoping or orienting behaviors.

Many reasons have been forwarded for gender differences in children's reactions to stress events, e.g., parents are less supportive of boys or respond negatively to their distress reactions, there are tempermental differences associated with sex, the salience of stress events is greater for boys, and there may be biologically determined increased male vulnerability to stress (Rutter, 1983).

Researchers using case studies have suggested that children with preexisting psychological problems will experience more severe reactions to hospitalization and surgery (Barnes, Kenny, Call, & Reinhart, 1972). However, there is no research in which the reactions of

children with and without preexisting psychological problems are compared, with respect to adaptational outcomes (Lambert, 1984).

Rutter (1983) and Lambert (1984) raise the possibility that intellectual functioning is important with respect to children's responses to hospitalization and surgery. There is a consistent tendency for children of above average intelligence to have lower rates of psychiatric disorder in general. More specifically, there is evidence that good scholastic achievement helps protect against chronic psychosocial adversity.

Mastery, competence, and problem-solving skills in children are important coping resources and may affect adaptation. Competence is defined as a "set of hierarchical attributes including a sense of self-efficacy, degree of optimistic trust in interpersonal relationships and the ability to cope actively with life's events" (Otero, 1983). The area of social competence has received a good deal of research attention. Social competence refers to the effective participation of the person in the activities of his or her society (Wrubel, Benner, & Lazarus, 1981). The competent individual actively defines what he or she wants in a social situation, and furthermore, possesses the skills to actualize the individually defined goals in the context of specific social situations (Wrubel,

Benner, & Lazarus, 1981).

Masten (1983) studied the relationships of humor, divergent thinking, intelligence and competence in normal urban children with varying levels of life stress. It was hypothesized that creative thinking was associated with resistance to stress. Ninety three children, grades 5-8, were assessed for humor, divergent thinking, social competence, intelligence, and stress. Results indicated that the advantages of divergent thinking ability depended on the intelligence level of the child.

Pellegrini (1980) investigated the social-cognitive qualities of stress resistant children. Competence was defined from a multi-dimensional perspective, including social, behavioral, and academic competence. Subjects included a community cohort of families with children in grades 3-6. Stress was measured through a parental response to a checklist of life events of children and families. Children were assessed with regard to two aspects of social cognitive functioning: interpersonal awareness and social problem-solving abilities. Intellectual functioning was also assessed with individually administered intelligence tests. Results indicated that social-cognitive ability was related to competence in children.

Otero (1983) investigated the handling of stressful psychosocial life events as a function of a heirarchical

configural pattern of competence. It was hypothesized that a higher level of competent behavior enabled individuals to deal more effectively with stressful life events. Results indicated that competent subjects were less involved with past stressful events. Less competent subjects evidenced an increase of and focusing on negative feelings, increased cognitive activity with past events, and increased worry.

Shure (1983) has investigated how children think through and solve typical everyday problems that come up and concluded that good problem-solvers are better adjusted and more socially competent than poor ones. An individual who plans his or her actions, can weigh the pros and cons, suffers less frustration. "Means-ends" thinking, i.e., a process of thought involving the ability to plan, step-by-step, ways to reach a goal, distinguishes normal children from those diagnostically disturbed. Alternate solution thinking relates very strongly to social adjustment in children (Spivack, Platt, & Shure, 1976).

Garmezy (1976; 1983) has conducted and reviewed much research regarding vulnerable and invulnerable children and has identified several factors found to relate to risk of psychopathology, including attentional dysfunction, birth complications, communication disorders within the family, and genetic factors which interact with environmental conditions in the

development of schizophrenia. He repeatedly refers to a triad of factors that are instrumental in protecting children who are exposed to high levels of stress: a) a positive personality disposition, b) a supportive family milieu, and c) an external societal agency, such as a school figure, that functions as a support system for strengthening and reinforcing a child's coping efforts (Garmezy, 1983).

Summary of Stress Research

Research in the area of stress and coping is extremely broad. There is yet no agreed upon definition of stress. Instead, many definitions are offered, some of which are very general or even contradictory. Researchers continue to devote great amounts of time and energy investigating various aspects of human stress; it is an impelling concept, for virtually all people experience stress on a regular basis.

As a result of the broad array of issues encompassed by the concept of stress, there is still basic disagreement concerning the most useful research paradigms and measurement tools. Much of the theory and model building in the field of stress research today are in fact attempts to delineate the breadth and depth of the concept of stress and propose research paradigms that will assist researchers in asking the questions most likely to be fruitful. Initially, researchers used

paradigms that reflected the current practices in personality research, i.e., they looked strictly at personality factors in causal relationships. Today however, due to the limited usefulness of exploring a very complex and multifaceted concept such as stress with a narrow research methodology, most stress researchers are grounding investigations in interactional models that recognize both personality and situational factors.

In addition, the site for research most likely to be fruitful in the areas of stress and coping has come under question. Originally, most of the research occured in laboratory settings, as it was very desirable to isolate variables of interest and posit cause and effect relationships. Today, however, many researchers state that investigations in naturalistic settings are necessary in order to observe and describe the many factors operating in any given stressful interaction. Although researchers recognize the value of naturalistic settings, there is a dearth of research that both occurs in a naturalistic setting and uses measures that have demonstrable psychometric properties. Leading stress researchers, such as Lazarus (Lazarus & Folkman, 1984), are recommending microanalytic process-oriented approaches to understanding and explaining coping and adaptational outcomes.

The role of cognitions in stress and coping is the

subject of a great deal of research activity. Cognitive processes mediate the impact of stressful events. It is also suggested that cognitive processes affect adaptational outcomes. Early researchers (e.g., Haan, 1977; Vaillant, 1977) claimed that the use of strategies such as logical analysis, cognitive redefinition, information seeking, reliance on self, and problem-solving were positively related to indexes of adaptation. There is limited research specifically describing and measuring the link between cognitive processes and adaptational outcomes in children undergoing surgery.

The vast majority of stress related research has focused on adults. However, there is increased interest in how children cope with stress, spearheaded by Garmezy's work (Garmezy, 1976) on "invulnerable" children, i.e., children who experience high degrees of stress yet evidence very satisfactory adaptational outcomes. As a result, there are new lines of longitudinal research investigating those children who are at risk for but fail to exhibit psychiatric disorders (e.g., Garmezy, 1981; Rutter, 1979).

Conclusions

The conclusions which can be tentatively drawn from a review of the literature are as follows:

1) The effects of stress on children are well documented and must be viewed within a developmental context.

a) There is a link between stressful life events and the perceived ratings of well-being by children.

b) Both internal and external factors determine whether an event is stressful for a child.

2) Hospitalization and surgery are stressful events for children.

a) Psychological factors such as trait anxiety, expectations, and locus of control influence children's recovery from surgery.

b) Separation is an important source of stress both during and immediately following hospitalization and is distinguishable from the affects of illness.

c) Unfamiliarity as a source of stress is well supported by the literature. The stress ameliorating role of preparation for hospitalization and surgery has received considerable support.

d) Age factors are significantly related to the stress of hospitalization. The relationship of age to stress and hospitalization appears to be curvilinear; children between the ages of 6 months to 4 years are most vulnerable.

3) Cognitive processes such as problem and emotion-focused coping mediate the impact of stressful events.

a) Action strategies, controlling the meaning of a situation, and self-enhancement are common coping responses used by adults during stressful times. All imply active, information processing and have adaptational value.

b) It appears that the most adaptive response to stress is a task orientation that directs the individual's attention to the task at hand rather than emotional reactions.

c) There is some support for the hypothesis that a varied repetoire of coping responses is more effective than a more limited one.

4) Both extrinsic and intrinsic factors afffect children's adaptational outcomes to hospitalization and surgery.

a) The efficacy of coping responses for both children and adults depends both upon the demands of the situation and the personality characteristics of the person. There is much research in general to support the interactive effects of various types of individual differences and particular environmental situations in describing successful adaptation.

b) The simple accumulation of stressful events partly determines the extent of stress and subsequent psychological adjustment. Both the length of the child's hospitalization and number of previous admissions are believed to affect their adaptation.

c) There may be gender differences in children's adaptation to hospitalization and surgery, as boys in general appear to be more vulnerable to the effects of stress. Boys may use more problem-focused coping, while girls may use more emotion-focused coping.

d) Personality and intellectual functioning may be important with respect to children's adaptation to hospitalization and surgery. There is growing evidence that children's sense of mastery, competence and problem-solving skills are positively related to their ability to effectively cope with stressful life events. The effect of children's previous psychological adjustment on their adaptation to hospitalization and surgery has not yet been empirically investigated.

CHAPTER III

DESIGN OF THE STUDY

The purpose of this chapter is to present the plan of operation for the study. The following sections are included: selection and description of the sample, measures, procedures for collecting data, design, research hypotheses, and procedures for quantitative data analysis.

Selection and Description of the Sample

The sample for this study consisted of children undergoing elective orthopedic surgery on an inpatient basis. In addition, the child's parent served as the respondent for two of the three measures. Mothers served as respondants whenever possible in order to standardize the assessment procedure. Subjects were recruited from a listing of all children scheduled for elective orthopedic surgery at a 300-bed urban children's hospital between March and August, 1985 that met the following criteria: a) English speaking, b) no brain injury involvement, c) free from obvious psychological disorders and d) minimum of two days hospitalization.

Recruitment of subjects occured as follows. The

parent(s) of all pediatric patients consecutively scheduled for orthopedic surgery at the hospital during the winter, spring, and summer of 1985 who met the above criteria following a review of their medical charts and consultation with the Department of Orthopedic Surgery, were mailed a packet of materials. Both private patients of the surgeons and orthopedic clinic patients were included. Included in the packet was a consent form that met all guidelines for research with human subjects and described the purpose of the proposed study, duration of participation, and length of time involved to fill out questionnaires (Appendix A). A stamped envelope addressed to the researcher was provided to allow parents to return the consent form. The researcher followed-up with a phone call to the home in the interim between orthopedic consultation and hospital admission in order to fully explain the study and subjects' participation. In some cases signed consent forms were obtained from the parents and patients following admission to the hospital.

To insure strict confidentiality of all subjects, no identifying names were used on any of the research instruments. Instead, a coding system only was used, whereby the four research protocols could be linked together for purposes of data analysis. The code only appeared on the research instruments. The letter of consent was separated from all data collection such that

no identification of subjects by name was possible. Subjects were thus recruited on a "rolling" admissions basis.

The subject pool consisted of 27 pediatric orthopedic surgery patients and their respective parent. Of the 33 subjects eligible and asked to participate in the study, 28, or 85% gave informed consent. Of the 28 subjects, 27, or 96%, completed the study.

The 27 children ranged in age from 6 to 17 years. Their mean age was 12.6 years. The sample consisted of 18 males (66%) and 9 females (33%). Because the hospital was located in the inner city of a large urban center, a favorable racial mix was represented, as 21 subjects (78%) were Caucasion and 6 subjects (22%) were Black. Complete age x sex x race information is found in Table 3.1.

The subjects' length of hospitalization ranged from 2 days to over 10 days, with a mean length of stay of 5 days. However, over half of the subjects stayed only 2 days. Over 75% of the children had previous overnight hospital admissions, and the mean number of previous admissions, including this most recent admission, was 2.6. Table 3.2 presents their hospital histories in greater detail.

Table 3.1
Description of Subject Sample
Age X Sex X Race
(N=27)

Age	Sex				Total
	Male		Female		
	White	Black	White	Black	
5-6 to 8-5	7.4(%)	0	3.7	0	11.1
8-6 to 11-5	11.1	0	0	3.7	14.8
11-6 to 14-5	18.5	14.8	14.8	0	48.1
14-6 to 17-5	11.1	3.7	11.1	0	25.9
Total	48.1	18.5	29.6	3.7	99.9

Table 3.2
Description of Subject Sample By
Hospital History
(N=27)

Length of Hospitalization (in days)	
1) Two Days	51.9%
2) Four Days	14.8
3) Six Days	18.5
4) Eight Days	3.7
5) Ten or More Days	11.1

Number of Total Overnight Hosital Admissions	
1) One Admission	25.9%
2) Two Admissions	22.2
3) Three Admissions	11.1
4) Four or More Admissions	40.7

Measures

Three measures were used in the study: a) The Roberts Apperception Test for Children (RATC) (McArthur & Roberts, 1982), b) The Personality Inventory for Children (PIC) (Wirt, Lachar, Klinedinst, & Seat, 1977), and c) The Revised Behavior Problem Checklist (RBPC) (Quay & Peterson, 1983). The Adaptive Scales of the RATC were used to measure surgical coping responses;

the Adjustment and Cognitive Triad Scales of the PIC were used to measure personality and cognitive functioning, respectively, of children undergoing hospitalization and surgery; the RBPC was used to measure post and long-term surgical adaptation of children. Postsurgical adaptation refers to child's behavior directly following orthopedic surgery but prior to discharge from the hospital. Long-term surgical adaptation refers to the child's behavior in the period between discharge from the hospital and follow-up visit to the orthopedic clinic, typically four weeks in length.

The Roberts Apperception Test for Children

Rationale. The Adaptive Scales of the Roberts Apperception Test for Children (RATC) was used to measure surgical coping responses of children hospitalized for orthopedic surgery. The test requires children to verbalize responses to situations and problems of an interpersonal nature and assesses their adaptive capacity to cope with stressful or potentially stressful situations. Children will project their characteristic thoughts, concerns, conflicts, and coping styles into the stories they create. There is a good deal of support for the use of story telling techniques in the assessment of coping responses to stress (Moos, 1974).

General Description. The Roberts Apperception Test

for Children (RATC) (McArthur & Roberts, 1982) is a picture thematic apperception technique designed to assess children's perceptions of common interpersonal situations. It consists of a standard set of 16 stimulus cards which depict common situations, conflicts, and stresses in children's lives. Eleven of the cards have parallel male and female versions.

The RATC is intended for use with children ages 6 to 15. All 16 stimulus cards are presented to the child in their exact numerical order. The children's responses are recorded verbatim and later scored on a number of quantitative rating categories. Raw scores are obtained for all rating categories and converted to normalized T scores (X=50, SD=10) on the appropriate Profile Form based on the child's age.

The Adaptive Scales. The eight adaptive scales used in the study as measures of surgical coping are fully described in Appendix B. They included the following (the parentheses indicate the name of the scale for purposes of the study):

a) Reliance on Others.
b) Support-Others.
c) Support-Child. (Self-Sufficiency)
d) Problem Identification
e) Limit Setting
f) Resolution 1. (Unrealistic Solution)
g) Resolution 2. (Constructive Solution)
h) Resolution 3. (Insightful Solution)

Standardization of the RATC. The RATC was standardized on a sample of 200 "well-adjusted" school

children, ages 6 to 15. An equal number of children of both sexes was represented, resulting in 20 males and 20 females in each of four age groups: 6-7, 8-9, 10-12, and 13-15. An effort was made to select children from lower, middle, and upper socio-economic family backgrounds, although the sample was not formally stratified. The standardization sample was drawn from three school districts in California, chosen because they provided a representative cross-section of lower, middle, and upper socio-economic families based on census data (McArthur & Roberts, 1982).

Reliability. Interrater agreement indicates that the average agreement across all 16 profile scales was 84% to 89%. The authors suggest that the profile scales meet the standards for interrater agreement.

Split-half reliability estimates were calculated using the formula for nominally parallel tests of Lord and Novick. In addition, the Spearman-Brown correction estimate was also used. Coefficients for the 8 adaptive scales ranged from .44 to .86 for the Lord and Novick estimate and from .48 to .86 for the Spearman-Brown estimate.

Validity. The validity of the RATC has been explored by the authors (McArthur & Roberts, 1982) in three ways: a) intercorrelations among the RATC measures, b) investigating the thematic content elicited by the individual stimulus cards, and c) comparing the

responses of clinic-referred and well-adjusted children and families. In addition, there have been several studies performed by other investigators that are further described in Appendix B.

Intercorrelations among the profile scales were calculated using a combined sample of 200 clinic-referred and 200 well-adjusted children. A high degree of interrelatedness of scales within the adaptive and clinical subgroups and a relative independence of certain scales was observed.

The underlying relationships amongst the profile scales were investigated by factor analysis. Three factors were identified: Adaptive, Clinical, and Developmental. The authors concluded that the three factors help confirm the validity of the RATC profile scales for differentiating adaptive and maladptive functioning.

McArthur and Roberts (1982) state that the reliability and validity studies lay the foundation in establishing the psychometric properties of the RATC. More investigation is needed in areas such as socioeconomic background, homogeneous diagnostic subgroups, and cross-cultural trends in children's responses to the stimulus cards.

The Personality Inventory for Children

Rationale. The Adjustment Scale (ADJ) and the Cognitive Triad Scales (IS, ACH, DVL) of the Personality

Inventory for Children (PIC) (Wirt, Lachar, Klinedinst, & Seat, 1977) were used to measure premorbid adjustment and cognitive functioning of children undergoing hospitalization and surgery. The PIC provided response set indicators, or validity scales, thus giving the researcher an indicator of the validity of the personality profile obtained.

Description. The PIC is an objective, multidimensional measure of behavior, affect, ability, and family function for children ages 3 to 16. It consists of 280 questions answered by the child's mother as "True" or "False." Raw scores on each of the scales are plotted on profiles modeled after the MMPI profiles, for which T scores can be read. For each scale, higher T-score elevations represent a reduced probability of occurence among nonreferred children and the increased probability of psychopathology or deficit. The dimensions represented by scales selected for the PIC profile do not reflect a specific theoretical perspective. Factor analysis, empirical-keying, and rational/content methodologies were applied to scale item selection. All profile scales successfully predict non-PIC measures of child adjustment and ability (Lachar, Kline, & Boersma, in press).

The PIC Profile Scales (Lachar, Kline, & Boersma, in press). The PIC scales to be used in the proposed research are fully described in Appendix C. They

included the following:

Informant Response Style:
a) Lie Scale (L).
b) Frequency Scale (F).
c) Defensiveness Scale (DEF).

General Adjustment:
d) Adjustment Scale (ADJ).

The Cognitive Triad:
e) Achievement Scale (ACH).
f) Intellectual Screening Scale (IS).
g) Development Scale (DVL).

Standardization: The PIC was normed on 2,390 children between the ages of 6 and 16 collected between 1962 and 1985. Both males and females were roughly equally represented in all age categories. Although no data is presented in the Manual regarding the race of the standardization sample, the authors (Wirt et al., 1977) studied the effects of both race and sex on PIC scale elevations. The analyses did not result in any significant sex main effects or sex by race interactions for the profile scales. Only the F scale resulted in a significant race effect.

Reliability. The authors report three studies examining test-retest reliability. The PIC was completed on two separate occassions by 34 mothers of children being evaluated at a large, urban clinic. The interval between test administrations was randomized, between 4 and 72 days, the average interval being 15 days. The sample consisted of 22 boys and 12 girls aged 5 to 14. The average reliability coefficient obtained was .86.

A second study extended the test-retest interval to an average of 51 days. Forty-six mothers in the Detroit area completed PIC protocols for 25 normal boys and 21 normal girls. The average test-retest coefficient obtained was .71.

A third study of normal children was also completed using a wider sample. Fifty-five test-retest pairs were obtained from parents in Indiana and Pennsylvania. The interval was 14 days. The sample contained 34 boys and 21 girls between 5 and 11 years. The mean correlation coefficient for the sample was .89.

Validity. The PIC Manual (Wirt et al., 1977) documents effective normative-criterion group separation for scales ADJ, ACH, and IS, amongst others. These scales demonstrated predictive ability to independent, clinically meaningful external criteria. Factor analysis revealed meaningful patterns of correlations among the 33 PIC scales, and within the items of the 16 profile scales (Wirt & Lachar, 1981). PIC scales have been found to predict meaningful external criteria for various target groups. Additional evidence of PIC profile scale validity was obtained in the ability of these scales to separate homogenous groups of behaviorally disturbed children and adolescents (Wirt & Lachar, 1981).

There are currently 77 data-based studies investigating the validity of the PIC scales. The

majority of the studies are presented in the Manual (Wirt et al., 1977). In addition, there are 25 reviews of the PIC published. These studies have helped establish the validity of the PIC for use in clinical, research, and school settings. The reader is urged to refer to the Manual, as it presents the numerous validity studies as they relate to each scale. In addition, Appendix C further describes the validity of the PIC. It is suffice to note that the PIC is establishing a well-respected empirical base with demonstrable psychometric qualities and is being used internationally.

The Revised Behavior Problem Checklist (RBPC)

Rationale. The Revised Behavior Problem Checklist (RBPC) (Quay and Peterson, 1983) was used to measure post and long-term surgical adaptation. The RBPC is a behavior rating scale and is widely used in research, clinical, and school settings. As it samples a broad range of behaviors exhibited by children and adolescents and is sensitive to change in behaviors, it is an appropriate measure of post and long-term surgical adaptation.

General Description. The RBPC is an individually administered 89 item checklist focusing on the identification of specific behavior problems occurring in childhood and adolescence. The items are rated by an adult familiar with the child's behavior. Each item is

rated on a 3-point scale ranging from "no problem" (0) to "severe problem" (2).

Research involving factor analysis of the items has yielded four broad behavior syndromes, which have been found to effectively differentiate between children with emotional or specific learning difficulties and "normal" children. These behavioral dimensions make up the four primary subscales of the RBPC and are labeled: Conduct Disorder (CD) (22 items), Socialized Aggression (SA) (17 items), Attention Problems-Immaturity (AP) (16 items), and Anxiety-Withdrawal (AW) (11 items). The two minor scales are Psychotic Behavior (PB) (6 items) and Motor Tension-Excess (ME) (5 items). The reader is referred to Appendix D for a more complete description of the subscales.

The RBPC requires approximately 10 minutes to administer and can be used across a wide range of children. It is not limited to use with a specific population. It has been used in a large number of studies involving unselected as well as clinical samples and is seen to effectively differentiate between many clinic subtypes.

Standardization. There were four separate clinical samples used for the standardization sample, representing a broad range of behaviors and an age range from 5 to 23. The samples include 760 cases, including private psychiatric residential, outpatient and

inpatient, a private school for children with learning disabilities, and a community sponsored school for children with developmental disabities. Males were more highly represented than females by a margain of two-to-one. Whites and blacks were proportionally represented. All socio-economic groups were equally represented. Both average and below average intelligence was included. There is no indication of geographical location in the Manual.

Reliability. Estimates of internal consistency for the samples across all six subscales range from .95 (CD) to .68 (PB). The range of alpha coefficients for each subscale across five samples are: CD .92 - .95, SA .85 -.93, AP .87 -.94, AW .74 - .89, PB .68 - .80, and ME .70 -.83.

Interrater reliability estimates were obtained from a sample of 172 children with developmental disabilities, 39 of which were girls and 133 were boys. All SES groups were represented. Ten teachers rated the children. The average intercorrrelations among the raters ranged from .85 (CD) to .28 (PB).

In order to estimate test-retest reliability, 149 children in grades one through six were rated by their teachers in October and again two months later. The rate-rerate correlations were .63 for CD, .49 for SA, .83 for AP, .79 for AW, .61 for PB, and .68 for ME (Quay & Peterson, 1983).

Validity. In order to establish the ability of the RBPC to successfully discriminate between clinical and normal children, 293 males and 273 female normal children in grades one through six were contrasted with three clinical samples of children. Results indicated that for both sexes the difference between the means were substantial and significant. Seventy-seven percent of the clinical group were correctly classified as were 87% of the normals.

The authors (Quay & Peterson, 1983) state that the correlations of the RBPC with a number of relevant variables and scales have already been obtained, supporting the construct validity of the instrument. Studies documenting comparisons of the categories of DSM-III to the empirically derived dimensions of the RBPC, correlations of subscales with behavioral observations and peer nominations, and correlations of subscales with intelligence and academic achievement are reported in the Manual. These studies increasingly support the validity of the RBPC.

Procedures for Collecting Data

Data was collected from child and parent subjects as follows. Upon admission and room assignment and after consent, the child-subject was administered the Roberts Apperception Test for Children (RATC) by the researcher. The RATC was administered in a standardized

fashion in the period after admission but prior to surgery. The RATC took approximately 30 minutes to administer. The child's responses were audio recorded and then transcribed in order to permit reliable scoring of the protocols.

Immediately prior to or during surgery, the child's parent (mother) completed by herself the 280-item version of the Personality Inventory for Children (PIC). The PIC took approximately 45 minutes to complete. Upon completion, she placed the Answer Sheet in the envelope provided. All envelopes were collected by the researcher within 12 hours of completion.

Following surgery but immediately prior to discharge, the parent-subject was given the Revised Behavior Problem Checklist (RBPC) to complete. The directions were modified to instruct the mother to rate her child's behavior only following surgery. The RBPC took approximately 10 minutes to administer. Upon completion, she placed the RBPC in an envelope provided. The researcher picked up the envelope within 12 hours.

The parent-subject was mailed and asked to complete the RBPC again one month following discharge. A thank-you note and stamped envelope addressed to the researcher were included. The instructions for the RBPC were modified to instruct the mother to rate her child's behavior only following discharge from the hospital. In addition, the parent completed an attached face sheet

requesting the following information: a) child's age, b) child's gender, c) prior hospitalizations, and d) length of current hospitalization. If the parent failed to return the RBPC within a week, the researcher telephoned the parent, and an identical packet was again sent. Of the 27 parents mailed copies of the RBPC for follow-up, 22, or 81.5%, returned the completed checklist. Figure 2 temporally depicts data collection points and measures.

The RATC tapes were transcribed for purposes of scoring. Two experienced doctoral level candidates in psychology, blind to the hypotheses of the study, scored the protocols. Practice scoring RATC protocols was provided by the researcher prior to scoring the research protocols. Inter-rater reliability was calculated using the following formula:

$$= \frac{\text{the number of scales/card in which both raters agree}}{\text{the number of agreement + disagreements}}$$

Interrater reliability was calculated for each of the 16 RATC cards for three sample protocals. These coefficients were then summed and divided by 16 to obtain the overall reliability coefficient. An interrater reliability coefficient of .81 was obtained following the above procedures after two trial calibrations. The Adjustment and Cognitive Triad Scales of the PIC were scored by hand using templates provided by the test publisher. The RBPC was scored by hand

using templates provided by the test authors.

Figure 2
Data Collection Points and Measures

Presurgery-------->	Postsurgery------->	Follow-up
RATC-1	RATC-2	
PIC	RBPC-1	RBPC-2

Design

The overall design of this study was descriptive, the purpose being to explore the relationships between coping responses and other instrinsic and extrinsic factors and adaptational outcomes in children undergoing orthopedic surgery. It was apparent from a review of the literature that an interactional theoretical framework encompassing both individual and situational variables was necessary in order to more fully understand the complexities inherent in the constructs of stress, coping, and adaptation. One of the major problems with research in the area of coping and adaptation has been the causal and overly restricting experimental approaches to research used in lieu of more exploratory approaches with solid theoretical foundations. A microanalytic process-oriented approach to coping was necessary to more fully understand coping processes and explain adaptational outcomes (Lazarus & Folkman, 1984).

A correlational approach was chosen for three reasons: a) The variables necessarily under

investigation were very complex and did not lend themselves to the experimental method and controlled manipulation. b) Correlational research permitted the simultaneous measurement of several variables and their interrelationships within a naturalistic setting. c) Correlational research permitted an analysis of the degrees of relationship between variables rather than all-or-nothing questions (Isaac & Michael, 1971).

A correlational research design in the form of a naturalistic field investigation was used in this study because of the flexibility involved in this approach. Such flexibility facilitated the inclusion of a variety of carefully selected variables and the study of a complex area. This type of research design did not directly address issues of causality. Rather, it was hoped that the results from the study would provide direction for intervention with children undergoing potentially stressful hospital events such as orthopedic surgery, generate further questions regarding the affects of hospitalization and surgery on children, and broaden the knowledge base concerned with the definition and measurement of stress and coping in children as applied to hospitalization and surgery.

Research Hypotheses

This study investigated the relationships between coping responses and adaptational outcomes of children

undergoing elective orthopedic surgery. Factors intrinsic and extrinsic to the child were studied.

Hypotheses Related to Coping Responses

The first two hypotheses were developed to study the relationships between coping responses and adaptational outcomes.

Hypothesis I: Children who obtain higher T-scores on each of the surgical coping response scales a) Reliance on Others, b) Support Others, c) Self-Sufficiency, d) Problem-Identification, e) Limit Setting, f) Unrealistic Solution, g) Constructive Solution, and h) Insightful Solution, as measured by the Roberts Apperception Test for Children (RATC), will exhibit better post and long-term surgical adaptation, as measured by the Revised Behavior Problem Checklist (RBPC), than will children who obtain lower T-scores.

Hypothesis II: There will be significant differences between T-scores on each of the surgical coping response scales, as measured by the RATC, administered preceeding surgery and following surgery.

Hypotheses Related to Intrinsic Stress Factors

The second set of hypotheses were developed to investigate how factors intrinsic to the child were related to surgical adaptation.

Hypothesis III: Children who obtain lower T-scores on the cognitive functioning scales Intellectual Screening (IS), Achievement (ACH), and Development (DVL), as measured by the Personality Inventory for Children (PIC), will exhibit better post and long-term surgical adaptation, as measured by the RBPC, than children who obtain higher T-scores.

Hypothesis IV: Children who obtain lower T-scores on the premorbid adjustment scale Adjustment (ADJ), as measured by the PIC, will exhibit better post and long-term surgical adaptation, as measured by the RBPC, than children who obtain higher T-scores.

Hypothesis V: There will be a significant correlation between post and long-term surgical adaptation, as measured by the RBPC, and age of the

child.

Hypothesis VI: Girls will exhibit better post and long-term surgical adaptation, as measured by lower scores on the RBPC, than will boys.

Hypotheses Related to Extrinsic Stress Factors

The final set of hypotheses were developed to investigate how factors extrinsic to the child were related to surgical adaptation.

Hypothesis VII: Children hospitalized for fewer days will exhibit better post and long-term surgical adaptation, as measured by lower scores on the RBPC, than will children hospitalized for more days.

Hypothesis VIII: Children with more prior hospital admissions will exhibit poorer post and long-term surgical adaptation, as measured by higher scores on the RBPC, than will children with fewer prior hospital admissions.

Analysis

Statistical procedures were used to test the eight hypotheses. The statistics used included: the *t*-test statistic, Pearson product-moment correlations, and multiple regression analysis. The form in which the variables were expressed and the nature of their relationship determined which of the correlational statistics was used (Borg & Gall, 1979). The analytic procedures used are discussed below for each hypothesis. Significance level was set at .05.

Prior to any statistical analysis, scattergrams and histograms were generated for each variable. If the histograms indicated a markedly skewed distribution or if the scattergrams indicated a curvilinear

relationship, a log transformation of the original variable was undertaken in order to restate the relationship in a linear form. Log data was then used in all subsequent analysis.

A three step analytic strategy was employed to test the hypotheses. The first level, or provisional analysis, consisted of bivariate correlations generated according to the specific hypotheses under investigation. These correlations were then examined in terms of statistical significance.

A second intermediate step involved computing a correlational matrix of all of the variables studied. The purpose of the correlational matrix was to examine whether confounding existed, i.e., whether the correlations between two variables obtained through the provisonal analysis might be spurious because of the effects of a third independent variable.

If in fact the independent variable was confounded or correlated with one or more independent variables, a multiple regression analysis was computed between the two correlated independent variables and the dependent variable in order to partial out the effects of the confounding. Multiple regression is a statistical technique through which one can analyze the relationship between a dependent variable and a set of independent variables. The multiple regression analysis permitted examination of the relationship between the independent

and dependent variables, while holding constant the effects of the second independent variable. This three step strategy was undertaken in order to empirically demonstrate whether the correlational effects obtained were in fact valid. In order for the null hypothesis to be rejected, significant correlations had to be obtained at this third level of analysis.

Hypothesis I refers to the possible relationship between children's coping responses and post and long-term adaptation to orthopedic surgery. The surgical coping variables (RATC) and the post and long-term adaptation variables (RBPC) are expressed as T-scores, which are continuous scores.

The Pearson product-moment correlation (r) was used, as the variables were continuously expressed. Correlation analysis summarizes the relationship between two variables, i.e., the degree to which variation in one variable is related to variation in another. It measures the goodness of fit of a linear regression line to the data (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). The product-moment corrrelation is the most stable correlation, with the smallest standard error of the correlation techniques. One tailed t-test statistics were then computed in order to determine whether the correlation coefficients obtained were statistically significant.

Hypothesis II tests whether the number of

children's coping responses differs significantly before orthopedic surgery as opposed to following orthopedic surgery. Two-tailed matched-pairs or dependent t-tests were computed between pre and postsurgery coping scores (RATC) in order to test this hypothesis. The t-test statistic is used to determine whether two means, proportions or correlation coefficients, differ significantly from one another. The hypothesis does not predict direction, but rather tests whether there are significant differences, either positive or negative, in the magnitude of children's coping responses.

Hypothesis III is concerned with whether there is a significant linear relationship between children's cognitive functioning and their post and long-term surgical adaptation. Both the PIC Cognitive Triad Scales and the RBPC scales are constructed using T-scores. Thus, both variables were expressed continuously and the Pearson product-moment correlation was computed in order to obtain the strength and direction of their linear relationship.

Hypothesis IV is concerned with whether there is a significant linear relationship between children's premorbid adjustment and their post and long-term surgical adaptation. Both the PIC Adjustment scale and the RBPC scales are constructed using T-scores and are thus continuously expressed. The Pearson product-moment correlation was computed in order to obtain the strength

and direction of the relationship.

Hypothesis V refers to the relationship between age and children's post and long-term surgical adaptation. Both age and surgical adaptation are continuously expressed. In order to measure the linear relationship between the two variables, the Pearson product-moment correlation was computed.

Hypothesis VI tests whether girls or boys demonstrate better post and long-term adaptation to orthopedic surgery. A one-tailed independent t-test was performed between the mean scores of males and females on the RBPC.

Hypothesis VII is concerned with the linear relationship between length of hospitalization and post and long-term adaptation to orthopedic surgery. Once again, both variables, i.e., days and RBPC, were continous. Thus, the Pearson product-moment correlation was computed in order to determine the degree to which variation in the number of days hospitalized was related to variation in post and long-term surgical adaptation.

Hypothesis VIII is concerned with the relationship between number of overnight hospital admissions and children's short and long term adaptation to orthopedic surgery. Both variables, i.e., number of admissions and surgical adaptation, as measured by the RBPC, are continuous. Thus the Pearson product-moment correlation was computed.

Supplementary Descriptive Data Analysis

Certain aspects of the present study did not lend themselves to quantitative analysis and the rigor of testing for statistical significance. The intensive data collection used and the difficulties associated with obtaining sufficiently large numbers of pediatric patients undergoing stressful orthopedic surgeries restricted the study to a relatively small sample. In an attempt to capture the richness of the data obtained, a qualitative case-study approach was used to describe two children's coping with their operations. Additional clinical material was obtained from these children, including interviews, scores on test variables not included in the hypotheses, and review of their medical charts. These case studies are reported in Chapter IV.

Summary

The primary purpose of the present study was to study the relationships between children's coping responses and adaptational outcomes to orthopedic surgery. A descriptive research design in the form of naturalistic field investigation was used in conjunction with correlational analytic techniques to address the questions posed.

A sample of 27 children undergoing orthopedic surgery participated in the study. Mothers of the patients completed the Personality Inventory for Children, used to measure premorbid adjustment and

cognitive functioning of their children, prior to the surgery. They also completed the Revised Behavior Problem Checklist, used to measure surgical adaptation, immediately before discharge and again one month later. The children completed the Roberts Apperception Test for Children, used to measure surgical coping responses, less than one day prior to their operations and again before their discharge.

Hypotheses related to both intrinsic and extrinsic factors related to surgical adaptation were developed and procedures to test these hyotheses were outlined. Pearson's product-moment correlations were used to summarize the degree to which variation in the independent variables were related to variation in the dependent variables. A correlation matrix was also computed in order to more fully examine the possibility of confounding of the independent variables. Multiple regression analyses were then performed in order to partial out or hold constant the effects of one independent variable while examining the relationship between a second independent variable and the outcome measure.

In addition to coping responses, the relationships between other independent variables and surgical adaptation were examined, including age, sex, length of hospitalization, and number of overnight hospital admissions.

The procedures used for data analysis included: one and two-tailed *t*-tests and correlational models. Supplementary descriptive case analysis was also used to aid in description of children's experiences in the hospital. Descriptive research such as this, while not addressing cause and effect, has heuristic value. The results from the present study will begin to build theory and broaden the knowledge base concerned with how children cope with stressful events such as hospitalization and surgery and how to help prepare high risk children for orthopedic surgery.

CHAPTER IV

RESULTS

This chapter presents summary statistics of the major variables and the test results of the hypotheses under investigation. Each hypothesis is restated in statistical form and the statistical procedures described. The results of the analysis are then presented.

Summary Statistics of Sugical Coping and Adaptation

The Roberts Apperception Test for Children (RATC) was used to measure coping responses of children to orthopedic surgery. The RATC was twice administered: once 24 hours or less preceeding surgery and again immediately preceeding discharge from the hospital. The total scale RATC T-scores, which are composed of mean T-scores of the eight subscales, ranged from 39 to 64 for the first RATC administration (RATC-1) and from 39 to 63 for the second RATC administration (RATC-2). The overall mean T-score for RATC-1 was 51.76 (SD = 7.74). The overall mean T-score for RATC-2 was 52.43 (SD = 6.49)

The Revised Behavior Problem Checklist (RBPC) was used to measure post- and long-term surgical adaptation.

The RBPC was twice administered: once immediately prior to discharge from the hospital, and again one month later. The total scale RBPC T-scores, which are composed of mean T-scores of the six subscales, ranged from 39 to 63 for the first RBPC administration (RBPC-1) and from 42 to 63 for the second RBPC administration (RBPC-2). The overall mean T-score for RBPC-1 was 52.43 (SD = 6.49). The overall mean T-score for RBPC-2 was 50.14 (SD = 7.77). Table 4.1 presents descriptive statistics for all coping response and adaptational outcome scales.

Summary Statistics of Intrinsic and Extrinsic Stress Factors

Four intrinsic factors, hypothesized to affect adaptational outcomes to orthopedic surgery, were investigated: cognitive functioning, premorbid adjustment, age, and gender.

Cognitive functioning was measured by the Cognitive Triad scales of the Personality Inventory for Children (PIC), administered immediately prior to or during surgery. Higher scores on the PIC indicate the increased possibility of psychopathology or deficit. Three scales compose the Cognitive Triad: Achievement, Intellectual Screening, and Development. T-scores for each subject were obtained on the three scales, added together, and divided by three in order to obtain a measure of cognitive functioning. Cognitive functioning

Table 4.1

Descriptive Statistics for Surgical Coping and Adaptational Outcome Scales

Scale	N	Mean	Standard Deviation	Standard Error
Presurgical Coping (RATC-1)				
Total	25	51.76	7.74	1.55
Reliance on Others	25	56.4	12.59	2.52
Support Others	25	47.12	15.47	3.09
Self-Sufficiency	25	50.44	9.24	1.85
Limit Setting	25	59.8	14.50	2.90
Problem Ident.	25	51.08	11.47	2.29
Unrealistic Solut.	25	49.92	9.52	1.90
Constructive Solut.	25	51.44	13.66	2.73
Insightful Solut.	15	50.27	6.13	1.58
Postsurgical Coping (RATC-2)				
Total	21	52.43	6.50	1.42
Reliance on Others	21	53	9.46	2.06
Support Others	21	51.86	13.14	2.87
Self-Sufficiency	21	50.52	9.37	2.05
Limit Setting	21	60.10	15.70	3.42
Problem Ident.	21	51.71	10.34	2.26
Unrealistic Solut.	21	49.52	9.20	2.00
Constructive Solut.	21	52.10	10.76	2.35
Insightful Solut.	12	51.92	8.20	2.37
Postsurgical Adaptation (RBPC-1)				
Total	27	49.93	6.72	1.29
Conduct Disorder	27	46.26	7.40	1.42
Socialized Aggress.	27	48.78	7.26	1.40
Attention Problems	27	51.19	11.53	2.22
Anxiety-Withdrawal	27	50.93	11.82	2.27
Psychotic Behavior	27	49.70	6.06	1.17
Motor Excess	27	51.74	9.82	1.89
Long-term Surgical Adaptation (RBPC-2)				
Total	22	50.14	7.77	1.66
Conduct Disorder	22	49.60	10.42	2.22
Socialized Aggress.	22	48.18	6.30	1.34
Attention Problems	22	49.90	9.30	1.98
Anxiety-Withdrawal	22	49.77	9.66	2.06
Psychotic Behavior	22	51	8.71	1.86
Motor Excess	22	52.14	10.60	2.26

ranged from T-scores of 43 to 78. The mean T-score was 54.80 (SD = 9.06).

Premorbid adjustment was measured by the Adjustment scale of the PIC. T-scores ranged from 40 to 85. The mean T-score was 54.58 (SD = 11.69).

The age of the child was documented from the birthdate on the medical chart. Children's ages ranged from 6 to 17 years. The mean age was 12.6 (SD = 2.86). There were 18 boys (67%) and 9 girls (33%) in the study. Table 4.2 presents the descriptive statistics for the instrinic variables.

Two extrinsic variables, hypothesized to affect chidren's adaptation to orthopedic surgery, were included in the study: length of hospitalization in days, and total number of overnight hospital admissions. This data was obtained both through a review of the child's medical charts and questions answered by the parent. The length of stay ranged from a minimum of two days to over 10 days. The mean length of stay was 4.60 (SD= 2.65) The total number of hospital admissions ranged from one to over four. The mean total number of admissions was 2.67 (SD = 1.28). Table 4.3 presents the descriptive statistics for the extrinsic factors.

Table 4.2

Descriptive Statistics for the Intrinsic Variables

Variable	N	Mean	Standard Deviation
Cognitive Funct.	26	54.80	9.06
Premorbid Adjust.	26	54.58	11.69
Age	27	12.56	2.86
Sex			
Males	18	12.44	2.90
Females	9	12.78	3.0

Table 4.3

Descriptive Statistics for the Extrinsic Variables

Variable	N	Mean	Standard Deviation
Length of Hosp.	27	4.60	2.65
Total Admissions	27	2.67	1.27

Test of the Hypotheses

Hypotheses Related to Coping Responses and Surgical Adaptation

Hypothesis I: Children who obtain higher T-scores on the surgical coping scales, as measured by the Roberts Apperception Test for Children, will exhibit better total post and long-term surgical adaptation, as measured by the Revised Behavior Problem Checklist, than will children who obtain lower T-scores.

Ho: rho = 0 (Total RATC-1 and Total RBPC-1)
H1: rho < 0 (Total RATC-1 and Total RBPC-1)

The bivariate relationships between the surgical coping scales and the surgical adaptation scales were determined by computing Pearson product-moment correlations. One-tail t-tests were used to determine

whether the correlations obtained were significant.

The correlation between Total Presurgical Coping and Total Postsurgical Adaptation was not significant ($r = -.18$, $p > .05$). The null hypothesis is retained.

Ho: rho = 0 (Total RATC-2 and RBPC-1)
H2: rho < 0 (Total RATC-2 and RBPC-1)

The correlation between Total Postsurgical Coping and Total Postsurgical Adaptation was not significant ($r = -.17$, $p > .05$). The null hypothesis is retained.

Ho: rho = 0 (Total RATC-1 and RBPC-2)
H3: rho < 0 (Total RATC-1 and RBPC-2)

The correlation between Total Presurgical Coping and Long-term Surgical Adaptation was not significant ($r = .31$, $p > .05$). The null hypothesis is retained.

Ho: rho = 0 (Total RATC-2 and RBPC-2)
H4: rho < 0 (Total RATC-2 and RBPC-2)

The correlation between Total Postsurgical Coping and Total Long-term Surgical Adaptation was not significant ($r = .36$, $p > .05$). The null hypothesis is retained.

Ho: rho = 0 (Subscales RATC-1/RATC-2 and RBPC-1/RBPC-2)
H5: rho < 0 (Subscales RATC-1/RATC-2 and RBPC-1/RBPC-2)

The correlations ranged from -.03 to .47 between the Surgical Coping Subscale Scores and the Total Surgical Adaptation scores. Three correlations were significant: (a) Presurgical Self-Sufficiency and Long-term Surgical Adaptation ($r = .44$, $p < .05$), (b) Presurgical Problem Identification and Long-Term

Surgical Adaptation ($r = .47$, $p < .05$), and (c) Postsurgical Self-Sufficiency and Long-Term Surgical Adaptation ($r = .47$, $p < .05$).

The correlations ranged from -.03 to .41 between the Total Surgical Coping Scores and the Surgical Adaptation Subscale Scores. Two correlations were significant: (a) Total Presurgical Coping and Postsurgical Adaptation Anxiety-Withdrawal ($r = -.39$, $p < .05$), and (b) Total Postsurgical Coping and Long-Term Surgical Adaptation Anxiety-Withdrawal ($r = .41$, $p < .05$).

Following the three-step strategy outlined in Chapter III, a correlational matrix of all independent and dependent variables was generated. Multiple regression equations were computed after identifying all possible sources of confounding in the independent variables in order to isolate the effects of the confounding independent variable. Multiple regression analysis revealed two significant linear relationships, both in the hypothesized directions: (a) Presurgical Limit Setting and Long-term Surgical Adaptation ($t = -2.16$, $p < .025$) and (b) Total Presurgical Coping and Postsurgical Anxiety-Withdrawal ($t = -2.01$, $p < .05$).

Although there are two significant correlations between subscale scores, the correlations between the total scores are not significant, and the null hypothesis is thus retained. The results of these analysis are presented in Table 4.4.

Table 4.4

Correlation Coefficients Between the Total Surgical Coping Scores (RATC) and the Total Surgical Adaptation Scores (RBPC)

	RBPC-1	RBPC-2
RATC-1	-.18	.31
RATC-2	-.17	.36

Correlation Coefficients Between the Surgical Coping Subscale Scores and the Total Surgical Adaptation Scores

	RBPC-1	RBPC-2
RATC-1		
Reliance On Others	-.16	.33
Support Others	-.12	.22
Self-Sufficiency	.12	.44*(a)
Limit Setting	-.18	.16**
Problem Identification	.14	.47*(b)
Unrealistic Solution	-.32	-.12
Constructive Solution	-.13	-.03
Insightful Solution	-.09	.36
RATC-2		
Reliance On Others	-.35	-.09
Support Others	-.07	.26
Self-Sufficiency	.15	.47*(c)
Limit Setting	-.09	.25
Problem Identification	.04	.29
Unrealistic Solution	-.19	-.04
Constructive Solution	-.04	.37
Insightful Solution	-.16	.30

Correlation Coefficients Between the Total Surgical Coping Scores and the Surgical Adaptation Subscale Scores

	RATC-1	RATC-2
RBPC-1		
Conduct Disorder	-.08	-.09
Socialized Aggression	-.03	-.07
Attentional Problems	-.18	-.12
Anxiety-Withdrawal	-.39*	-.34
Psychotic Behavior	-.08	-.03
Motor Excess	-.07	-.06
RBPC-2		
Conduct Disorder	.25	.34
Socialized Aggression	.22	.29
Attentional Problems	.32	.38
Anxiety-Withdrawal	.15	.41*(d)
Psychotic Behavior	.29	.23

Table 4.4 (cont'd.)

Motor Excess	.31	.23

* p <.05 bivariate correlation only.
** p <.025 when effects of Adjustment held constant.
(a) p >.05 when effects of Adjustment held constant.
(b) p >.05 when effects of Adjustment held constant.
(c) p >.05 when effects of Adjustment held constant.
(d) p >.05 when effects of Age held constant.

Hypothesis II: There will be significant differences between T-scores on each of the surgical coping response scales (a) Reliance on Others, (b) Support Others, (c) Self-Sufficiency, (d) Limit Setting, (e) Problem Identification, (f) Unrealistic Solution, (g) Constructive Solution, and (h) Insightful Solution, as measured by the Roberts Apperception Test for Children administered preceeding surgery versus following surgery.

Ho: $u = 0$
H1: $u \neq 0$

Two tail t-tests for paired or dependent samples were computed. None of the t-values were significant at $p < .05$. These results appear in Table 4.5. There were no significant differences in the number of surgical coping responses used presurgery as opposed to postsurgery. The null hypothesis is retained.

Hypotheses Related to Instrinsic Stress Factors

Hypothesis III: Children who obtain lower T-scores on the cognitive functioning scales, as measured by the Personality Inventory for Children (PIC) will exhibit better post and long-term surgical adaptation, as measured by the RBPC, than children who obtain higher T-scores.

Ho: rho = 0 (Cognitive Functioning and Postsurgical Adaptation
H1: rho > 0 (Cognitive Functioning and Postsurgical Adaptation)
Ho: rho = 0 (Cognitive Functioning and Long-term Surgical Adaptation)
H2: rho > 0 (Cognitive Functioning and Long-term Surgical Adaptation)

Table 4.5

Paired Difference t-test Results for Presurgical (RATC-1) and Postsurgical (RATC-2) Coping Response Scales

Scale	N	$\bar{X}1$	$\bar{X}2$	t-value
Total	20	51.76	52.43	-.79 NS
Reliance on Others	20	56.40	53.00	1.35 NS
Support Others	20	47.12	51.86	1.92 NS
Self-Sufficiency	20	50.44	50.52	.03 NS
Limit Setting	20	59.80	60.10	.08 NS
Problem Identification	20	51.08	51.71	.15 NS
Unrealistic Solution	20	49.92	49.52	.37 NS
Constructive Solution	20	51.44	52.10	-.37 NS
Insightful Solution	12	50.27	51.92	1.34 NS

The bivariate relationship between cognitive functioning and surgical adaptation was determined by the Pearson product-moment correlation. Correlations between cognitive functioning and post and long-term surgical adaptation were not significant ($r = .06$, $p > .05$, and $r = .21$, $p > 0.5$, respectively).

Further multiple regression analysis with cognitive functioning did not reveal any significant correlations. The null hypothesis is retained.

> Hypothesis IV: Children who obtain lower T-scores on the premorbid adjustment scale Adjustment, as measured by the PIC, will exhibit better post and long-term surgical adaptation, as measured by the RBPC, than will children who obtain higher T-scores.
>
> Ho: rho = 0 (Premorbid Adjustment and Postsurgical Adaptation)
> H1: rho < 0 (Premorbid Adjustment and Postsurgical Adaptation)

Ho: rho = 0 (Premorbid Adjustment and Long-term Surgical Adaptation)
H2: rho < 0 (Premorbid Adjustment and Long-term Surgical Adaptation)

The Pearson product-moment correlation was computed in order to investigate Hypothesis IV. Both the correlations between premorbid adjustment and postsurgical adaptation ($r = .39$, $p < .05$) and long-term surgical adaptation ($r = .70$, $p < .0005$) were significant.

Multiple regression analysis revealed that the relationship between premorbid adjustment and postsurgical adaptation was confounded by the independent variable "days hospitalized" and was not significant with the effect of days hospitalized held constant ($t = .99$, $p > .05$). However, the relationship between premorbid adjustment and long-term surgical adaptation was significant despite partialing of all possible confounding variables ($t = 2.88$, $p < .005$). The null hypothesis is rejected in favor of the alternative hypothesis H2.

Hypothesis V: Different age children will show different post and long-term surgical adaptation.

Ho: rho = 0 (Age and Postsurgical Adaptation)
H1: rho ≠ 0 (Age and Postsurgical Adaptation)
Ho: rho = 0 (Age and Long-term Surgical Adaptation)
H2: rho ≠ 0 (Age and Long-term Surgical Adaptation)

The relationship between age and surgical adaptation was investigated using the Pearson product-moment correlation. Provisional analysis indicated that

age was significantly correlated with postsurgical adaptation ($r = -.38$, $p < .05$), but not with long-term surgical adaptation ($r = -.025$, $p > .05$).

Further analysis using multiple regression indicated that age was confounded with total postsurgical coping. The standardized beta value for age was -.35. The correlation between age and postsurgical adaptation with postsurgical coping held constant was not significant ($t = -1.5$, $p > .05$). However, the correlation between age and postsurgical adaptation with presurgical coping held constant remained significant ($t = -2.07$, $p < .025$). Nonetheless, the null hypothesis is retained.

Hypothesis VI: Girls will show better post and long- term surgical adaptation than will boys.

Ho: $u = 0$ (Postsurgical Adaptation)
H1: $u \neq 0$ (Postsurgical Adaptation)
Ho: $u = 0$ (Long-term Surgical Adaptation)
H2: $u \neq 0$ (Long-term Surgical Adaptation)

This hypothesis was tested by t-test comparisons of the RBPC-1 and the RBPC-2 means for the male and female groups. There were no significant differences in postsurgical adaptation ($t = -0.59$, $p > .05$) and long-term surgical adaptation ($t = -0.443$, $p > .05$) between males and females. Table 4.6 describes the scores for males and females. The null hypothesis is retained.

Table 4.7 is a summary table and presents the bivariate correlations for Hypothesis III-VI, hypotheses related to instrinsic stress factors.

Table 4.6

T-test Results for
Postsurgical Adaptation (RATC-1) and
Long-term Surgical Adaptation (RATC-2)
Mean Scores for Males (M) and Females (F)

Surgical Adaptation	Mean (M)	Mean (F)	t-value
Postsurgical Adap.	49.67	51.38	-0.60 NS
Long-term Surgical Adap.	49.57	51.13	-0.44 NS

Table 4.7

Summary of Bivariate Correlation Coefficients for
Hypotheses Related to Intrinsic Stress Factors

		Postsurgical Adaptation	Long-term Surgical Adaptation
III	Cognitive Functioning	.06	.21
IV	Premorbid Adjustment	.39*(a)	.70**
V	Age	-.38*(b)	-.02

* p <.05
** p <.0005
(a) p >.05 when effects of Days Hospitalized held constant.
(b) p >.05 when effects of total Presurgical Coping held constant

Hypothesis Related to Extrinsic Stress Factors

Hypothesis VII: Children with longer periods of hospitalization will exhibit less successful post and long-term surgical adaptation than will children with shorter periods of hospitalization.

Ho: rho = 0 (days hospitalized and postsurgical adaptation)
H1: rho > 0 (days hospitalized and postsurgical adaptation)
Ho: rho = 0 (days hospitalized and long-term surgical adaptation)
H2: rho > 0 (days hospitalized and long-term surgical adaptation)

The correrlations between days hospitalized and surgical adaptation were determined by computing Pearson product-moment correlations.

The correlation between days hospitalized and postsurgical adaptation was not significant ($r = .32$, $p > .05$). The correlation between days hospitalized and long-term surgical adaptation was significant ($r = .41$, $p < .05$).

Multiple regression analysis indicated that the variable "days hospitalized" was confounded with the variable "premorbid adjustment." The relationship between days hospitalized and long-term surgical adaptation was not significant with the effects of premorbid adjustment held constant ($t = .83$, $p > .05$). The null hypothesis is retained.

> Hypothesis VIII: Children with more prior hospital admissions will exhibit less successful post and long-term surgical adaptation than will children with fewer hospital admissions.
>
> H_0: rho = 0 (Admissions and Postsurgical Adaptation)
> H_1: rho > 0 (Admissions and Postsurgical Adaptation)
> H_0: rho = 0 (Admissions and Long-term Surgical Adaptation)
> H_2: rho > 0 (Admissions and Long-term Surgical Adaptation)

The correlations between hospital admissions and surgical adaptation were determined by computing Pearson product-moment correlations.

The correlation between admissions and postsurgical adaptation was not significant ($r = .17$, $p > .05$). The

correlation between admissions and long-term surgical adaptation was also not significant ($r = .04$, $p > .05$). Futher analysis using multiple regression did not reveal any significant effects. The null hypotheses are retained.

The results of the correlations for hypotheses related to extrinsic stress factors are presented in Table 4.8

Table 4.8

Bivariate Correlation Coefficients for Hypotheses Related to Extrinsic Stress Factors

		Postsurgical Adaptation	Long-term Surgical Adaptation
VII	Days Hospitalized	.32	.41*(a)
VIII	Hospital Admissions	.17	.04

* $p < .05$
(a) $p > .05$ when effects of Adjustment held constant

Descriptive Case Analysis

Two case studies are presented in an attempt to capture the richness of the data obtained. Gary was a nine year old male, undergoing operations on both of his legs due to bone growth deformities, who demonstrated a problematic surgical adaptation. Alex was a 17 year old male with severe scoliosis who, despite a demanding operative procedure and several postoperative complications, exhibited satisfactory surgical adaptation.

Case #1: Gary

Gary was a 9-8 year old white male with an admitting diagnosis of Perkins Disease. The surgical procedure involved orthopedic surgery on both legs in order to correct bone growth deformities. Gary remained in the hospital for 10 days. He had a significant history of prior hospitalizations involving surgery. Two weeks prior to the surgery, his mother indicated that he was experiencing many behavioral difficulties related to his upcoming hospitalization and surgery, including difficulties following directions, poor frustration tolerance, overdemanding, and defiance. His mother was a single parent and expressed exasperation with Gary's behaviors.

Test Results: Gary's mother completed the Personality Inventory for Children (PIC) while Gary was undergoing surgery. Gary's profile was valid and had clinically significant elevations on scales indicative of poor scholastic achievement, sadness, fearfulness, poor self-control and defiance, and overactivity, restlesssness, and distractability. Mothers of children obtaining similar profiles are frequently seen as overly permissive and have difficulties setting limits on child demands. Gary clearly presented many behavioral concerns prior to his hospitalization and surgery.

Sequential analysis of Gary's scores on the Roberts Apperception Test for Children (RATC), administered

one day prior to his surgery, indicated significant elevations (T > 60) on the following scales: Reliance on Others, Self-Sufficiency, Limit Setting, Anxiety, Depression, Rejection, and Unresolved Conflict. There were no significantly low scores (T < 40).

Gary's presurgical coping responses were characterized by high rates of limit setting, self-sufficiency, and reliance on others. Gary's high scores on Limit Setting suggest excessive concerns about pleasing his parents and authority figures, as others were frequently required to correct his wrong doings, e.g., "They did something bad and got grounded for three days," and "A gang tried picking her up. Her mother and dad said do not walk by the street again." His reliance on others was extremely high, indicating Gary's preoccupation with going to the hospital and getting help from others. In addition, he tended to use unrealistic solutions to problematic situations or left problems unresolved, e.g., "They're talking to their son about going into the hospital. They're sad. After that they were happy," and "He's getting into bed and he's nervous about tomorrow. That's all." Gary's high scores on Self-Sufficiency as a coping strategy, on the other hand, suggests that he was able to be self-reliant and displayed much affection for others. His self-sufficient coping responses were an important compensatory resource to the anxiety, depression, and

rejection he experienced, e.g., "He's glad to be back home from the hospital," and "He's got the answer done and he was happy."

Examination of Gary's clinical scale scores suggest much sadness, worry, and rejection. The high rejection score reflects Gary's concern that parental conflict, accidents, or death might leave him feeling rejected and abandoned. In combination with his high rejection score, Gary's anxiety and depression suggest that his hospital admission and surgery had an overwhelming affect on his behavior and feelings.

The RATC was readministered 10 days following Gary's surgery, prior to his discharge from the hospital. Sequential analysis indicated significant elevations on the following scales: Self-Sufficiency, Limit Setting, Constructive Resolution, Anxiety, Aggression, and Depression. There were no significantly low scores.

Although several of Gary's coping strategies were the same preceeding and following surgery, e.g., self-sufficiency and limit setting, his reliance on others significantly decreased. In addition, Gary verbalized more constructive solutions to interpersonal problems, e.g., "If anyone pushes him, walk away, don't fight. He never fights again in school" and "The father is trying to think how he can get them home safe. So he figured out to pick them up after school in the car." Gary also

expressed fewer feelings of rejection.

Examination of his clinical scale scores indicates that Gary's level of aggression and depression were significantly higher following surgery than preceeding surgery. The wide scatter of Gary's scores suggests that being in the hospital was quite demanding. Physical restriction imposed by having full-length casts on both legs might have increased Gary's postsurgery levels of aggression and depression.

Gary's postsurgical adaptation, measured 10 days following surgery, was very problematic. He exhibited significant behavioral concerns on all subscales of the Revised Behavior Problem Checklist ($T > 73$). Particularly noteworthy were his scores on the Attentional Problems and Anxiety/Withdrawal scales (greater than two standard deviations above the mean).

Gary's long-term surgical adaptation, measured one month following discharge, continued to be problematic. There was an increase in aggressive behaviors, although he did demonstrate a decrease in anxious, fearful and depressed behaviors.

Conclusion: Gary's case illustrates two important points relative to this study. One, his level of premorbid adjustment was predictive of his surgical adaptation, both 10 days after surgery and 30 days following discharge. Problematic behaviors, both internalizing and externalizing, exhibited prior to

hospitalization, placed Gary at increased risk for experiencing problematic surgical adaptation.

Two, although Gary used a wide variety of coping responses, including high levels of self-sufficiency and increased constructive resolution skills, the demands of the situation exceeded his ability or resources. He clearly experienced much anxiety about being in the hospital and having an operation. For example, his first response on the RATC was: "They're talking to their son about going to the hospital. They're sad." Rather than appraising the situation merely as a challenge to his resources, it was perhaps appraised as a threat to his well-being because of the compromised resources he had prior to the surgery. The situation was stressful for Gary and he demonstrated significant post and long-term surgical adaptation as a result.

Case #2: Alex

Alex was a 17-3 year old white male with a history of congenital scoliosis. Alex's scoliosis was diagnosed within the past year when an X-ray was taken following a football injury he sustained. A myelogram confirmed scoliosis of the thorasic region.

Congential scoliosis is often caused by a defective embryologic development. Alex suffered from the presence of a hemivertebra, or the asymmetric fusion of two vertebrae, eventually involving a 62 degree

curvature of the spine. The operation involved the insertion of rods along the spine and a fusion of the vertebrae involved, called a spinal fusion with Harrington rod instrumentation. Following the operation, Alex was placed in a circle bed to increase his movement, circulation, and skin integrity. A body cast was placed five days later. Alex remained in this cast for approximately six months.

Alex developed several complications during and postsurgery. He lost over 90 cc of blood and was placed in the Intensive Care Unit for two days as a result. In addition, he developed an immunologic problem as a result of the operation. Postsurgery he was unable to urinate, necessitating that he be cathaterized.

Test Results. Alex's mother completed the Personality Inventory for Children (PIC) while Alex was in the ICU. There was a tendency to minimize Alex's problem behaviors. There were no clinically significant elevations on the PIC. Overall, Alex's premorbid adjustment, as evidenced by the PIC, was excellent.

Sequential analysis of Alex's scores on the Roberts Apperception Test for Children, administered one day prior to his surgery, indicated clinically significant elevations ($T > 60$) on the following scales: Constructive Resolution, Aggression, and Depression. There were no significantly low scores.

Alex's presurgical coping responses were

characterized by high rates of constructive and insightful resolutions to problem situations. Frequently, new insights or problem solving abilities which generalized to new situations were expressed: "The son feels left out. The mother realizes this and tells him that she loves him just as much and the kid realizes it and learns to like his brother," and "He finally realizes that if he doesn't do it, he'll get bad grades and fail."

Recognition of support by others was another coping strategy: "They'll talk about their problem," "She wakes up and her friend tells her to go home to sleep in bed," and "The dad asks him how much he needs, gives it to him, and lets him go to the show." However, low levels of problem identification were evident, suggesting much denial of conflict. Alex's anxiety about his operation was evident by significantly high levels of aggression and depression on the clinical scales. The wide variation in Alex's scores suggested that being in the hospital was an acutely disturbing situation.

Sequential analysis of Alex's postsurgical coping responses indicated signficant scores on Self-Sufficiency and Insightful Resolution. Other clinically significant scales were Anxiety and Depression.

Alex's postsurgical coping responses were characterized by high rates of self-sufficiency,

perception of appropriate limits, ability to recognize problem situations, and insightful solutions to problem situations. Self-sufficiency included responses such as: "He realizes that the quicker he does it, the sooner he can do what he wants," and "He thinks fighting is stupid and doesn't solve anything." Alex also used significantly more coping responses postsurgery in which problem situations were recognized: "He lost his job," and "A couple of guys are giving the black boy a hard time." Increased problem identification following surgery suggests that denial and avoidance served adaptive functions; it was necessary to deny the stressful aspects of the surgery in order to successfully adapt to a situation in which he had little control. Ten days following the surgery, however, Alex no longer needed to use high levels of denial and avoidance, as he had overcome a difficult postoperative recovery, including loss of blood, pain, traction, and inability to urinate, and could exhibit more control over his body and the environment.

Alex also used more age appropriate and sophisticated resolution skills following surgery, e.g., "He realized that the quicker he does his homework, the sooner he can do what he wants. He does it and then goes outside," "They realized that just because he's black, he has feelings too. Eventually they became friends and play together," and "He helps the parents

and realizes that the parents love him as much as the baby."

Alex's scores on the measure of postsurgical adaptation, administered 10 days following his surgery, indicated a significant elevation only on Motor Excess. All other scales were below the mean, suggesting no other significant behavioral reactions to the hospitalization and surgery. Follow-up assessment one month later indicated no problem areas.

Conclusion: This case study illustrates two important conclusions relevant to the present study. One, Alex's level of premorbid adjustment predicted his post and long-term surgical adaptation. He demonstrated no significant adjustment difficulties prior to his hospitalization and scoliosis operation. Alex's surgery and postoperative recovery were particularly demanding; he lost much blood, necessitating a stay in the ICU; he developed a serious immunologic problem postoperatively; and was unable to freely urinate. In spite of these obstacles, however, he demonstrated very positive adaptation using coping strategies such as support from others, self-sufficiency, and adequate problem-resolution skills.

Two, a coping strategy characterized by denial and avoidance presurgy may have helped Alex more successfully adapt to the anxiety, aggression, and depression he experienced while in the hospital. Once

he overcame the immediate challenges imposed by the surgery, however, Alex returned to prestress levels of recognizing differences and difficulties. Denial and avoidance might have served an adaptive function for Alex in a stressful situation in which he had little control.

Summary of Findings

Research questions about children's coping responses and adaptation to orthopedic surgery have been investigated by the testing of eight hypotheses and qualitative case analyses.

The first two hypotheses investigated the main research question, which concerned the linear relationship between coping responses and surgical adaptation. The statistical hypothesis that there was a significant linear relationship between the magnitude of coping responses used and post and long-term surgical adaptation was not accepted for the total scales. However, there were two significant relationships amongst the subscales: (a) presurgical limit setting and long-term surgical adaptation, and (b) total presurgical coping and postsurgical anxiety-withdrawal. The second hypothesis that the magnitude of children's coping responses significantly differs preceeding surgery versus following surgery was not supported.

The next four hypotheses investigated the linear

relationship between intrinsic stress factors and surgical adaptation. Hypothesis III, which investigated whether cognitive functioning was related to surgical adaptation, was not supported.

Hypothesis IV, indicating that children with better premorbid adjustment will show better surgical adaptation, was supported for long-term surgical adaptation.

The hypothesis (V) that age is related to surgical adaptation was equivocal. Although age was significantly correlated with postsurgical adaptation, it was confounded with postsurgical coping.

Hypothesis VI investigated whether girls would show better surgical adaptation than would boys. The hypothesis was not supported.

The last two hypotheses were related to the relationship between extrinsic stress factors and surgical adaptation. Hypothesis VII, which indicated that length of hospitalization was related to surgical adaptation, was supported using bivariate correlations. However, multiple regression analysis indicated that days hospitalized was confounded with the variable premorbid adjustment. The null hypothesis was thus not rejected.

The last hypothesis, that children with more hospital admissions would exhibit less successful surgical adaptation, was not supported by any analysis.

Qualitative analyses of the data suggested that the relationships between surgical coping responses and adaptational outcomes were complex and affected by many idiopathic intrinsic and extrinsic factors.

A discussion of the meaning and significance of these results is found in the next chapter, Chapter V.

CHAPTER V

DISCUSSION AND CONCLUSION

Summary

This study was undertaken in an effort to understand the relationships between coping responses and adaptational outcomes of children undergoing elective orthopedic surgery. Knowledge of these relationships is needed in order to prevent possible negative reactions due to hospitalization and surgery.

The reactions and psychological adjustment of children to hospitalization and surgery can be hypothesized from a stress and coping model. This model is based on a theory of interactionism, whereby stress is defined as the interaction between the individual, his or her resources and capabilities, and the demands of the situation. Accordingly, factors both within the person and situational or extrinsic factors are important in understanding coping and adaptation. Psychological stress is thus defined as a relationship between the person and the environment that is thought to be a threat to one's well-being. Theorists advocating interactional models of stress and coping include: Lazarus and Folkman (1984), Sarason and Sarason (1981), Moos and Billings (1982), and Rutter (1983).

A descriptive research design in the form of a naturalistic field investigation was used, in conjunction with quantitative and descriptive analysis of the data. A sample of 27 children, ages 6 through 17, undergoing orthopedic surgery at a large, urban, children's hospital participated in the study. They completed the Roberts Apperception Test for Children, used to measure their coping reponses, at two points: once immediately preceeding surgery and again prior to discharge from the hospital. In addition, the child's parent completed the Revised Behavior Problem Checklist, used to measure surgical adaptation, at two points: once prior to discharge from the hospital and again one month post-discharge. Premorbid adjustment and cognitive functioning of the child were measured prior to the surgery, using the Personality Inventory for Children. Length of stay number of hospital admissions, age and gender were obtained from the parent and the medical chart.

Eight hypotheses related to children's responses to hospitalization and surgery were developed and tested. The main hypothesis that children who score higher on measures of surgical coping will exhibit better surgical adaptation than those who score lower was not accepted for the total scores using statistical hypothesis testing. However, presurgical limit setting and long-term surgical adaptation were significantly correlated

in the predicted direction, such that children who perceived appropriate and constructive limits placed on their behaviors, as assessed prior to their surgery, also exhibited better surgical adaptation upon one month follow-up. In addition, total presurgical coping and postsurgical anxiety/withdrawal were significantly related; children who used greater numbers of total coping responses, as assessed prior to their surgery, also exhibited less anxiety and withdrawal after surgery.

Children's coping responses did not significantly differ preceeding surgery versus following surgery. Furthermore, the hypotheses that children with higher intellectual functioning, shorter periods of hospitalization, or fewer hospital admissions will show better surgical adaptation were not supported. Girls did not show better surgical adaptation than did boys.

The hypothesis that younger children will experience poorer short-term adjustments to hospitalization and surgery was supported using bivariate correlations but was not supported with the effects of postsurgical coping held constant. There was no significant correlation between age and long-term surgical adaptation. Finally, the hypothesis that premorbid adjustment would predict surgical adaptation at 30-day follow-up was supported.

Qualitative data analysis, using case studies,

suggested that the relationships between coping responses and adaptational outcomes did exist, although they were complex and not easily demonstrated empirically. The following sections discuss the significance and meaning of the results of the research questions. Implications for children entering the hospital for orthopedic surgery and future research questions are also discussed.

Discussion of the Hypotheses

Coping Responses and Adaptational Outcomes

Children's overall surgical coping responses were not significantly linearly related to their surgical adaptation using statistical hypotheses testing techniques. However, there were two exceptions: presurgical limit setting was related to long-term surgical adaptation, and total presurgical coping was related to postsurgical anxiety and withdrawal.

A possible explanation for the results of Hypothesis I is that hospitalization and orthopedic surgery were not appraised as taxing or exceeding the child's resources or endangering his or her well-being.

An interactional model of stress and coping states that an individual's cognitive appraisal of a stressful event is crucial to understanding how that person may respond to the stress or whether stress is perceived at all (Magnusson, 1982). An essential question is thus whether the children appraised the orthopedic surgery as

exceeding their resources and endangering their well-being? If so, at what point might they have appraised it as stressful--prior to the surgery, during anesthesia induction, or while in traction postsurgery?

Were there factors that helped protect these children against the possible threat of hospitalization and surgery to their resources or well-being? There is general agreement in the literature that the presence and use of a wide variety of social resources facilitates children's adjustment to stressful life events. It has further been demonstrated that parent-child contacts during hospitalization are helpful in reducing the level of stress experienced by the child (Peterson, Mori, & Carter, 1985).

Although there is solid evidence that even minor surgery is stressful for children (Burstein & Meichenbaum, 1979; Lambert, 1984; Skipper & Leonard, 1968), interviews with the children prior to and following the surgery indicated that the majority felt well-prepared and cared for while in the hospital. Although sometimes expressing anxiety about the surgical procedures, the older children frequently expressed confidence in their own ability to cope with the experience, particularly if they had successfully been through a similar procedure in the past. Younger children frequently expressed confidence in the ability of their parents or the nursing staff to care for them.

In fact, many of the parents functioned as paranurses, staying by their children's bedside and comforting and supporting them throughout their stay. It is possible that these children thus did not appraise the situation as a threat to their resources or well-being because of the support they received from parents and staff. Examples of coping responses used by children demonstrating support by others included: "the doctor is talking with the girl", "mother is trying to make her feel better," "they are talking about going to the hospital and the parents are asking him how he feels," "the lady is hugging her child because he might be getting out of the hospital," and "he's explaining to the boy how its gonna be at the hospital."

There is a notable exception, however. Qualitative observations indicated that children whose parent(s) did not remain in the hospital throughout the entire stay frequently exhibited much anxiety related to separation. This anxiety became particularly exacerbated when undergoing stressful procedures such as blood work or physical examinations by the orthopedic resident. At these times the child either cried and could not be easily comforted or, in the case of several adolescents, remained silent and withdrawn.

A second possible explanation for the above results is that the children's expectations about the surgery influenced their postoperative adaptation (Burstein &

Meichenbaum, 1979; Cohen & Lazarus, 1973). Melamed and her associates concluded that appropriate psychological treatments prove effective for preparing children for hospitalization and medical procedures (Melamed et al., 1982). The children in the present study did not all participate in a preparation program. The hospital offered an optional Saturday morning program consisting of a film and discussion with the nursing staff, parents, and children in an effort to prepare children and their families for surgery. In addition, ward staff again helped prepare children and their families once the child was admitted. The child's doll was frequently used to demonstrate and model to the child the medical procedures necessary. Children thus were prepared on different levels; such preparation was not controlled for in the present study. Examples of children's coping responses indicative of the effects of preparation include: "the doctor is explaining to the girl what will be done," "they say it is just like going to sleep," and "he has been there before and knows what to expect."

Another explanation for the nonsignificant correlations between total surgical coping and total surgical adaptation is measurement related, involving the choice of a multi-band outcome measure. The Revised Behavior Problem Checklist measures four broad behavior syndromes, in addition to two minor scales. Although

both externalizing and internalizing behaviors are noted in the literature in conjunction with hospitalization, interview data with the subjects and their parents suggest that attention and anxiety/withdrawal behaviors are predominant while in the hospital, while aggressive behaviors surface at home following discharge from the hospital. The restriction to a single broad band measurement instrument might be more effective in assessing children's behaviors following surgery.

One overriding limitation effecting the results obtained is methodological. Although Table 4.4 presents many correlations in the .30 to .38 range, these were not statistically significant because of the relatively small sample size. Frequently, an increase of less than five subjects would have significantly added to the power of the statistic.

The presence of statistically non-significant results in a correlational study employing a small "N" does not mean that these relationships do not exist, however. A question is thus raised over meaningful versus statistical significance, suggesting that a more qualified conclusion be drawn about the relationship between children's surgical coping responses and adaptation; this relationship cannot be adequately described by the presence or absence of statistically significant correlations alone. A more qualified conclusion, based on both empirical and qualitative data

analysis, is that relationships between surgical coping responses and adaptational outcomes exist. However, the inherent complexities in these relationships do not easily lend themselves to the rigor of hypothesis testing. Both intrinsic and extrinsic factors, such as the presence of social supports, may affect the relationship between children's coping responses and adaptation to surgery. Further study, using more restrictive measures but greater sample size, is warranted.

While the major aspects of Hypothesis I were not supported, two correlations involving subscales of coping and adaptation were significant in the predicted direction using regression analysis: (a) presurgical limit setting and long-term surgical adaptation and (b) total presurgical coping and postsurgical anxiety and withdrawal. Presurgical limit setting reflects the child's perception of reasonable and appropriate limits placed by adults in response to a violation of rules or expectation, as assessed one day or less prior to surgery. Long-term surgical adaptation refers to observable behaviors one month following discharge from the hospital.

While significant correlations might be expected merely out of chance occurance, the magnitude and direction of these correlations are notable. The results suggest that children who perceived appropriate

limits placed on their behaviors by adults, as assessed one day or less prior to their surgery, exhibited better long-term surgical adaptation than those who perceived fewer limits in their environment. One possible explanation for this result is once again the role that social supports, particularly intra-familial, play in children's adaptation to orthopedic surgery. Children whose coping responses include firm limits and guidelines on their behavior, i.e., support from their environment, demonstrate better long-term surgical adaptation. Appropriate and firm limit setting is associated with better child adjustment in the develomental literature (Baumrind, 1968). Such limits provide the child with a sense of stability, security, and trust. It is the presence of a caring, authoritative adult that is important.

In addition, the correlation is between limit setting and long-term surgical adaptation. It is probable that limit setting does not occur only when a child is in the hospital, but rather prior to and after the surgery as well. Examples of coping responses used by subjects included: appropriate punishments for doing something wrong, telling the child what not to do, limiting or restricting the child's behavior, having to take medicine, and getting grounded for bad school grades.

The correlation between total presurgical coping

and postsurgical anxiety and withdrawal was also significant. A possible explanation for this correlation is the role that action strategies play in reducing the impact of a stressful event. It has been hypothesized that active cognitions play an essential role in coping with stressful situations. Action strategies help form and maintain a set of illusions by looking at the known facts in a particular light in order to maintain the most positive picture possible (Curry & Russ, 1985; Taylor, 1983).

Children who used greater numbers of coping responses prior to their surgery thus demonstrated less anxiety and withdrawal while in the hospital. Rather than passive acceptance of the situation, these children used active strategies to gain a sense of mastery and control the meaning of the experience. Passive acceptance, helplessness, and depression have been linked to higher morbidity and mortality rates in a number of investigations (Lazarus & Folkman, 1984). On the other hand, high levels of cognitive arousal are related to successful surgical adaptation (Ray & Fitzgibbon, 1981). Effective coping might have depended not only on what the subjects did, but also on how much they did (Curry & Russ, 1985).

Active cognitions might thus have functioned to help the subjects form and maintain a set of illusions by looking at the known facts in a particular light in

order to maintain the most positive picture possible. Other researchers (Alloy & Abramson, 1979; Cohen & Lazarus, 1973; Taylor, 1983) have concluded that avoidance and illusion may be cognitive processes that serve essential adaptive functions. If one is to maintain hope, the opposite of depression, then one must select the positive aspects of the situation and believe that one's actions make a difference. Breznitz (Turkington, 1984) maintains that a sense of hope is essential for successful adaptation to stressful situations. Hope involves active work, as opposed to passive acceptance. Coping responses indicative of children's efforts to maintain hope included: "He went to the hospital and found out it wasn't a bad place after all," "his surgery wasn't bad because he didn't even know," "when the person gets out of surgery, then he'll be alright," and "maybe her mom and dad might be separated and they might be getting together again."

Hypothesis II predicted that the number of coping responses would significantly differ preceeding surgery versus following surgery. The hypothesis was not supported. The results obtained suggest that coping efforts, in a quantitative sense, remained relatively stable throughout the child's hospital stay. Qualitative examination of the subject's coping responses on the RATC administrations again suggest stability. The children's stories demonstrated quite

similar thematic content one day prior to their surgery and before their discharge from the hospital.

One further way to investigate the stability of children's coping responses to orthopedic surgery is to examine the test-retest reliability coefficients obtained for the sample. Overall test-retest reliability for the sample is remarkably high ($r = .86$), given the nature of stimulus bound thematic apperception tests such as the RATC to be influenced by state factors of the child. More weight can thus be given to the conclusion that coping responses are stable over time, as opposed to predictions from an interactional model of stress to the contrary.

Hypotheses Related to Intrinsic Stress Factors

Four hypotheses related to intrinsic stress factors were developed and tested. Intrinsic factors hypothesized to affect adaptational outcomes to orthopedic surgery were: cognitive functioning, premorbid adjustment, age, and gender.

Hypothesis III predicted that the child's cognitive functioning would be significantly related to post and long-term surgical adaptation. Correlations were not significant at the $p < .05$ level; further regression analysis did not reveal significant correlations. The hypothesis was not supported. Not only was cognitive functioning not significantly related to surgical adaptation, but examination of the correlation matrix

indicates that cognitive functioning was not related to measures of surgical coping.

One possible explanation for this result is that the advantages of good scholastic achievement and intellectual functioning do not protect children from the adversities imposed by hospitalization and surgery. Although this finding seems to contradict the work of Rutter (1983), it should be noted that his finding referred to long-term functioning. On the other hand, the present study focused on adaptation to a specific stressor over a relatively short period of time (three to thirty days). The value of superior cognitive functioning might be evident over the long haul, across many stressors, as opposed to discrete episodes of stress measured in days.

Hypothesis IV predicted that children's premorbid adjustment, i.e., the variety and frequency of problem behaviors prior to admission to the hospital for orthopedic surgery, was related to their surgical adaptation. Initial results indicated that premorbid adjustment was significantly correlated with both post and long-term surgical adaptation at the $p < .05$ level. Further regression analysis indicated that the relationship between premorbid adjustment and postsurgical adaptation (short-term) was confounded by the number of days the child was hospitalized. However, the relationship between premorbid adjustment and long-

term surgical adaptation was significant at the p <.005 level.

These results raise several important issues. The most important is that children's overall psychological adjustment was the most powerful predictor, investigated in the present study, of their behavioral responses to hospitalization and orthopedic surgery. Children with poorer premorbid adjustment were more likey to develop behavioral concerns at home one month following their operations. Premorbid adjustment was an important individual difference that mediated the impact of hospitalization and surgery over the first month following discharge.

One possible explanation for the finding that premorbid adjustment predicted long-term surgical adaptation is the role that a child's psychological resources play in his or her adaptation to stressful events. Reseachers, most notably Garmezy (1976; 1983) consistently refer to the role that a positive personality disposition plays in protecting children who are exposed to stressful events. The ability of these children to meet and conquer the adversities imposed by the rigors of hositalization and painful orthopedic surgery, including traction, forced dependency, and loss of privacy might depend, in large part, upon the psychological resources they bring into the stressful encounter.

Why was "premorbid adjustment" confounded with the variable "days hospitalized? The importance of psychological resources in protecting children from the effects of hospitalization and surgery might also depend upon the severity of the stress they encounter while in the hospital. There is much research to support the hypothesis that the simple accumulation of stressful events is significant; the more stressors encountered, the more severe the reactions. The severity of the children's orthopedic surgery could roughly be measured by the number of days they remained in the hospital. Children undergoing spinal fusions for scoliosis generally remained in the hospital for 10 days and remained in body casts for up to six months following discharge from the hospital. Removal of excess bone growth or heel cord lengthening, on the other hand, necessitated a hospital stay of two to three days. Because the relationship between premorbid adjustment and postsurgical adaptation was confounded by the number of days the child was hospitalized, the results suggest that in the short run, the affects of premorbid adjustment are not signficant when adjusted for the severity of the stressor. However, it is in the long run that the importance of a child's psychological resources is more evident.

Although researchers using case studies have suggested that children with preexisting psycholgical

problems will experience more severe reactions to hospitalization and surgery (Barnes, Kenny, Call, & Reinhart, 1972), there has been no research to date in which the reactions of children with and without preexisiting psychological problems are compared (Lambert, 1984). The results of the present study thus represent an important first step in studying the correlations between premorbid adjustment and adaptational outcomes to orthopedic surgery.

Hypothesis V predicted that different age children will show different post and long-term surgical adaptation. The literature states that the age period of greatest risk is about 6 months to 4 years. On the other hand, the advanced metacognitive processes of older children could also foster greater anxieties in children (Maccoby, 1983), as they might forsee the possible threats to their well-being associated with hospitalization and surgery but are unable to protect themselves.

The results of Hypothesis V were equivocal. Age was significantly correlated with postsurgical adaptation ($p < .05$), such that younger children experienced greater postsurgical difficulties than older children. However, age was confounded with total postsurgical coping, but not with presurgical coping.

One explanation for this result is that hospitalization and orthopedic surgery are stressful for

younger children with deficient coping responses. Young school-aged children who utilize fewer numbers of cognitive responses exhibit poorer adadptation while in the hospital. Younger children who are more active in using coping responses, on the other hand, may be at less risk for developing adjustment difficulties postsurgery. In addition, older children as a group have developed cognitive processes that allow them to actively respond to being in the hospital. The results suggest that older children utilized greater numbers of cognitive responses.

Once the child returned home, however, his or her age was not signficiantly associated with surgical adaptation. It is perhaps only during the intense stress associated with being in a hospital that age plays a role in surgical adaptation. At home the surroundings are no longer unfamiliar, as the child is reunited with his or her family.

Hypothesis VI predicted that girls would show better post and long-term surgical adaptation than would boys. The hypothesis was not supported. There were no significant differences between males and females on any of the total surgical adaptation measures.

Researchers such as Rutter (1983) state that boys tend to be more vulnerable to the effects of stress and, in particular, hospital admissions. However, the boys in this sample did not quantitatively exhibit poorer

surgical adaptation, as compared with the girls. In retrospect, a more pertinent line of investigation with regard to gender is whether boys and girls use different coping responses. For example, do boys use physical aggression and controlling behaviors and girls use verbal aggression and orienting behaviors as Lambert (1984) suggests? Further research is needed to determine if the quality of girls and boys coping responses to orthopedic surgery differ, regardless of their surgical adaptation.

Hypotheses Related to Extrinsic Stress Factors

Hypothesis VII predicted that length of hospitalization was a significant factor in children's surgical adaptation, such that children with longer periods of hospitalization would exhibit less successful post and long-term surgical adaptation than would children with shorter periods of hospitalization. Although the correlation between days hospitalized and long-term surgical adaptation was significant in the predicted direction, it was not significant with the effects of premorbid adjustment held constant. The hypothesis was not supported.

One possible explanation for the results is that the children hospitalized for longer periods of time had serious orthopedic conditions that affected their level of premorid adjustment. The long-term cases in the

sample consisted of children undergoing spinal fusions for correction of scoliosis. There is a large body of literature describing the affects of chronic physical illness or disability on children's adjustment (Moos & Tsu, 1977). Scoliosis is a deformity involving lateral curvature of the spine and is often progressive through childhood. Many nonsurgical and conservative treatments are available such as exercises to improve posture, bed rest, traction, and plaster cast or brace. Surgical treatment is indicated when curvatures cannot be stisfactorily improved, or their improvement satisfactorily maintained, by nonsurgical measures (Raney, Brashear, & Shands, 1971). The scoliosis patients in this sample had been in and out of the orthopedic clinic many times. Scoliosis is a disfiguring deformity for children and adolescents that would have psychosocial consequences. In addition, the scoliosis was frequently associated with other physical conditions, including muscular dystrophy. The variable days hospitalized was very much linked to the severity of the orthopedic condition. It is thus not surprising that the variable days hospitalized was signficantly confounded with the variable premorbid adjustment. Together, these two independent variables accounted for 19% of the variance in postsurgical adaptation ($p > .05$) and 51% of the variance in long-term adaptation ($p < .001$).

Hypothesis VIII predicted that children with more prior hospital admissions would exhibit less successful post and long-term surgical adaptation than would children with fewer hospital admissions. The hypothesis was not supported.

There is continued debate in the literature whether previous hospitalization positively or negatively affects the degree of emotional upset during or following subsequent hospitalizations (Lambert, 1984). The children in this sample with many prior hospitalizations did not experience more difficulties postsurgery or in the month following discharge from the hospital.

Qualitative analysis indicates that in general the benefits of orthopedic surgery outweight the drawbacks. Conversations with parents and children prior to the surgery indicated much variation in children's reactions to coming again to the hospital for surgery. Many parents stated that their child expressed great displeasure about the upcoming hospital admission and exhibited increasingly irritable and argumentative behaviors. Still other parents, usually of adolescents, stated that their child was ready and eager to get their body "fixed," although apprehension was nonetheless expressed by the child. There are thus likely many other variables not directly addressed in the present study, such as the child's and parent's view of the

orthopedic difficulty and orthopedic surgery, that affected whether prior admissions was related to the child's surgical adaptation.

Limitations of the Study

The most significant limitation of the study concerns the size of the sample. A sample of 27 children affects both the empirical results and the generalizations that can be made, or the external validity. Quite frequently, relatively large correlations were obtained in the predicted direction in the testing of the hypotheses, but because of the small sample size, these correlations were not statistically significant at the $p < .05$ level. The conclusions based on the empirical results are thus limited by methodological constraints.

In addition, the generalizability of the results is limited. With a sample of 27 subjects, it is more difficult to generalize the results beyond the sample itself.

Generalization to a larger patient population is often made using the Tukey-Cornfield Bridge argument (Glass & Stanley, 1970). This is a logical argument allowing for inferrences to be made from non-randomized samples to populations of interest, provided that the characteristics of the sample are described in detail. Of the 33 subjects eligible and asked to participate in the study, 27, or 82%, completed the study. This

participation rate is quite high and compares favorably with other published studies in the field (Curry & Russ, 1985). The subject pool consisted of adequate numbers of minority children. However, boys outnumbered girls three-to-one. Socioeconomic status was varied, as both private and orthopedic clinic patients participated. Use of the Tukey-Cornfield Bridge argument allows for the cautious generalization of these results to the larger pediatric orthopedic population undergoing similar operations.

Another limitation of the study was the use of a projective test to measure surgical coping responses. Although the Roberts Apperception Test for Children has adequate psychometric properties, projective tests in general have certain limitations in terms of construct validity. Other methods of assessing children's coping responses, such as structured interviews, were considered in the present study, but also have limitations associated with using retrospective self-report measures. However, the use of projective measures is well-supported by stress researchers (Moos, 1974), and is one viable method of exploring coping processes, particularly when such processes cannot be readily observed.

In addition to the above limitations, naturalistic field investigations are unable to control for many confounding variables. Although an effort was made to

control for confounding among the independent variables under investigation by using multiple regression analysis, other variables were not controlled for and might be confounders. Confounding variables might include expectations regarding the surgery, and the amount of social support and preparation the child received prior, during, and following surgery.

Implications of the Research

The results of this research have implications for hospital staff and parents of children entering the hospital for orthopedic surgery. The clearest finding of the study is that children's premorbid adjustment functions as a powerful predictor of surgical adaptation. Children experiencing various and frequent problem behaviors prior to their surgery exhibit higher rates of both internalizing and externalizing behaviors one month after they are discharged from the hospital. It is thus important to adequately screen for children at risk for problematic postsurgical adaptation prior to orthopedic surgery. Appropriate secondary prevention strategies can then be used. Intervention programs specifically aimed at this population of children can be implemented. Such interventions might include increased parental and hospital staff support, behavioral programs, modeling procedures, systematic desensitization, and exposure therapy (Melamed et al., 1982; Peterson, Mori, & Carter, 1985). This implication

is important to nursing staff, pediatric and orthopedic residents, and pediatric psychologists involved with providing care for children undergoing orthopedic surgery.

It is also important that children are encouraged by hospital staff and parents to use action-oriented cognitive strategies prior to orthopedic surgery in order to limit behaviors indicative of anxiety and withdrawal following the surgery. The use of coping strategies such as reliance on others, self-sufficiency, problem-identification, and problem resolution should be encouraged so that the child may maintain a sense of hope. Traditional puppet therapy, modeling procedures, and exposure therapy can be used, depending on the age of the child, to help encourage active use of strategies, as opposed to passive acceptance of the situation. In this context, the defiance sometimes noted of children by hospital staff can be viewed as a positive attempt of children to cope with a situation that is not totally under their control.

Finally, the results suggest that it is important that parents and hospital staff continue to impose appropriate but firm limits on the children's behavior prior to the orthopedic surgery. Children's perceptions of such limits are important in terms of their adaptation one month following discharge from the hospital.

Directions for Future Research

The present study, while directly assessing the relationships between coping responses and adaptational outcomes of children undergoing elective orthopedic surgery, merely begins the process of describing the relationships. The results of the study indicate the need for further investigation of children's responses to various surgeries and medical procedures, pose new questions for researchers in the stress and coping field, and provide directions for future research.

More information is needed regarding how children appraise the stress associated with hospitalization and major surgical procedures. Are there particular points that they appraise as stressful, e.g., admission, first night in the hospital, transport to the operating room, anesthesia induction, postoperative pain and restriction, or discharge? Interviews with the child as the stress occurs is advantageous. However, assessment of cognitive appraisal during the actual coping episode is not always possible or appropriate in terms of the treatment process. A coping interview, based on prospective and retrospective self report, can be used (Curry and Russ 1985).

A second needed line of inquiry is whether children's expectations about their surgeries influence their surgical adaptation. For example, if children

believe that the positive results of the surgery will outweigh the negatives, do they demonstrate more positive adaptational outcomes than those who do not expect good results? Use of elective orthopedic surgery patients would allow the researcher to interview children at various points prior to the surgery and compare their expectations to their surgical adaptation.

The role of social supports in helping children cope with the adversities of hospitalization and surgery is powerful and requires future research. What are the essential aspects of social supports that help children cope with surgery? Are children of single parent, foster care, or institutionalized families at increased risk for developing emotional difficulties? Social support might be measured in a number of ways, including number of visitors, time spent visiting, hospital staff time, and time on the telephone.

In order to explore gender issues in relation to adaptation to orthopedic surgery, comparisons of the coping responses used by girls and boys is necessary. Do boys use more physical agression and controlling responses, while girls use more verbal aggression and orienting responses? Implications from this line of inquiry could assist with predicting and explaining differential reactions to surgery and help prepare boys and girls for surgery based on their coping strengths.

Use of more narrow band outcome measures is

necessary in order to more fully describe surgical adaptation. Internalizing symptomatology is more prevalent while the child is in the hospital, while externalizing symptomatology becomes more prevalent after the child returns home.

Although research on stress and coping is exploratory in nature, use of larger sample sizes is necessary, once the variables of interest have been narrowed. Further research is necessary in order to increase the statistical power of the analyses while not prematurely narrowing the scope of the inquiry.

Conclusion

The results of this research highlight the resiliance in children under stress. Most children exposed to a stressor of marked gravity, associated with a heightened probability of maladaptive outcomes, demonstrated behavior marked by adapation and competence. The "stress resistance" of these children is noteworthy and is a starting point for research on protective factors and the processes they activate.

However, those children demonstrating poorer premorbid adjustment are at risk for developing adverse reactions to orthopedic surgery. This subgroup of children requires special attention as they prepare to enter the hospital; their stress resistance is

lower as they are less apt to have available effective protective factors. This minority poses a special challenge to parents and hospital staff to insure the most advantageous physical and psychological adaptation possible.

APPENDICES

APPENDIX A

CONSENT FORM

Children's
HOSPITAL OF MICHIGAN
DETROIT MEDICAL CENTER • 3901 Beaubien Boulevard/Detroit, Michigan 48201

Dear Parent(s):

Your child will soon be undergoing orthopedic surgery at Children's Hospital of Michigan. Children and their parents often find hospitalization and surgery to be stressful. I am a Psychologist in the Department of Psychiatry/Psychology and am studying how children cope with their surgery. I would like to have you and your child participate in a research study I am conducting.

This work may improve our understanding of surgical stress in order to develop new ways of helping children facing similar operations. It is sponsored by your child's surgeon, Dr. LaMont, the Department of Psychiatry/Psychology, and Michigan State University.

You will be asked to complete two questionnaires about your child, both while s/he is at the hospital and when you see Dr. LaMont for a follow-up visit. Altogether these questionnaires require about one hour of time. Your child will be asked to make up stories for 16 pictures for which there are no right or wrong answers, requiring about one hour of time. The questionnaires are currently used by the Department of Psychiatry/Psychology.

Your participation is completely voluntary. Enclosed is a consent form that more fully describes your participation in the study. If you are willing to participate, please sign the form and leave it with the receptionist, or mail it to me in the stamped envelope provided. I will call you at home in order to more fully explain the study and answer any questions you might have.

Thank you for your consideration.

Sincerely,

Paul Robins, M.A.

Paul Robins, M.A.
Psychiatry/Psychology

Consent Form

No. 1985-03

Children and their parents often find hospitalization and surgery to be stressful. Paul Robins, M.A. is a psychologist, and is trying to learn more about the stresses of pediatric surgery for children. This work will help improve the understanding of surgical stress in order to develop new ways of helping children. The work is sponsored by Children's Hospital of Michigan and Michigan State University. He would like us to help him learn about how children cope with surgery by taking part in a study. We will be asked to complete some questions which ask about:

a) background information (child's age, gender, days hospitalized, etc.);

b) child's personality (likes, dislikes, skills, etc.);

c) child's behavior (attention seeking, shy, etc.).

Your child will be asked to make up stories for 16 pictures for which there are no right or wrong answers, both prior to and following his or her surgery.

We understand that it will take approximately one hour of our time and one hour of our child's time to participate in this study. The investigator will give us the questionnaires both in the hospital and when we bring our child to the doctor for a follow-up visit.

All information obtained will be kept confidential. No names will be placed on any of the questionnaires, nor will our names be used in any reports of the study. When the study is completed, we will be mailed a written summary of the results if we so desire.

This is a research study, and it does not involve any psychological treatment. However, it may be of benefit to us in that we may learn how children cope with hospitalization and surgery. We may withdraw from this study at any time. If we do withdraw from this study, the hospital and the doctors will still give us the best care that they can, both currently and if we are treated there in the future.

Information about what we learned from this study may be published, or given to other people doing research, but our names will not be used.

Participation in this study does not entail any known risks. However, in the unusual event of emotional upset resulting from completing the questionnaires or stories, no compensation and no free psychological treatment or reimbursement is offered.

Any questions we have asked about this study have been answered. If we have other questions later on, Paul Robins, M.A. will answer them for us. He can be reached at 494-4878 weekdays from 8:00 a.m. to 5:00 p.m. We also may call Dr. Flossie Cohen, who can be reached at 494-5566. She is Chairman of the Children's Hospital of Michigan Research Grants and Investigation Committee and will answer any questions we have about our rights as part of a research study.

By signing this paper we are saying that we have read and understood it and that we agreed to take part in this study.

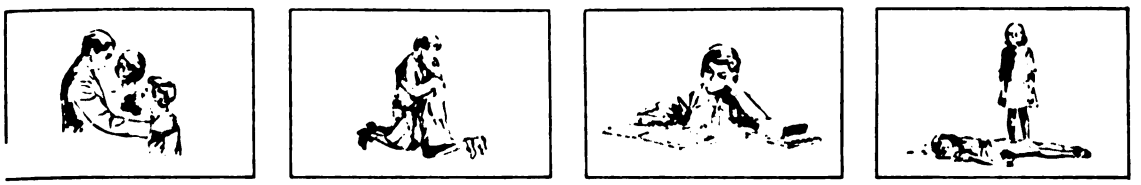
_____	_____
Name of Participant	Signature of Child (if over age of 13)
_____	_____
CHM # (PDB #)	Signature of Participant or Parent or Legal Guardian
_____	_____
Date	Physician's Signature
	_____
	Witness

The child assented to participate in this project.

_____
Investigator

APPENDIX B

THE ROBERTS APPERCEPTION TEST FOR CHILDREN



Card 1B
Family Confrontation

Card 2G
Maternal Support

Card 3B
School Attitude

Card 4
Child Support/Aggression

Card 5G
Parental Affection

Card 6B
Peer/Racial Interaction

Card 7G
Dependency/Anxiety

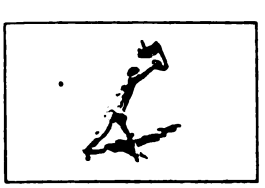
Card 8
Family Conference

Card 9
Physical Aggression

Card 10B
Sibling Rivalry

Card 11
Fear

Card 12G
Parental Conflict/Depression



Card 13B
Aggression Release

Card 14G
Maternal Limit Setting

Card 15
Nudity/Sexuality

Card 16B
Parental Support

Figure 1
The RATC Stimulus Cards

Summary Score Sheet

Card Number	Profile Scales: Adaptive: Reliance on Others	Support-Other	Support-Child	Limit Setting	Problem Identification	Resolution 1	Resolution 2	Resolution 3*	Clinical: Anxiety	Aggression	Depression	Rejection	Unresolved	Indicators: Atypical Response	Maladaptive	Refusal
1B/G																
2B/G																
3B/G																
4																
5B/G																
6B/G																
7B/G																
8																
9																
10B/G																
11																
12B/G																
13B/G																
14B/G																
15																
16B/G																
Total																

Supplementary Measures: Ego Functioning	Aggression	Levels of Projection
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.
6.	6.	6.
7.	7.	7.
8.	8.	8.
	9.	

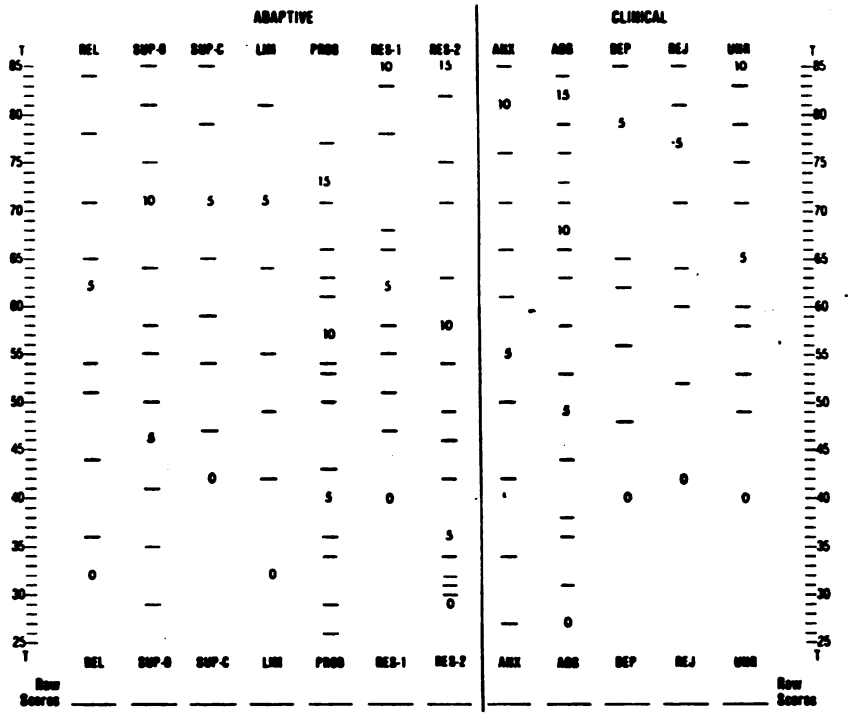
Interpersonal Matrix

	REL	SUP-O	SUP-C	LIM	PROB	RES-1	RES-2	RES-3	ANX	AGG	DEP	REJ	UNR	ATY	MAL
Child															
Mother															
Father															
Parents															
Family															
Siblings															
Peers															
School Personnel															
Others															

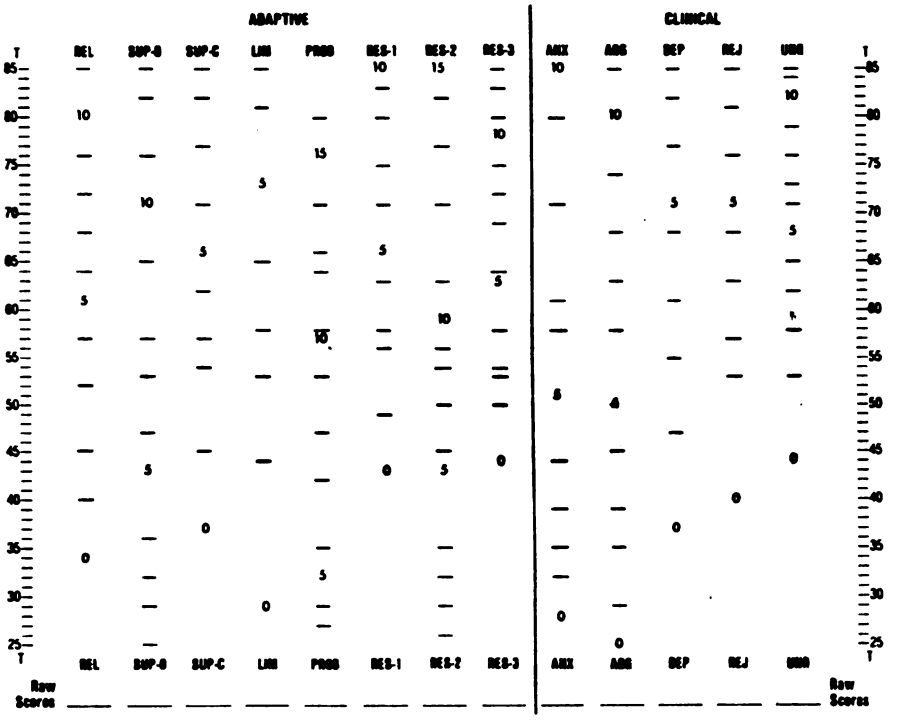
	Age 6-7	8-9	10-12	13-15
ATY	2	1	1	1
MAL	1	1	1	1
REF	1	1	1	1
RES-3	1	2	4	

*For ages 13–15 only, Resolution 3 should be plotted as a profile scale.

Ages 10–12



Ages 13–15



The RATC differs from other apperception tests commonly used with children, e.g., the CAT and TAT, in five major respects: a) it is specificially designed for children and thus depicts children in all 16 stimulus cards, b) it emphasizes everyday interpersonal events, as opposed to psychosexual or adult concerns, c) the stimuli show realistic drawings of children and adults executed in a uniform style by the same artist, d) it employs easily scored, objective measures which yield high interrater agreement, and e) it provides normative data for a sample of 200 well-adjusted children ages 6 through 15.

The Adaptive Scales

The eight adaptive scales used in the study as measures of surgical coping are each described below (McAruthur & Roberts, 1982). The parentheses indicate the name of the scale for purposes of the study.

Reliance on Others. The Reliance on Others scale assesses a child's tendency to make up stories in which the character reaches out to others for help in solving a problem, either external or intrapsychic. The scale measures the adaptive capacity to use outside help to overcome a problem. Examples include: "he went to tell his parents," "he talked it over with his mom," and "please can't I hold him."

Support-Others. The Support-Other scale reflects a tendency to support others by giving assistance, emotional support, or material objects. Common examples of thematic content include granting a request, buying a present, or giving professional help: "he reads him the story," and "I love you."

Support-Child. (Self-Sufficiency) The Support-Child scale measures self-sufficiency and maturity as indicated by assertiveness or the experience of positive emotions. Common examples of thematic content include curiosity, positive feelings about self, pride in work, joy, expectation, affection, and a good dream: "he's excited," and "he's thinking hard about all the answers."

Problem Identification. The Problem Identification scale indicates the child's ability to formulate concepts beyond the nature of the card. The ability to engage in and articulate problem situations is considered adaptive. It requires a lack of defensiveness, verbal ability, and the capacity to view others in complex, dynamic ineractions. Common examples include marital separation, not knowing what to do, inability to handle school work, getting lost, lying, environmental disaster, and having problems: "he's wondering what's going on," and "they want to go surfing and they don't have a ride."

Limit Setting. The Limit Setting scale reflects the child's perception of reasonable and appropriate

limits placed in response to a violation of rules or expectations. Low scores may reflect a lack of parental involvement or concern. Common examples include scolding, punishment, explaining what the child did wrong, making the child do something over, or showing the child how to do something the right way: "the father took him to his room and he went to bed without his supper," "his dad's telling him not to do that any more," and "he had to clean up the paint on the walls."

Resolution 1. (Unrealistic Solutions) The Resolution 1 scale reflects a child's tendency to seek easy or unrealistic solutions to problem solutions that have magical, wish-fulfilling, or unrealistic quality. Common themes include living happily ever after, and suddenly not having a problem.

Resolution 2. (Constructive Solution) The Resolution 2 scale indicates a constructive resolution of a problem either external or intrapsychic. The resolution is limited to the present situation. It is not accompianed by any new insights or approaches which may be applied to new problem situations. This scale involves resolution without explanation of the process or "working through" of the problem, e.g., "he figures out it was just a dream and he goes back to sleep," and "she'll go get help and make sure she's OK."

Resolution 3. (Insightful Solution) The Resolution 3 scale indicates a constructive resolution which goes beyond the immediate problem or conflict situation. The character in a story acquires new insight or develops problem-solving abilities which generalize to new situations. It occurs developmentally for older children.

Validity

The authors investigated the relationship among the stimulus cards, i.e., which cards evoked similar responses in children and what were the underlying dimensions. A factor analysis was performed and yielded four factors, which accounted for 89% of the common variance.

Roid (1983) explored two kinds of factor structure using more complex factors methods: a) the structure of the 13 basic profile scales, and b) a hierarchical analysis of the structure of individual cards in the context of selected profile indicators. The findings replicated the three-factor structure of profile scales described by McArthur and Roberts (1982), i.e., Adaptive, Clinical, and Developmental. In addition, specific combinations of cards elicited a structure of profile indicators that suggested the presence of four higher-order factors: a) internalization, b) externalization, c) aggressive-destructive, and d) degree of maturity in the child's resolution of stories.

An initial test of criterion-related validity was

conducted by the authors (Zachary, 1983). In order to affirm the ability of the RATC to discriminate between clinic and nonclinic groups, the RATC was administered to a heterogeneous sample of 200 clinic chidren. A multiple regression was calculated and resulted in a multiple R of .79, which was highly significant, $F(12, 387)=48.53$; $p<.001$. 62% of the variance in group membership was accounted for by the 13 profile scales. In addition, clinic and nonclinic children differed significantly on 12/15 rating variables at the .01 level or better, providing further evidence of the RATC's validity.

Muha (1977) assessed the ability of the RATC to discriminate successfully between clinic and nonclinic families. 10 cards were administered to clinic and nonclinic families. Family functioning was also observed and rated, using a standardized evaluation scale. The RATC protocals were scored on 13 RATC measures. Results indicated that the two groups differed significantly on 8 of the 13 measures. All significant differences were in the expected directions.

McArthur (1976) compared the clinical effectiveness of three projective tests, i.e., the RATC, CAT, and TAT. Stimulus cards from each test were selected and administered to 98 white males ages 8 and 11, who were judged by their teachers to be well-adjusted. Results indicated that the RATC elicited a significantly lower percentage of stereotyped responses than either the CAT or TAT. The author maintained that projective stimuli should elicit a minimum of stereotyped responses and hence the RATC is useful in a manner for which it is intended.

Hersh (1978) investigated the predictive validity of the RATC and obtained mixed results. Subjects included 25 children, ages 6 to 13, referred for psychiatric evaluation. A wide range of presenting complaints were included. Therapeutic change was assessed by comparing children's scores on the RATC and four additional measures pre and post treatment. The four outcome measures were published and unpublished rating scales, filled out by the child's parents or teachers, thus functioning as independent criterion scores against which to measure the validity of the RATC. Results indicated that the children improved over the course of therapy, as assessed both by changes in the children's average scores of the RATC, and by the independent criteria of parent and teachers' ratings. However, the RATC scales did not correlate significantly with the independent ratings of the severity of the children's presenting problems at intake, or the direction and magnitude of changes in individual children as the result of therapy.

APPENDIX C

THE PERSONALITY INVENTORY FOR CHILDREN

PERSONALITY INVENTORY FOR CHILDREN

REVISED FORMAT ADMINISTRATION BOOKLET

by ROBERT D. WIRT, Ph.D.
PHILIP D. SEAT, Ph.D.
WILLIAM E. BROEN, Jr., Ph.D.
Revision by DAVID LACHAR, Ph.D.

Published by

WPS WESTERN PSYCHOLOGICAL SERVICES
Publishers and Distributors
12031 Wilshire Boulevard
Los Angeles, California 90025

This inventory consists of statements about children and family relationships. The inventory items are presented in four parts.

DIRECTIONS: First fill in the information requested on the answer sheet; then read each of the statements in this booklet and decide whether it is *true* or *false* as applied to your child.

Look at the example of the answer sheet shown at the right. In the example the parent decided that statement 25 was true as applied to the child and statement 26 was false as applied to the child.

Section of answer sheet correctly marked

	T	F
25	●	ⓕ
26	ⓣ	●

If a statement is TRUE or MOSTLY TRUE, as applied to your child, use a pencil to blacken the circle labeled T (See 25 in the example). If a statement is FALSE or NOT USUALLY TRUE, as applied to your child, blacken the circle labeled F (See 26 in the example).

In marking your answers on the answer sheet, *be sure that the number of the statement agrees with the number on the answer sheet.* Make your marks heavy and black. Erase completely any answer you wish to change. Do not make any marks on this booklet.

Continue to answer the inventory items unless instructed to stop at the end of Part I, II, or III.

W-152I
2 3 4 5 6 7 8 9
Printed in U.S.A.

DO NOT MAKE ANY MARKS ON THIS BOOKLET

PART I

1. My child often plays with a group of children.
2. My child hardly ever smiles.
3. Other children often get mad at my child.
4. My child worries about things that usually only adults worry about.
5. My child has many friends.
6. My child seems average or above average in intelligence.
7. My child's manners sometimes embarrass me.
8. My child has a good sense of humor.
9. My child sometimes sees things that aren't there.
10. My child is worried about sin.
11. Other children don't seem to listen to or notice my child much.
12. My child sometimes undresses outside.
13. My child has little self-confidence.
14. I often wish my child would be more friendly.
15. My child can comb his (her) own hair.
16. My child is usually rejected by other children.
17. My child seems to enjoy destroying things.
18. Now and then my child writes letters to friends.
19. Thunder and lightning bother my child.
20. The school says my child needs help in getting along with other children.
21. My child often asks if I love him (her).
22. Other children look up to my child as a leader.
23. My child could ride a tricycle by age five years.
24. My child sometimes gets angry.
25. My child frequently complains of being hot even on cold days.
26. My child's behavior often makes others angry.
27. Recently my child has complained of eye trouble.
28. Others think my child is talented.
29. My child frequently has gas on the stomach (sour stomach).
30. My child is good at lying his (her) way out of trouble.
31. My child often cheats other children in deals.
32. My child is good at leading games and things.
33. At one time my child had speech difficulties.
34. Pestering others is a problem with my child.
35. My child can cut things with scissors as well as can others of his (her) age.
36. My child doesn't seem to care to be with others.
37. My child has difficulty doing things with his (her) hands.
38. Others think my child is mean.
39. My child seems to know everyone in the neighborhood.
40. My child would never take advantage of others.
41. My child can be left home alone without danger.
42. My child jumps from one thing to another.
43. My child has been in trouble for attacking others.
44. My child seems too serious minded.
45. My child has more friends than most children.
46. When my child gets mad, watch out.
47. My child really has no real friend.
48. My child is as happy as ever.
49. My child often complains that others don't understand him (her).

GO ON TO THE NEXT PAGE

50. My child has very few friends.
51. My child likes to play active games and sports.
52. Sometimes I worry about my child's lack of concern for others' feelings.
53. Often my child is afraid of little things.
54. My child tends to see how much he (she) can get away with.
55. My child almost never argues.
56. My child often disobeys me.
57. My child likes to show off.
58. Others have said my child has a lot of "personality."
59. My child goes to bed on time without complaining.
60. My child likes to "boss" others around.
61. Reading has been a problem for my child.
62. A scolding is enough to make my child behave.
63. My child sometimes disobeys his (her) parents.
64. My child is in a special class in school (for slow learners).
65. My child usually plays alone.
66. My child sometimes eats too many sweets.
67. My child often brings friends home.
68. My child learned to count things by age six years.
69. My child could print his (her) first name by age six years.
70. My child doesn't seem to learn from mistakes.
71. My child can't seem to wait for things like other children do.
72. My child always does his (her) homework on time.
73. My child is usually a leader in groups.
74. Sometimes my child lies to avoid embarrassment or punishment.
75. Other children make fun of my child's different ideas.
76. Sometimes my child's muscles twitch.
77. My child worries about talking to others.
78. My child first talked before he (she) was two years old.
79. School teachers complain that my child can't sit still.
80. My child has some bad habits.
81. Several times my child has spoken of a lump in his (her) throat.
82. My child frequently has nightmares.
83. My child almost never acts selfishly.
84. My child is usually in good spirits.
85. My child seems fearful of blood.
86. My child seems more clumsy than other children his (her) age.
87. My child will do anything on a dare.
88. My child sometimes becomes envious of the possessions or good fortune of others.
89. Shyness is my child's biggest trouble.
90. Usually my child gets along well with others.
91. My child gets lost easily.
92. My child often has headaches.
93. My child seems to get along with everyone.
94. My child is easily embarrassed.
95. My child is very popular with other children.
96. My child gets confused easily.
97. My child is almost always smiling.
98. My child loses most friends because of his (or her) temper.
99. My child is shy with children his (her) own age.
100. My child was difficult to toilet train.
101. My child wants a lot of attention when sick.

GO ON TO THE NEXT PAGE

102. My child can count change when buying something.

103. My child can tell the time fairly well.

104. Many times my child has become violent.

105. My child can take a bath by him (her) self.

106. Recently my child has complained of chest pains.

107. There is seldom a need to correct or criticize my child.

108. My child has as much pep and energy as most children.

109. Recently the school has sent home notes about my child's bad behavior.

110. Sometimes my child will put off doing a chore.

111. My child often talks about death.

112. My child has been difficult to manage.

113. Sometimes my child's room is messy.

114. My child is usually afraid to meet new people.

115. My child almost never needs punishing or scolding.

116. My child could eat with a fork before age four years.

117. Often my child complains of blurring (blurred vision).

118. My child needs protection from everyday dangers.

119. My child respects the property of others.

120. Frequently my child will put his (her) hands over his (her) ears.

121. Everything has to be perfect or my child isn't satisfied.

122. Spanking doesn't seem to affect my child.

123. My child talks a lot about his (her) size or weight.

124. My child often will cry for no apparent reason.

125. My child will worry a lot before starting something new.

126. My child usually looks at the bright side of things.

127. My child often has crying spells.

128. Sometimes my child gets hot all over without reason.

129. My child seems tired most of the time.

130. Others have remarked how smart my child is.

131. My child takes illness harder than most children.

GO ON TO THE NEXT PAGE
(unless instructed to stop at the end of Part I)

PART II

132. My child tends to pity him (her) self.
133. Others always listen when my child speaks.
134. Several times my child had complaints, but the doctor could find nothing wrong.
135. I often wonder if my child is lonely.
136. Usually my child takes things in stride.
137. My child is likely to take remarks the wrong way.
138. Little things upset my child.
139. My child keeps thoughts to him (her) self.
140. It has been a long time since our family has gone out together.
141. My child has never mentioned his (her) heart racing or pounding.
142. My child has usually been a quiet child.
143. At times my child has seriously hurt others.
144. My child has never had cramps in the legs.
145. At times my child yells out for no reason.
146. My child is liable to scream if disturbed.
147. My child has no special talents.
148. Our family seems to enjoy each other more than most families.
149. My child broods some.
150. My child could do better in school if he (she) tried.
151. My child never liked to be cuddled.
152. Our marriage has been very unstable (shaky).
153. The child's father seems jealous of the child.
154. I am afraid my child might be going insane.
155. My child seldom talks about sickness.
156. My child has had convulsions.
157. My child often gets up at night.
158. Most of my child's friends are younger than he (she) is.
159. There is a lot of swearing at our house.
160. My child never takes the lead in things.
161. My child takes criticism easily.
162. My child sometimes swears at me.
163. My child is not worried about disease.
164. My child seems bored with school.
165. The child's parents are now separated or divorced.
166. My child gets exhausted so easily.
167. I can't get my child to do his (her) school lessons.
168. My child stays close to me when we go out.
169. Often my child goes about wringing his (her) hands.
170. The child's parents have broken up their marriage several times.
171. Sometimes my child runs errands for me.
172. It is not too unlikely that my child will stay in the house for days at a time.
173. My child has had brief periods of time when he (she) seems unaware of everything that is going on.
174. My child has never had face twitchings.
175. My child usually runs rather than walks.
176. My child is different from most children.
177. My child is afraid of dying.
178. My child believes in God.
179. My child doesn't seem to care for fun.
180. Often my child will sleep most of the day on a holiday.
181. My child often stays in his (her) room for hours.
182. My child has never had any paralysis.

GO ON TO THE NEXT PAGE

183. My child seldom breaks rules.

184. How to raise the child has never been a problem at our house.

185. Several times my child has threatened to kill him (her) self.

186. My child usually doesn't trust others.

187. My child has many friends of the opposite sex.

188. My child seems unhappy about our home life.

189. Others often remark how moody my child is.

190. The trouble with my child is a "chip on the shoulder."

191. Nothing seems to scare my child.

192. My child doesn't seem to be interested in practical things.

193. My child can't seem to keep attention on anything.

194. The child's parents are not active in community affairs.

195. My child tends to swallow food without chewing it.

196. My child loves to stay overnight at a friend's house.

197. School has been easy for my child.

198. My child can't sit still in school because of nervousness.

199. I do not approve of most of my child's friends.

200. Constipation has never been a problem for my child.

201. My child is often restless.

202. Several times my child has been in trouble for stealing.

203. My child seldom complains of stomachaches.

204. My child has never failed a grade in school.

205. My child is afraid of strangers.

206. The child's parents can't seem to live within their income.

207. My child loves to work with numbers.

208. My child has never been in trouble with the police.

209. My child seldom visits a doctor.

210. My child's favorite stories are fairy tales or nursery rhymes.

211. The child's father doesn't understand the child.

212. Dizzy spells are no problem with my child.

213. The child's father drinks too much.

214. My child tends to brag.

215. My child would rather be with adults than with children his (her) own age.

216. My child tends to be pretty stubborn.

217. My child seldom talks.

218. Our whole family seldom gets to eat together.

219. Reading is my child's favorite pastime.

220. The child's father usually makes the important decisions at our house.

221. "Bad days" are frequent with my child.

222. My child insists on keeping the light on while sleeping.

223. My child seems to prefer adults to children.

224. My child is dependent on others.

225. My child gets common colds more often than most children.

226. The child's parents disagree a lot about rearing the child.

227. Often my child locks himself (herself) in the bedroom.

228. Often my child will laugh for no apparent reason.

229. My child sometimes skips school.

230. My child is not as strong as most children.

231. Others have remarked how self-confident my child is in a group.

232. Others often remark how sensible my child is.

233. My child seems to understand everything that is said.

GO ON TO THE NEXT PAGE

234. Sometimes the child's father will go away for days after an argument.

235. Money seems to be my child's biggest interest.

236. I have often found my child playing in the toilet.

237. The child's father sometimes gets drunk and mean.

238. My child is a healthy child.

239. My child thinks others are plotting against him (or her).

240. Usually my child plays inside.

241. The child's father seldom misses work.

242. Often my child takes walks alone.

243. The child's parents have set firm rules that must be obeyed.

244. Often my child will wander about aimlessly.

245. Several times my child has threatened to run away.

246. At times my child has difficulty breathing.

247. There is always a lot of argument at our dinner table.

248. My child plays with friends who are often in trouble.

249. My child seldom has nose bleeds.

250. My child has never been expelled from school.

251. My child whines a lot.

252. My child has never run away from home.

253. My child shows unusual talent.

254. Speaking up is no problem for my child.

255. I had an especially difficult time with temper tantrums in my child at an early age.

256. Sharing things has been no problem for my child.

257. The child's parents always discuss important matters before making a decision.

258. My child smokes at home.

259. The child's father frequently "blows up" at the child.

260. My child is shy with adults.

261. I have heard that my child drinks alcohol.

262. My child is rather absent-minded.

263. My child is afraid of the dark.

264. My child boasts about being sent to the principal in school.

265. My child never has fainting spells.

266. The child's father is too strict with the child.

267. My child will never clean his (or her) room.

268. My child is able to keep out of everyday dangers.

269. Most of my child's time is taken up watching television.

270. Frequently my child has a high fever.

271. The child's father is hardly ever home.

272. Sometimes I don't understand what my child means.

273. My child is exceptionally neat and clean.

274. My child speaks of him (her) self as stupid or dumb.

275. There is a lot of tension in our home.

276. Several times my child has threatened to kill others.

277. The child's father spends very little time with the child.

278. My child seldom has back pains.

279. The child's father has very little patience with the child.

280. The child's parents frequently quarrel.

STOP HERE! **GO ON TO THE NEXT PAGE**
(unless instructed to stop at the end of Part II)

Use of the mother as respondent has particular advantages and helps overcome many of the limitations associated with requesting the child to respond to numerous self-report descriptions. Referred children are often non-compliant and hence would not accept a technique requesting them to read and respond to a large number of questions. There are wide differences in verbal comprehension abilities in children that restrict the types and richness of items possible. In addition, the PIC validity scales signal respondent defensiveness or exaggeration. Rather than representing the mother's intentional distortion or the mother's personality, the PIC has established predictive accuracy (Lachar, Kline, & Boersma, in press).

Informant Response Style

Lie Scale (L). This rationally developed scale was constructed to identify a defensive response set in the informant. L reflects the absence or denial of behavior problems. L elevation increases when the respondent intentionally attempts to portray the child as having fewer problems than is actually the case.

Frequency Scale (F). This scale consists of seldom ensorsed items. The F scale obtains extreme elevations for profiles generated by All True, All False, and Random Sort response sets. The F scale also reflects the severity of symptoms.

Defensiveness Scale (DEF). This empirically constructed scale is composed of items that separated mothers judged to be high-defensive from mothers judged to be low-defensive. It reflects fake-good response sets.

General Adjustment

Adjustment Scale (ADJ). This scale is a screening measure to identify children in need of a psychological evaluation and as a general measure of poor psychological adjustment. It was empirically constructed by comparing the items endorsement rates for 600 normal boys 7 to 12 years of age to the item endorsement rates for 200 maladjusted boys 7 to 12 years of age.

The Cognitive Triad

Achievement Scale (ACH). This empirically derived scale identifies children with limited academic abilities, poor achievement, and poor psychological adjustment characterized by impulsivity, limited concentration, over or under assertiveness with peers, and disregard for parental expectations. These children usually possess adequate intellectual capacity.

Intellectual Screening Scale (IS). This scale was empirically constructed to identify children with impaired intellectual functioning. Items were identified by constrasting the protocols of retarded children with normal, nonretarded disturbed, and psychotic children.

Development Scale (DVL). This scale was rationally derived and reflects retarded development in motor coordination, poor school performance, and lack of any special skill or abilities.

Validity

PIC scales were constructed using two methods. An empirical approach involved comparing a group of people without known psychopathology, i.e., "normals," with groups of other persons believed to have certain problems of living, i.e., "criterion" groups. A second approach was the rational method. Here the researchers asked persons knowledgeable in the field to pick items from the total pool which they believed could be related to the disposition under question. Those items for which there was high agreement among the judges made up a scale which was tested using a criterion group to determine if the scale in fact discriminated among groups.

Due to the limitations posed by the task of completion of a 600-item inventory by a parent informant, a Revised Format Manual Supplement and Administratin Booklet were published (Lachar, 1982). The Revised Format Administration Booklet retains all 600 original inventory items, but presents these items in a different order. Completion of the first 280 items of the Revised Format Administration Booklet allows the scoring of the factor scales, validity and screening scales, and the clinical scales.

The shortened profile scales have retained their reliability properties. Both coefficient alpha estimates of internal consistency and three test-retest estimates of temporal consistency suggest that the shortened versions have retained their reliability. In addition, the equivalence of shortened and full-length scales was evaluated (Lachar, 1982). The results again suggest strong concordance between shortened and full scales with a variety of populations. Lachar (1982) concluded that all available evaluations of the shortened profile scales suggest that they provide reliable and valid data regarding child functioning.

APPENDIX D

THE REVISED BEHAVIOR PROBLEM CHECKLIST

Identification Number

POSTSURGERY BEHAVIOR CHECKLIST

Please rate your child's behavior after surgery on the following 89 items. If an item does not constitute a problem or if you have had no opportunity to observe or have no knowledge about the item, circle the zero. If an item constitutes a mild problem, circle the one; if an item constitutes a severe problem, circle the two. Please complete every item and remember to rate your child's behavior only following surgery.

Thank you for your cooperation.

Identification Number

POSTHOSPITALIZATION BEHAVIOR CHECKLIST

Please complete the following two questions.

1. How many nights did your child remain in the hospital?
   Circle One: 1 2 3 4 5 6 7 8 9 10+

2. How many times has your child been admitted overnight to a hospital, including this past hospitalization?
   Circle One: 1 2 3 4+

Please rate your child's behavior since discharge from the hospital on the following 89 items. If an item does not constitute a problem or if you have had no opportunity to observe or have no knowledge about the item, circle the zero. If an item constitutes a mild problem, circle the one; if an item constitutes a severe problem, circle the two. Please complete every item and remember to rate your child's behavior only since discharge from the hospital.

Thank you for your cooperation.

1.	Restless; unable to sit still	0	1	2
2.	Seeks attention; "shows-off"	0	1	2
3.	Stays out late at night	0	1	2
4.	Self-conscious; easily embarrassed	0	1	2
5.	Disruptive; annoys and bothers others	0	1	2
6.	Feels inferior	0	1	2
7.	Steals in company with others	0	1	2
8.	Preoccupied; "in a world of his own;" stares into space	0	1	2
9.	Shy, bashful	0	1	2
10.	Withdraws; prefers solitary activities	0	1	2
11.	Belongs to a gang	0	1	2
12.	Repetitive speech; says same thing over and over	0	1	2
13.	Short attention span; poor concentration	0	1	2
14.	Lacks self-confidence	0	1	2
15.	Inattentive to what others say	0	1	2
16.	Incoherent speech, what is said doesn't make sense	0	1	2
17.	Fights	0	1	2
18.	Loyal to delinquent friends	0	1	2
19.	Has temper tantrums	0	1	2
20.	Truant from school, usually in company with others	0	1	2
21.	Hypersensitive; feelings are easily hurt	0	1	2
22.	Generally fearful; anxious	0	1	2
23.	Irresponsible, undependable	0	1	2
24.	Has "bad" companions, ones who are always in some kind of trouble	0	1	2
25.	Tense, unable to relax	0	1	2
26.	Disobedient; difficult to control	0	1	2
27.	Depressed; always sad	0	1	2
28.	Uncooperative in group situations	0	1	2
29.	Passive, suggestible; easily led by others	0	1	2
30.	Hyperactive; "always on the go"	0	1	2
31.	Distractible; easily diverted from the task at hand	0	1	2
32.	Destructive in regard to own and/or other's property	0	1	2
33.	Negative; tends to do the opposite of what is requested	0	1	2
34.	Impertinent; talks back	0	1	2
35.	Sluggish, slow moving, lethargic	0	1	2
36.	Drowsy; not "wide awake"	0	1	2
37.	Nervous, jittery, jumpy; easily startled	0	1	2
38.	Irritable, hot-tempered; easily angered	0	1	2
39.	Expresses strange, far-fetched ideas	0	1	2
40.	Argues; quarrels	0	1	2
41.	Sulks and pouts	0	1	2
42.	Persists and nags; can't take "no" for an answer	0	1	2
43.	Avoids looking others in the eye	0	1	2
44.	Answers without stopping to think	0	1	2
45.	Unable to work independently; needs constant help and attention	0	1	2
46.	Uses drugs in company with others	0	1	2
47.	Impulsive; starts before understanding what to do; doesn't stop and think	0	1	2
48.	Chews on inedible things	0	1	2
49.	Tries to dominate others; bullies, threatens	0	1	2
50.	Picks at other children as a way of getting their attention; seems to want to relate but doesn't know how	0	1	2
51.	Steals from people outside the home	0	1	2

(please go on to next page)

52.	Expresses beliefs that are clearly untrue (delusions)	0	1	2
53.	Says nobody loves him or her	0	1	2
54.	Freely admits disrespect for moral values and laws	0	1	2
55.	Brags and boasts	0	1	2
56.	Slow and not accurate in doing things	0	1	2
57.	Shows little interest in things around him or her	0	1	2
58.	Does not finish things; gives up easily; lacks perseverance	0	1	2
59.	Is part of a group that rejects school activities such as team sports, clubs, projects to help others	0	1	2
60.	Cheats	0	1	2
61.	Seeks company of older, "more experienced" companions	0	1	2
62.	Knows what's going on but is listless and uninterested	0	1	2
63.	Resists leaving mother's (or other caretaker's) side	0	1	2
64.	Difficulty in making choices; can't make up mind	0	1	2
65.	Teases others	0	1	2
66.	Absentminded; forgets simple things easily	0	1	2
67.	Acts like he or she were much younger; immature, "childish"	0	1	2
68.	Has trouble following directions	0	1	2
69.	Will lie to protect his friends	0	1	2
70.	Afraid to try new things for fear of failure	0	1	2
71.	Selfish; won't share; always takes the biggest piece	0	1	2
72.	Uses alcohol in company with others	0	1	2
73.	School work is messy, sloppy	0	1	2
74.	Does not respond to praise from adults	0	1	2
75.	Not liked by others; is a "loner" because of aggressive behavior	0	1	2
76.	Does not use language to communicate	0	1	2
77.	Cannot stand to wait; wants everything right now	0	1	2
78.	Refuses to take directions, won't do as told	0	1	2
79.	Blames others; denies own mistakes	0	1	2
80.	Admires and seeks to associate with "rougher" peers	0	1	2
81.	Punishment doesn't affect his or her behavior	0	1	2
82.	Squirms, fidgets	0	1	2
83.	Deliberately cruel to others	0	1	2
84.	Feels he or she can't succeed	0	1	2
85.	Tells imaginary things as though true; unable to tell real from imagined	0	1	2
86.	Does not hug and kiss members of family; affectionless	0	1	2
87.	Runs away; is truant from home	0	1	2
88.	Openly admires people who operate outside the law	0	1	2
89.	Repeats what is said to him or her; "parrots" others' speech	0	1	2

	CD	SA	AP	AW	PB	ME
Raw Score	_____	_____	_____	_____	_____	_____
T Score	_____	_____	_____	_____	_____	_____

RBPC Subscales

Conduct Disorder (CD). The CD subscale represents a dimension of aggressive, noncomplaint, quarrelsome, interpersonally aliented, acting-out behavior. It is also linked with noncompliance with a medial regimen, lower level of moral reasoning, and attribution of hostility to others.

Socialized Aggressive Disorder (SA). The SA subscale also represents a dimension of acting-out, externalizing behavior. However, unbridled agressiveness and interpersonal alienation are not present. There are strong bonds with others, socialized delinquency, greater susceptibility to peer influence, without cognitive deficits.

Attention Problems (AP). The subscale reflects problems in concentration, perseverance, impulsivity, and direction-following which leds to a deficient ability to come to grips with the demands of both home and school.

Anxiety-Withdrawal (AW). This subscale represents the internalizing dimension of disorder which subsumes such characteristics as anxiety, depression, fear of failure, social inferiority, and self-concern, reflecting subjective distress.

Psychotic Behavior (PB). The PB scale is comprised both of items that are clearly related to overt psychosis, and items related to language dysfunction.

Motor-Tension Excess (ME). ME involes both gross motor behaviors and apparent motoric tension.

LIST OF REFERENCES

LIST OF REFERENCES

Achenbach, T. M. (1974). Developmental psychopathology. New York: The Ronald Press Co.

Alloy, L. B., & Abramson, L. Y. (1979). Judgment of contingency in depressed and nondepressed students: Sadder but wiser? Journal of Experimental Psychology: General, 108, 441-485.

Anthony, E.J. (1974). The syndrome of the psychologically invulnerable child. In E. J. Anthony & C. Koupernik (Eds.), The child in his family: Children at psychiatric risk. New York: Wiley.

Appley, M. H., & Trumbull, R. (1977). On the concept of psychological stress. In A. Monat & R. S. Lazarus, (Eds.), Stress and Coping. An anthology. New York: Columbia University Press.

Arnstein, H. S. (1960). What to tell your child about birth, death, illness, divorce, and other family crises. New York: Bobbs-Merrill.

Barnes, C. M., Kenny, F. M., Call, T., & Reinhart, J. B. (1972). Measurement of anxiety in children for open heart surgery. Pediatrics, 49, 250-259.

Baumrind, D. (1969). Authoritarian vs. authoritative parental control. Adolescence, 3, 256-261.

Bellotti, M. J. (1983). An investigation of two theoretical constructs of stress: The effects of stress appraisal and stress accumulation on psychological adjustment. (Doctoral dissertation, University of Conneticut, 1982). Dissertation Abstracts International, 44, 601B.

Billings, A.G., & Moos, R. H. (1982). Stressful life events and symtomes: A longitudinal model. Health Psychology, 1, 99-117.

Blom, G. E. (1958). The reactions of hospitalized children to illness. Pediatrics, 22, 590-599.

Blom, G. E. (1984). Children who cope: Some implications for intervention and prevention. In Boger, R. P., Blom, G. E., & Lezotte, L. E. (Eds.), Child nurturing in the 1980's. New York: Plenum Press.

Blotcky, M. J., & Grossman, I. (1978). Psychological

implications of childhood genitourinary surgery. Journal of the American Academy of Child Psychiatry, 17, 448-45.

Borg, W. R., & Gall, M. D. (1979). Educational Research. Third Edition. New York: Longman Inc.

Bronheim, S. M. (1982). Familiarity, behavioral modeling and affect-arousal as related to children's coping with stress. (Doctoral dissertation, Catholic University of America, 1981). Dissertation Abstracts International, 43, 1247B.

Burstein, S., & Meichenbaum, D. (1979). The work of worrying in children undergoing surgery. Journal of Abnormal Child Psychology, 7, 121-132.

Chamberlain, D. C. (1980). Sources of stress, psychological structure, and coping response. (Doctoral dissertation, Indiana University, 1979). Dissertation Abstracts International, 40, 3459B.

Chandler, L. A. (1982). Children under stress: Understanding emotional adjustment reactions. Springfield, Il: Chas. Thomas.

Chandler, L. A., & Lundahl, W. T. (1983). Empirical classification of emotional adjustment reactions. American Journal of Orthopsychiatry, 53, 460-467.

Coddington, R. D. (1972). The significance of life events as etiological factors in diseases of children. Journal of Psychosomatic Research, 16, 7-18.

Cohen, F. C., & Lazarus, R. S. (1973). Active coping processes, coping dispositions, and recovery from surgery. Psychosomatic Medicine, 35, 375-389.

Cook, R. E. (1967). Effects of hospitalization upon the child. In J. A. Haller, (Ed.), The hospitalized child and his family. Baltimore: Johns Hopkins Press.

Curry, S. L., & Russ. S. (1985). Identifying coping strategies in children. Journal of Clinical Child Psychology, 14, 61-69.

Davenport, H. T., & Werry, J. S. (1970). The effect of general anesthesia, surgery, and hospitalization upon the behavior of children. American Journal of Orthopsychiatry, 40, 806-811.

Dohrenwend, B. S., & Dohrenwend, B. P. (1980). What is a

stressful life event? In H. Selye (Ed.), Guide to stress research. New York: Van Nostrand Reinhold.

Endler, N. S., & Magnusson, D. (1976). Toward an interactional psychology of personality. Psychological Bulletin, 83, 956-974.

Fleming, R. (1980). Toward an integrative approach to the study of stress. Journal of Personality and Social Psychology, 46, 939-949.

Fluger, I. (1981). Two cognitive coping strategies and arousal reduction in field dependent-independent males. (Doctoral dissertation, University of Kansas, 1980). Dissertation Abstracts International, 42, 1007A.

Garmezy, N. (1976). Vulnerable and invulnerable children. Theory, research, and intervention. Unpublished manuscript #337, University of Minnesota, Minneapolis.

Garmezy, N. (1981). Children under stress: Perspectives on antecedants and correlates of vulnerability and resistance to psychopathology. In I. A. Rabin, J. Aronoff, A. M. Barclay, & R. A. Zucker (Eds.), Further explorations in personality. New York: Wiley.

Garmezy, N. (1983). Stressors of childhood. In N. Garmezy & M. Rutter (Eds.), Stress, coping, and development in children. New York: McGraw Hill.

Ginsburg, H., & Opper, S. (1979). Piaget's theory of intellectual development. Englewood Cliffs, NJ: Prentice-Hall.

Goggin, E. L., Lansky, S. B., & Hassanein, K. (1976). Psychological reactions of children with malignancies. Journal of the American Academy of Child Psychiatry, 15, 314-325.

Glass, G. V., & Stanley, J. C. (1970). Statistical methods in education and psychology. Englewood Cliffs, NJ: Prentice-Hall.

Goldstein, M. J. (1973). Individual differences in response to stress. American Journal of Community Psychology, 1, 113-137.

Haan, N. (1977). Coping and defending. Processes of self- environment organization. New York: Academic Press.

Hefferin, E. A. (1982). Life-cycle stressor. An overview of research. In D. C. Sutterley & G. F. Donnelly (Eds.), Coping with stress. A nursing perspective. Aspen Systems Corp.

Hersh, J. A. (1978). A concurrent validation of the Roberts Apperception Test as a measure of the therapeutic progress of children. (Doctoral dissertation, California School of Professional Psychology, 1978). Dissertation Abstracts International, 39, 4032-B.

Holmes, T. H., & Rahe, R. H. (1967). The social readjustment rating scale. Journal of Psychosomatic Research, 11, 213-218.

Humphrey, J. H., & Humphrey, J. N. (1981). Reducing stress in children through creative relaxation. New York: Charles Thomas.

Hyson, M. C. (1983). Going to the doctor: A developmental study of stress and coping. Journal of Child Psychology and Psychiatry, 24, 247-259.

Ilfeld, F. W. (1980). Coping styles of Chicago adults: Description. Journal of Human Stress, 1, 2-10.

Isaac, S., & Michael, W. B. (1971). Handbook in research and evaluation. New York: Robert R. Knapp.

Jemmott, J.B., & Locke, S. E. (1984). Psychosocial factors, immunologic mediation, and human susceptibility to infectious diseases: How much do we know? Psychological Bulletin, 95, 78-108.

Johnson, J. H. (1982). Life events as stressors in childhood and adolescence. In B. Lahey & A. Kazdin (Eds.), Advances in clinical child psychology: Vol. 5, 219-253.

Kagan, J. (1983). Stress and coping in early development. In N. Garmezy & M. Rutter (Eds.), Stress, coping, and development in children. New York: McGraw Hill.

Kalb, R. C. (1977). The effects of the cognitive control of leveling-sharpening on the response of children to stress. (Doctoral dissertation, Fordham University, 1976). Dissertation Abstracts International, 38, 1884-1885B.

Kania, M. E. (1979). Identification of resource variables serving to moderate life events and concomitant life satisfaction of elementary age

children. (Doctoral dissertation, The University of Utah, 1978). Dissertation Abstracts International, 40, 2370B.

Kashani, J. H., Venzke, R. & Millar (1981). Depression in children admitted to hospital for orthopedic procedures. British Journal of Psychiatry, 138, 21-25.

Kliman, G. (1968). Psychological emergencies of childhood. New York: Grune & Stratton.

Knight, R. B., Atkins, A., Eagle, C. T., Evans, N., Finkelstein, J. W., Fukushima, D., Katz, D., & Weiner, H. (1979). Psychological stress, ego defenses, and cortisol production in children hospitalized for elective surgery. Psychosomatic Medicine, 41, 40-49.

Lachar, D. (1982). Personality Inventory for Children (PIC) revised format manual supplement. Los Angeles: Western Psychological Services. (W-152GS).

Lachar, D., & Gdowski, C. L. (1979). Actuarial Assessment of child and adolescent personality: An interpretive guide for the Personality Inventory for Children. Los Angeles: Western Psychological Services.

Lachar, D., Kline, R. B., & Boersma, D. C. (in press). The Personality Inventory for Children: Approaches to actuarial interpretation in clinic and school settings. In H. M. Knoff (Ed.), The psychological assessment of child and adolescent personality. New York: Guilford Press.

Lambert, S. A. (1984). Variables tht afffect the school-age child's reaction to hospitalization and surgery: A review of the literature. Maternal-Child Nursing Journal, 13, 1-18.

Laux, L., & Vossel, G. (1982). Paradigms in stress research: Laboratory versus field and traits versus processes. In L. Goldberger and S. Breznitz (Eds.), Handbook of stress. New York: The Free Press.

Lazarus, R. S. (1966). Psychological stress and the coping process. New York: McGraw Hill.

Lazarus, R. S. (1977). Cognitive and coping processes in emotion. In A. Monat & R. S. Lazarus (Eds.), Stress and coping. An anthology. New York: Columbia University Press.

Lazarus, R. S., Cohen, J. B., Folkman, S., Kanner, A., & Schaefer, C. (1980). Psychological stress and adaptation: Some unresolved issues. In H. Selye (Ed.), Guide to stress research. New York: Van Nostrand Reinhold Co.

Lazarus, R. S., DeLongis, A., Folkman, S., & Gruen, R. (1985). Stress and adaptational outcomes: The problem of confounded measures. American Psychologist, 40, 770-779.

Lazarus, R. S., & Folkman, S. (1984). Stress, appraisal, and coping. New York: Springer Publishing Co.

Lazarus, R. S., & Launier, R. (1978). Stress related transactions between person and environment. In L. A. Pervin & M. Lewis (Eds.), Perspectives in interactional psychology. New York: Plenum Press.

Lefcourt, H. M., Martin, R. A., & Salch, W. E. (1984). Locus of control and social support: Interactive moderators of stress. Journal of Personality and Social Psychology, 47, 378-389.

Levine, M. D., Carey, W. B., Crocker, A. C., & Gross, R. T. (1983). Developmental behavioral pediatrics. Philadelphia: W.B. Saunders Co.

Maccoby, E. E. (1983). Social-emotional development and response to stressors. In L. Goldberger & S. Breznitz (Eds.), Handbook of stress. New York: The Free Press.

Magnusson, D. (1982). Situational determinants of stress: An interactional perspective. In L. Goldberger & S. Breznitz (Eds.), Handbook of stress. New York: The Free Press.

Masten, A. S. (1983). Humor and creative thinking in stress-resistant children. (Doctoral dissertation, University of Minnesota, 1982). Dissertation Abstracts International, 43, 3737B.

McArthur, D. (1976). A comparison of the stimulus influence of three thematic projective thechnques with children. (Doctoral dissertation, California School of Professional Psychology, 1975). Dissertation Abstracts International, 37, 4693B.

McArthur, D. S., & Roberts, G. E. (1982). Roberts Apperception Test for Children. Manual. Los Angeles: Western Psychological Services.

McNamee, A. S. (Ed.), (1982). Helping children cope. Association for Education International.

Melamed, B. G., Robbins, R. L., & Graves, S. (1982). Preparation for surgery and medical procedures. In D. C. Russo & J. W. Varni (Eds.), Behavioral pediatrics: Research and Practice. New York: Plenum Press.

Milgram, N. A. (1982). War related stress in Israeli children and youth. In L. Goldberger & S. Breznitz (Eds.), The handbook of stress. New York: The Free Press.

Monat, A. & Lazarus, R. S. (1977). Stress and coping. An anthology. New York: Columbia University Press.

Moos, R. H. (1974). Psychological techniques in the assessment of adaptative behavior. In G. V. Coelho, D. A. Hamburg, & J. E. Adams (Eds.), Coping and adaptation. New York: Basic Books.

Moos, R. H., & Billings, A. G. (1982). Conceptualizing and measuring coping resources and processes. In L. Goldberger & S. Breznitz (Eds.), Handbook of stress. New York: The Free Press.

Moos, R. H., & Tsu, V. D. (1977). The crisis of physical illness: An overview. In R. H. Moos (Ed.), Coping with physical illness. New York: Plenum Press.

Mueller, D., Edwards, D., & Yarvis, R. (1977). Stressful life events and psychiatric symptomatology: Change or undersirability? Journal of Health and Social Behavior, 18, 307-317.

Muha, T. W. (1977). A validation study of the Roberts Apperception Test as a measure of psychological dysfunction in families. (Doctoral dissertation, California School of professional Psychology, 1976). Dissertation Abstracts International, 38, 5034B.

Nie, N. H., Hull, C. H., Jenkins, J. G., Steinbrenner, K., & Bent, D. H. (1975). Statistical package for the social sciences. New York: McGraw-Hill.

Otero, R. F. (1983). The handling of stressful psychosocial life-events as a function of a hierarchical configural pattern of competence. (Doctoral dissertation, University of Maryland). Dissertation Abstracts International, 43, 4157-4158B.

Pearlin, L. T., & Schooler, C. (1978). The structure of coping. Journal of Health and Social Behavior, 19, 2-21.

Pellegrini, D. S. (1980). The social-cognitive qualities of stress-resistant children. (Doctoral dissertation, University of Minnesota, 1979). Dissertation Abstracts International, 41, 1925-1926B.

Perkins, D. V. (1982). The assessment of stress using life events scales. In L. Goldberger & S. Breznitz (Eds.), The handbook of stress. New York: The Free Press.

Peterson, L., Mori, L., & Carter, P. (1985). The role of the family in children's responses to stressful medical procedures. Journal of Clinical Child Psychology, 14, 98-104.

Prugh, D. G., & Eckhardt, L. O. (1980). Children's reactions to illness, hospitalization, and surgery. In H. I. Kaplan, A. M. Freedman, & A. J. Sadock (Eds.), Comprehensive textbook of psychiatry, III. New York: Williams & Williams, Co.

Prugh, D. G., & Jordan, K. (1975). Physical illness or injury: The hospital as a source of emotional disturbances in children and family. New York: Brunner/Mazel.

Quay, H. C., & Peterson, D. R. (1983). Interim Manual for the Revised Behavior Problem Checklist. University of Miami: Coral Gables.

Quay, H. C., & Werry, J. S. (1979). Psychopathological disorders of childhood. New York: John Wiley & Sons.

Raney, R. B., Brashear, H. R., & Shands, A. R. (1971). Shand's handbook of orthopedic surgery. St. Louis: C.V. Mosby.

Ray, C., & Fitzgibbon, G. (1981). Stress arousal and coping with surgery. Psychological Medicine, 11, 741-746.

Rie, H. E., Broverman, H., Grossman, B. J., & Olga, N. (1968). Immediate and long-term effects of interventions early in prolonged hospitalization. Pediatrics, 41, 755-764.

Roid, G. H. (1983, March). Dimensions of child personality and psychopathology. Factor structure

of the Roberts Apperception Test for Children. Paper presented at the meeting of the National Association of School Psychologists, Detroit, MI.

Rutter, M. (1979). Protective factors in children's responses to stress and disadvantage. In M. W. Kent, & J. E. Rolf (Eds.), Primary prevention of psychopathology: Social competence in children (Vol. 3). Hanover: University of New England.

Rutter, M. (1983). Stress, coping, and development: Some issues and some questions. In N. Garmezy & M. Rutter (Eds.), Stress, coping, and development in children. New York: McGraw Hill.

Sarason, I. G., & Sarason, B. R. (1981). The importance of cognition and moderator variables in stress. In D. Magnusson (Ed.), Toward a psychology of situations: An interactional perspective. Hillsdale, NJ: Lawrence Erlbaum.

Scott, D. W., Oberst, M. T., & Dropkin, M. J. (1982). A stress and coping model. In D. C. Suterley & G. F. Donnelly (Eds.), Coping with stress. A nursing perspective. Rockville, MD: Aspen Systems

Seal, S. R. (1973). Psychophysiological reactivity of coping and cognitive styles in children. (Doctoral dissertation, McGill University, 1972). Dissertation Abstracts International, 34, 884B.

Selye, H. (Ed.). (1976). Guide to stress research. New York: Van Nostrand Reinhold Co.

Shapiro, F. I. (1973). Cognitive controls and adaptation in children. (Doctoral dissertation, Boston College, 1972). Dissertation Abstracts International, 33, 5026-5077B.

Shure, M. B. (1981). Social competence as a problem-solving skill. In J. Wine & M. Syme (Eds.), Social competence. New York: Guilford Press.

Skipper, J. K., & Leonard, R. C. (1968). Children, stress, and hospitalization: A field experiment. Journal of Health and Social Behavior, 9, 275-287.

Spielberger, C. D., Auerbach, S. M., Wadsworth, A. P., Dunn, T. M., & Taulbee, E. S. (1973). Emotional reactions to surgery. Journal of Consulting and Clinical Psychology, 40, 33-38.

Spivack, G., Platt, J. J., & Shure, M. B. (1976). The problem-solving approach to adjustment: A guide to

research and intervention. San Francisco: Jossey-Bass.

Sturmer, R. A., & Rothbaum, F. (1980). The effects of stress on children's human figure drawings. Journal of Clinical Psychology, 36, 324-331.

Sutterly, D. C. & Donnelly, G. F. (Eds.). (1982). Coping with stress. A nursing perspective. Rockville, MD: Aspen Sytems Corporation.

Taylor, S. E. (1983). Adjustment to threatening events: A theory of cognitive adaptation. American Psychologist, 38, 1161-1173.

Thompson, R. J. (1981). Enhancing coping with the stress of chronic illness: A heuristic review. Psychological Documents, MS 2298. American Psychological Association.

Turkington, C. (1984, April). Israeli researcher finds hope eases stress, affects outcome. APA Monitor, p. 18.

Vaillant, G. E. (1977). Adaptation to life. Boston: Little, Brown.

Vernon, D. T. A., & Bigelow, D. A. (1974). Effect of information about a potentially stressful situation on responses to stress impact. Journal of Personality and Social Psychology, 29, 50-59.

Vernon, D. T. A., Foley, J. M., Sipowicz, R. R., & Schulman, J. L. (1965). The psychological responses of children to hospitalization and illness. Springfield, IL: Chas. C. Thomas.

Vernon, D. T., & Schulman, J. L. (1964). Hospitalization as a source of psychological benefit to children. Pediatrics, 34, 694-696.

Vernon, D. T. A., Schulman, J. L., & Foley, J. M. (1966). Changes in children's behavior after hospitalization: Some dimensions of response and their correlates. American Journal of Diseases of Children, 111, 581-593.

White, R.W. (1976). Strategies of adaptation. In R. H. Moos (Ed.), Human adaptation. Lexington, MA: D. C. Heath.

Wilcox, B. L. (1979). Life event recency and social support as mediators of the relationship between stressful life events and psychological adjustment.

(Doctoral dissertation, University of Texas at Austin, 1978). Dissertation Abstracts International, 40, 1390-1391B.

Willis, D. J., Elliot, C. H., & Jay, S. M. (1982). Psychological effects of physical illness and its concomitants. In J. M. Tuma (Ed.), Handbook for the practice of pediatric psychology. New York: Wiley.

Wirt, R. D., & Lachar, D. (1981). The Personality Inventory for Children. In P. McReynolds (Ed.), Advances in psychological assessment. Vol. 5. San Francisco: Jossey-Bass.

Wirt, R. D., Lachar, D., Klinedinst, J. K., & Seat, P, D. (1977). Multidimensional description of child personality: A manual for the Personality Inventory for Children. Los Angeles: Western Psychological Services.

Wolff, S. (1973). Children under stress. Harmondsworth: Penguin Books, Ltd.

Wright, L., Schaefer, A., & Solomons, G. (1979). Encyclopedia of pediatric psychology. University Park Press.

Wrubel, J., Benner, P., & Lazarus, R. S. (1981). Social competence from the perspective of stress and coping. In J. Wine & M. Syme (Eds.), Social competence. New York: Guilford Press.

Youssef, M. M. (1981). Self-control behaviors of school-aged children who are hospitalized for cardiac diagnostic procedures. Maternal-Child Nursing Journal, 10, 219-271.

Zachary, R. A. (1983, March). A comparison of well-adjusted and clinic children's thematic responses to the Roberts Apperception Test for Children. Paper presented at the meeting of the National Association of School Psychologists, Detroit, MI

Zeiss, A. M. (1980). Aversiveness versus change in the assessment of life stress. Journal of Psychosomatic Research, 24, 15-19.

Zeltzer, L., Kellerman, J., Ellenger, L., & Rigler, D. (1980). Psychologic effects of illness in adolescence. II. Impact of illness in adolescents-crucial issues and coping styles. The Journal of Pediatrics, 97, 132-138.