THE EFFECTS OF DEPLOYMENT ON A CHILD'S ACADEMIC AND BEHAVIORAL FUNCTIONING

by

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ABSTRACT

The Effects of Deployment on a Child's Academic and Behavioral Functioning

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Potential disruption of family life due to a military deployment is a significant concern of U.S. armed forces, as well as to service members. In addition to the effects of parental absence, periods immediately surrounding the military family member's deployment and return may have deleterious effects on children. This study proposed a 7-phase definition of the cycle of deployment, and suggested that strain on the family due to the cycle could be grouped into four levels. A sample of 201 families with fathers in the Navy and children ages 5 to 12 supplied information on deployment, family functioning (FACES IV), family stress levels (Perceived Stress Scale), family coping skills (F-COPES), and child behaviors (Devereux scales). Current and prior reading and math grades and teachers' ratings of the child were also obtained. Greater deployment strain and poorer family functioning were associated with poorer child behavioral and academic performance and greater family stress. Predictors interacted such that child problems occurred primarily when deployment strain was combined with poor family functioning or coping skills. The negative effects were substantial in real-

world terms; up to 1/3 *SD* on the Devereux-Parent or a difference in reading grades of B+ to B-. It was demonstrated that the deleterious effects of deployment were mainly due to increased family stress, and not simply parental absence. Reading grades were much more sensitive to stressors than math grades. Age and gender of the child had minimal effects. Results suggested that deployment strain can have serious adverse consequences for children, but that healthy family functioning and/or coping skills largely mitigate these effects.

To all the Military Children who never cease to amaze me
with their love, support, and resilience.

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Table of Contents

TABLE OF TABLES

TABLE OF FIGURES

CHAPTER I

INTRODUCTION

The American Psychological Association's Presidential Task Force on Military Deployment Services for Youth, Families and Service Members (APA Task Force, 2007) was created in response to the lack of current research on the effects of deployments and military families. This task force notes that there are significant gaps in our understanding of the psychological and social effects of deployment on military personnel and their families, especially deployment to the war zones of the Global War on Terrorism. There have been relatively few studies of the effects of military deployment on the family, especially in recent decades. These studies have reported mixed findings, with some showing negative effects on children (Huebner, Mancini, Wilcox, Grass, & Grass, 2007; Pierce, 1978), others no effects (McIntire & Drummond, 1978), and some a few positive effects (Gabower, 1960; Kersey, 1981; Pedersen, 1960). Further, since most of these studies were conducted, there have been significant changes in who makes up the U.S. military personnel.

With the adoption of the All-Volunteer Force the marital status of American military personnel changed dramatically. Rather than being comprised primarily of single military members, by 1973 51% of the active duty forces were married (Martin & McClure, 2000). In 2005, 55.1 % of active duty personnel were married. Family members now outnumber active duty members. The most recent available demographic information indicates there are now 1,387,674 (42.2%) military members and 1,897,913 (57.8%) family members of active duty personnel. The majority of the family members (1,195,498) are children ages birth to 23 years (ICF International, 2008).

Since 1973, the military services have acknowledged that family factors influence the retention decision-making process of military members. In the 1980's, the American military began to show considerable interest in the family functioning of military families, for example, the United States Army named 1984 "The Year of the Military Child" and 1985 "The Year of the Military Family" (Jensen et al., 1985). As a result of the increasing proportion of members with family responsibilities (Bowen & Orthner, 1989) as well as the shift in values for military members to balance and prioritize family and work goals (Bowen, 1985), the American military has come to recognize the interrelationship among personal and family well-being, recruitment and retention efforts, and job productivity and satisfaction (Hunter, 1982).

Families in the military are mostly made up of married personnel. These married military members (70.1% officers, and 52.2% enlisted) usually have two children who are born and raised into adolescence during a member's typical 20 year professional military career (ICF International, 2008). These military families are characterized by frequent relocations, a life of constant change, numerous and prolonged separations due to deployments, hazardous assignments, and recalls to duty at a moment's notice (Finlayson, 1969).

One factor that may adversely affect military families is military deployment. Since the beginning of the Global War on Terrorism as a result of September 11, 2001, American military personnel and their families have endured multiple separations from each other. In response to war efforts, approximately 1.5 million military members have been deployed with one-third of these troops having been sent two or more times to a combat area. Of these troops, 70,000 have been deployed three times, and 20,000 served

at least five deployments. At the time of a report by the American Psychological Association's Presidential Task Force on Military Deployment Services for Youth, Families and Service Members (2007), there were 700,000 children in the U.S. with at least one parent currently deployed.

In general, military families are always in one of four stages of deployment: (a) predeployment (the family and military member are anticipating a major deployment within 90 days), (b) the military member is deployed (currently away from home on assignment), (c) the family and military member are reunited (returned from a major deployment within 90 days), or (d) the military member is not deployed and is not scheduled to leave for a deployment within 90 days) (Eastman, Archer, & Ball, 1990). All stages bring about changes to the functioning of the family system, and the periods of separation resulting from deployment are significant sources of stress in the military family (Bowen, 1985; Eastman, Archer, & Ball, 1990; Jensen, Lewis, & Xenakis, 1986; Nice, 1983).

The Emotional Cycle of Deployment first proposed by Logan (1987), and subsequently revised by Pincus, House, Christensen, and Adler (2001), describes some of the stressors and emotions experienced by the military family during deployment stages, including (a) the apprehension of an impending departure (e.g., Hiew, 1992), (b) an increase in caretaking and household responsibilities for the family members at home (e.g., Black, 1993), (c) the loss of emotional support (e.g., Bey & Lange, 1974), and (d) the readjustment of roles upon reunion (e.g., Amen, Jellen, Merves, & Lee, 1988). An exhaustive review of the literature suggests that few studies have empirically examined the factors that affect the way each family copes with these stressors.

Families are a fundamental unit of social behavior. Across all cultures, they are the principal means through which men and women connect and children are helped through the long process of learning to function on their own. Families impact virtually all other human activities (Nock, 1992). The field of family systems theory has emerged as a useful tool for understanding and studying families.

Family systems theory describes the interactive and reciprocal nature of family behavior (Montgomery & Fewer, 1988). In particular, Minuchin's (1974) approach to family systems theory emphasizes family structure where the ideal structure allows each family member to have a sense of belonging and separateness, both of which are necessary for healthy functioning. It is also important for the family to be able to adapt to different circumstances as a way to enhance the growth of its members (Minuchin, Baker, Rosman, Liebman & Todd, 1975). Because of the interrelatedness of a family system, in order to maintain healthy family functioning, a change in the behavior of one family member should result in a corresponding change in another family member (Minuchin & Fishman, 1981).

Family functioning is associated with the emotional development of children. Family structure, which refers to the makeup of the family (e.g., mother, father, brother, sister) in which a child lives, is associated with adaptation in children. A family with both a biological mother and father living together with their children is associated with the lowest risk of maladaptation in children (Cuffe, McKeown, Addy, & Garrison, 2005).

Military deployments with the departure and return of the military parent and spouse lead to changes in family structure and likely lead to increased stress. Family cohesion and adaptability are two variables that may help to immunize families against

stress (Eastman, Archer, and Ball (1990). Given the fact that family structure has been found to be associated with adaptation in children (Cuffe et al., 2005), the present study reported on below focused on the cohesiveness and adaptability of the family system and their role in mediating the stress of military-induced separations and the impact of family structure on children's adaptation. An exhaustive review of the literature suggests that almost no research to date has examined the effects of deployment on the child from a family systems perspective. Previous studies that have examined this issue relied on author-designed questionnaires and often categorized deployment stage as deployed versus not deployed.

Overview and Goals of the Study

This study contributes to the limited knowledge about the relationship between family functioning and military-induced separations as they affect children's behavioral and academic performance. A family systems approach was used to measure family functioning. The study examined (a) the relationship between deployment and the outcome measures of children's behavioral and academic performance and family stress, (b) the relationship between family functioning and the outcome measures, (c) the interaction between deployment and family functioning, and (d) whether the adverse effects of unhealthy family functioning and deployment were mediated by family stress.

The American Psychological Association's Presidential Task Force on Military Deployment Services for Youth, Families and Service Members (2007) noted that the lack of a consistent theoretical foundation in the research has hindered communication and the development of a unified explanation of effects of deployment on military families. Without a consistent foundation, it is difficult to determine whether findings by

different researchers are measuring the same effects of deployment. This research studied family functioning using the Circumplex Model (Olson, Sprenkle, & Russell, 1979) as a way to identify family structure, and rather than relying on author-designed questionnaires as has been the case in previous literature, this study used a valid measure of family functioning, that is, the Family Adaptability and Cohesion Scales (FACES IV; Olson et al., 1979). In addition, this research proposed a model of deployment phases following those of Logan (1987) and Pincus et al. (2001). This study obtained dates of deployment/ expected return, etc., to determine at what points in time there tended to be peaks in children's indices of behavioral or academic problems that reflected the effects of deployment.

Previous studies have varied greatly in their designs, measures, and populations; consequently, there is not a cohesive body of research. Further, it has been difficult to understand the impact of deployment on children because in previous research, various factors have not been controlled, for example, age and gender of the child, gender of the deployed individual, deployment area, etc. Therefore, both main effects and interaction effects found in this study differed from those found in earlier studies. This study measured and accounted for a number of potential intervening and moderating variables in an attempt to provide a clearer picture of the relationship between deployment and children's behavior, and contributes to the literature because this study reflects the current military family environment.

CHAPTER II

LITERATURE REVIEW

This literature review examines both theoretical and research literature that is useful for understanding military families and deployments. Three theoretical models, Family Systems Theory, Stress and Coping, and the Emotional Cycle of Deployment are explained and research literature where applicable is detailed. The relationship among the three models and military families and deployments is discussed. The roles of family functioning, stress and coping as they are related to a child's behavior and academics as a result of a military deployment are reviewed.

Theories of Families and Stress

A Systems Approach to Families

It is important for researchers and clinicians to have a unified, consistent theoretical model of family systems to guide research and practice. Such a model provides a conceptual framework that organizes complex, multidimensional levels of information about the etiology and maintenance of problems, linking basic scientific knowledge about a families' psychopathology to interventions that are empirically-based. Further, researchers and clinicians can build upon that conceptual framework so that research can be organized and new treatments developed, refined, and researched (Nichols & Schwartz, 2004).

Systems theory as applied to the family is a sub-system of the larger general systems theory. Systems are understood as sets of interacting, interconnected, and interrelated parts (Klein & White, 1996). A primary assumption of systems theory is that

a system must be understood by examining the sum of its parts (holism) and the relationships among those parts (interconnectedness) (Klein, 1996).

Since its conception, general systems theory has been used as a way to view and understand a variety of organizational groups, including the family and the different systems with which families interact. Bronfenbrenner (1986) used general systems theory as a framework to provide an ecological approach that allows us to understand the importance of seeing the various systems within which an individual functions as being mutually dependent.

Family systems theory applies concepts from general systems theory to the family as a behavioral system (Braden & Sherrard, 1987). Family systems are dynamic and constantly interacting within themselves and with their continuously changing environment. A family needs to experience and adapt to these changes and new situations in order to function and progress. For example, a family experiencing a military deployment will have to adjust to having a family member away for several months. During this time the at-home members will need to adapt to new routines and rituals and adapt again once the military member returns from a deployment. Understanding the dynamics and interactions of a family system is only possible when viewing the family as a whole. The rules of communication and patterns of interaction followed by the family as a whole influence each individual family member's behavior (Braden et al., 1987). The interrelationships of a family not only have major influences on an individual's behavior, but at the same time a change in an individual will also affect every member of the family system (Broderick, 1993). These reciprocal interactions are believed to lead to what Minuchin (1974) called family structure (Simon,

Stierlin, & Wynne, 1985). Family structure describes the way family members interact. When family interactions are repeated, the members are able to establish a pattern which leads to expectations for future behavior. The ideal structure allows each family member to have a sense of belonging and separateness, both necessary for healthy living (Minuchin, 1974).

Subsystems, another main construct of Minuchin's theory, describe the way families are grouped for various functions; for example, a husband and wife would belong to the marital subsystem. A person can belong to more than one subsystem at a time with roles that differ based on the particular subsystem. For example, mothers and daughters create a female subsystem within a family. Subsystems can be (a) temporary, for example, some of the family members may enjoy watching a tv show together, or (b) enduring, for example, siblings remain siblings throughout their lives.

Subsystems have boundaries whose purpose is to regulate the amount of contact between individuals. Rigid boundaries are restrictive, permit little contact with other subsystems, and tend to lead to disengagement. For example, a family may have a rule to not answer the telephone during dinner time. While this may lead to closeness between the family members, it disengages them from other subsystems. Subsystems with diffuse boundaries can be very supportive but at the expense of independence and autonomy. In a family with diffuse boundaries, the parents may be over-protective and do everything for the children. This may lead to the children becoming overly dependent on the parents; in turn, the children may become less comfortable alone yet have difficulty relating to others. According to Minuchin, functional families have well-organized boundaries. Families tend to function on a continuum of boundaries ranging from rigid

boundaries on one end (resulting in disengagement), to clear boundaries in the middle, and to diffuse boundaries at the other end (leading to enmeshment) (Minuchin, 1974).

In general, the family is viewed as a social system with three main characteristics. First, the family structure is an open sociocultural system, continuously taking in information from its environment. That is, the family is in contact with other families, individuals, and institutions, such as schools, churches, and government, and can be influenced by them. Second, development for the family is a continuous process. Reorganization is necessary when its environment changes. Family systems must be stable enough to ensure continuity, but flexible enough to accommodate to changing circumstances. Third, the family adapts to new circumstances in order to maintain continuity and to allow for psychosocial growth of its members. Adaptability is an important skill that describes a family's ability to change in response to different circumstances in ways that enhance the growth of its members (Minuchin, Baker, Rosman, Liebman, & Todd, 1975).

Minuchin's (1974) approach is based on the interrelationship of the whole, and the premise that individuals cannot be separated from the whole. Thus, Minuchin and Fishman (1981) concluded that a change in the behavior of one family member will result in a corresponding change in the behavior of another family member so that healthy functioning is maintained. In modern formulations of family systems theory, two concepts have emerged as crucial to adapting to change: cohesion and flexibility, also referred to as adaptability.

Several family researchers and theorists agree that the two concepts, cohesion and flexibility, play an important role in the understanding of family functioning (Barber &

Buehler, 1996; Green & Werner, 1996; Lee, 1988). The Circumplex Model of Marital and Family Systems was built upon the two primary dimensions of cohesion and flexibility, with a third dimension, communication, included as a facilitating dimension (Olson et al., 1979).

The Circumplex Model. The Circumplex Model of Marital and Family Systems (henceforth referred to as the Circumplex Model in this document) was developed to link theory, research, and practice. According to Olson (1976), the goal of those working in the family field is to establish a connection between what is believed to be healthy versus unhealthy functioning for families (theory), to investigate how this functioning occurs in families (research), and to move families with problems towards greater health through therapy, education, or policy (practice). This linkage between theory, research, and practice is a necessary step to move the study of families toward an integrated whole of knowledge and practice.

The Circumplex Model (see Figure 1; permission letter in Appendix A) is useful to researchers because it allows one to construct clear and testable hypotheses that correspond to the basic premise of the model. Further, the self-report scale (Family Adaptability and Cohesion Evaluation Scale, version 4 –FACES IV) developed from it is designed to tap the full continua of cohesion and flexibility (Gorall, 2002).

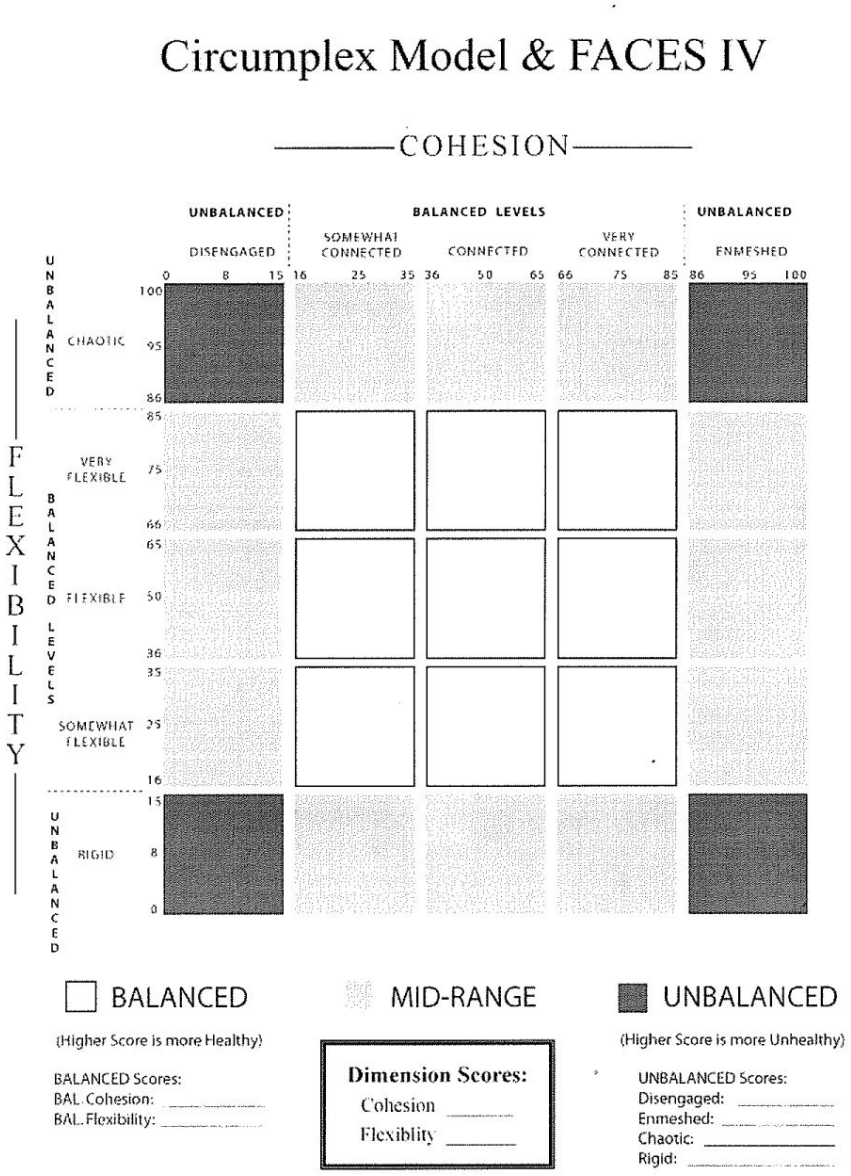

Figure 1. Circumplex Model of Marital and Family Functioning
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The model provides a graphic representation of family functioning. Responses from the FACES IV are plotted onto this graphic representation. The original Circumplex Model of Marital and Family Systems was first conceived by Olson, Sprenkle, and Russell (1979) and further elaborated on by Olson (1986) as a way to help link theory, practice, and research. After much research, Olson (1986) and his colleagues agreed that family cohesiveness and family adaptability are two of the main theoretical constructs of any family system. These were developed after examining the underlying dimensions of Minuchin's (1974) major concepts and other theories about families from other social science fields, including psychiatry, social psychology, family therapy, and anthropology (Olson et al., 1979).

According to the Circumplex Model, families function in terms of (a) cohesion, or the emotional bonding that family members have for each other (e.g., emotional bonding, family boundaries, supportiveness, interest in recreation time and friends), and (b) flexibility, also referred to as adaptability, the extent to which a family system is flexible and has the ability to change in terms of leadership, relationship roles, and relationship rules in response to situational stressors and developmental changes (Olson, 1986). That is, depending on the type of situation the family is experiencing, a family which is adaptable is able to be flexible in determining who is in charge and which rules should be followed in order to best fit the circumstances of that situation.

Cohesion and adaptability both emphasize the importance of family adjustment and change. Families that are too cohesive (enmeshed) or too distant (disengaged) are less functional than those with a moderate degree of cohesion. Balanced and midrange levels of cohesion indicate a healthy sense of both connectedness and separateness. In

regard to adaptability, families that change too much (are chaotic), or do not change enough (are rigid) are also less functional. Elements of this dimension are leadership, control, discipline, roles, and rules. A healthy family system will be indicated by healthy levels of both structure and flexibility. Families that contain balanced levels of both cohesion and flexibility are hypothesized to be able to function most effectively (Olson & Gorall, 2006). Therefore, it is important to understand a family's levels of cohesion and flexibility in order to gauge its ability to cope with stress.

Communication, which is described as a third dimension of the model, is seen as the facilitating dimension. This component can help or hinder the movement of families on the other two dimensions. Positive communication skills, such as sending clear and congruent messages, showing empathy, supportive comments, and displaying problem-solving strategies in family transactions help family members to share their wants and needs in relation to cohesion and adaptability. Negative communication, including veiled messages, double binds, and criticism, prevent family members from conveying their feelings and restricts their movement on the cohesion and adaptability dimensions (Olson, Russell, & Sprenkle, 1983). Olson (1983) hypothesized that balanced couples and families will use more positive communication than extreme families.

The Circumplex Model contains three levels for the Cohesion Dimension (Disengaged, Balanced Cohesion, and Enmeshed) and three levels for the Flexibility Dimension (Rigid, Balanced Flexibility, and Chaotic). Following the responses to the FACES IV, families are described as one of six types: (a) Balanced, (b) Rigidly Cohesive, (c) Midrange, (d) Flexibly Unbalanced, (e) Chaotically Disengaged, and (f) Unbalanced (Olson & Gorall, 2006). The Circumplex Model predicts that balanced

levels of cohesion and flexibility allow for the healthiest of functioning for families. The remaining four unbalanced levels (Disengaged, Enmeshed, Flexibility and Chaotic) are characteristic of problematic family functioning.

1. Balanced families are at healthy functioning levels and are thought to be the most likely to be able to handle the stressors of daily living and relational strains.
2. The Rigidly Cohesive types have high degrees of emotional closeness as well as high degrees of rigidity. In general, they are able to function well because of their closeness but may have difficulty adapting to situational stresses as a result of their high rigidity.
3. Those families that are Midrange can function adequately. They neither have the high levels of strength and protective factors of the balanced subscales, nor the high levels of risk factors associated with the unbalanced subscales.
4. The Flexibly Unbalanced families are the most difficult to characterize. It would seem that their high degrees on the unbalanced subscales and low levels of Cohesion might lead to problematic functioning. However, their high levels of flexibility suggest that these families may be able to adjust their behavior when necessary.
5. Families that are Chaotically Disengaged lack emotional closeness and experience problems with change, contributing to difficult functioning.
6. Unbalanced families are the opposite of balanced families. They have problematic functioning and lack the protective factors of the balanced

families. The Unbalanced groups are believed to be the least healthy in their overall functioning.

Family systems are constantly changing to interact with their environment. Families with healthy functioning have balanced levels of cohesiveness and adaptability. These families are characterized by the Circumplex Model as Balanced. They are able to adapt to their environment without changing too much and have an adequate amount of emotional closeness. These characteristics allow Balanced families to adapt well to stressors that they may encounter and to cope with the situational strains.

Stress and Coping

Lazarus and Folkman (1984) defined stress as a relationship between the person and the environment that is viewed by the person as demanding or exceeding his or her resources, and it is hazardous to his or her well-being. The person and the environment are thought to be in a bidirectional dynamic relationship that is constantly changing (Folkman, 1984). The stressfulness of an event depends on the interpretation of the person experiencing it (Lazarus, Cohen, Folkman, Kanner, & Schaefer, 1980).

Coping is conceptualized by Lazarus and Folkman (1984) as the cognitive and behavioral effort by which a person attempts to master, tolerate, or decrease the demands that have been created by the stressful situation. Coping is theorized to take two forms: emotion-focused and problem-focused (Lazarus & Folkman, 1980). Emotion-focused coping is the reduction and/or regulation of emotional suffering by using strategies such as avoidance, devaluing, minimizing, and engaging in positive comparisons. Problem-focused coping involves coping responses geared towards managing the problematic aspects of the situation by directly dealing with the source of stress.

This cognitive-oriented model of stress and coping describes the person-environment interaction in which appraisal is the determinant of whether stress is experienced. Appraisal is defined as "evaluative perceptions, thoughts, and inferences" (Lazarus & Folkman, 1984, p. 142) that are utilized to interpret an event and determine the necessary adaptational response, that is, coping. In this model, the term *adaptation* incorporates maladaptive responses. It is used to describe how persons change their thought processes (whether adaptive in the long run or not) to deal with a stressor. Adaptation may often be considered positive for the individual but have negative effects on the family.

Families and stress. Boss (2002) defined family stress as pressure or strain on the family system. It is theorized that there are two different contexts in which family stress is mediated, that is, (a) one in which the family does not have control (external context), and (b) one in which the family has control (internal context).

A family's external context is anything outside the control of the family system that has a large influence on how the family perceives events and deals with the stress that is produced. It may include the environment in which the family is embedded, a family's culture, history of past events, economic status of the family's community, developmental stage in the life cycle, or a family's hereditary and genetic background.

A family's internal context is composed of three dimensions: the structural context, the psychological context, and the philosophical context. These are elements that the family can change and control, allowing them to have some choice about whether and, if so, how they should change. This choice allows families dealing with high amounts of stress to survive and possibly thrive.

The structural context refers to a family's boundaries, role assignments, and rules regarding who is within the boundaries. Unclear boundaries (boundary ambiguity) lead to stress (Boss, 2002). All family systems contain structural features and individual personalities that may cause them to be vulnerable to a variety of stressors which may disrupt family functioning. Structural changes require family members to adapt and adjust to these changes (McGoldrick & Walsh, 1999). The influence of these familial changes impacts the individuals, who in turn feed information back into the family system resulting in further alterations of family structure. This variability in cohesion, adaptability, and communication within families at different times may be stressful for the individual family members. This stress can weaken the overall integrity of their families (Olson, 1993).

The psychological context refers to how the family perceives, appraises, defines, and assesses the stressful situation. A family's perception of a situation helps to determine which defense mechanisms to use when a stressful event occurs. A family that relies on denial when perceiving a stressful event avoids the resolution of the problem and tries to resist the necessary subsequent reorganization of the family (Boss, 2002). Boss defines a stressful event as an occurrence which is significant enough to cause change in the family system.

The philosophical context is a family's values and beliefs. Stress occurs when an individual family's values and beliefs differ from those of the larger culture to which the family belongs (Boss, 2002). For example, the military has its own subculture which causes it to differ from the general American culture (grocery stores, entertainment, community center, etc. on military bases). For the American military families living in

foreign countries, these families have to follow the rules of American mainstream culture as well as the foreign culture in which they reside. This conflict in values and beliefs between the individual families and the larger culture may cause stress to the families.

Family models of stress and coping. A classic model of family stress was developed by Hill (1949) as a result of numerous observations of families stressed by father-absence as a result of World War II. In this model, a family's response to a stressor depends on three things: (a) the actual stressor, (b) the family's resources in meeting the demands of the stressor, and (c) the meaning attached to the event by the family (individually and collectively). McCubbin and Patterson (1983) extended Hill's model and suggested that the family can experience demands in addition to the main stressor such that there is a cumulative effect. The resources utilized by the family in order to adapt to these demands include existing and newly developed resources, and how the event is interpreted by the family involves a continuous redefinition of the stressor. This continuous redefinition is critical for family coping. That is, once the family understands the demands placed upon them, assesses the available resources, and interprets the stressor event, they are able to adapt to the stressor. Family adaptation is the most important factor for restoring a family's balance when it is disrupted by a stressor.

McCubbin and McCubbin (1987) suggest that families first adjust to life changes and crises, and then adapt to the changes and crises. How well a family adjusts to a crisis depends on (a) the severity of the stressor, (b) the vulnerability of the family as determined by the pileup of demands, (c) the family's type (family attributes that are used to explain how the family behaves), (d) the family's resistance resources, (e) the family's

appraisal of the stressful event, and (f) the family's coping responses and problem-solving attempts. The interaction of these components determines the family's level of adjustment to a stressor and their transition into crisis. Not all stressful events produce major problems for families, but when an event is perceived as stressful and dictates a need for an adjustment, the family experiences maladjustment and enters crisis. Crisis demands changes, and so the family begins to adapt.

The adaptation phase focuses on the family's attempts, over a period of time, to recover from the crisis (McCubbin & McCubbin, 1987). The family's level of adaptation depends upon (a) the pileup of demands created by the crisis; (b) the family's ability to promote bonding, flexibility, predictability, and satisfaction; (c) the family's appraisal; (d) the family's world view; (e) the family's type; (f) the family's resources and strengths; (g) the family's social supports; and (h) the family's coping responses. McCubbin and McCubbin (1987) described the adaptation phase as a process where the family recognizes a need to reorganize and restructure in order to restore stability. Restructuring is achieved by the family working together to obtain a shared lifestyle, by trying to fit better into their community, and by compromising on a solution that may not be ideal for all family members. One instance where military families need to restructure themselves is when the military member returns from a deployment. The returning member is reintegrated back into the family and a shared lifestyle re-established. New routines started in the military member's absence may need to be adjusted and compromises made so that all members of the family are comfortable with the new family structure.

A family's ability to cope is believed to develop over a period of time. Coping is also theorized to help balance the family in order for it to become unified and well-organized. A balanced family should be able to support and promote its own growth, promote the development of its individuals, and promote the family as a whole (McCubbin & McCubbin, 1987).

Healthy family systems are able to handle stressors and find ways to cope with these challenges. Research also indicates that healthy family functioning may be able to prevent negative effects, particularly on a child's behavior and academics.

Family Functioning and Its Relationship to Child Behaviors and Academics

Family functioning in civilian families. Studies conducted with civilian families (described in detail in this section) suggest that family functioning plays a supportive role in a child's behavioral and academic outcomes. Lucia and Breslau (2005) conducted a longitudinal study to examine the relationship between family cohesion, that is, the extent to which family members openly express their feelings as measured by the Family Environment Scale (Moos & Moos, 1981), and childhood behavior problems, as measured by the Child Behavior Checklist (CBCL) (Achenbach, 1991a). A stratified random sample was obtained from the 1983-1985 list of low birth-weight (≤2500 g) and normal birth-weight (>2500 g) newborns from two large hospitals in Michigan. Children (N= 823) were evaluated at ages 6 and 11 years, and mothers completed the Family Environment Scale when their children reached age 6. At age 11, the CBCL was administered again. Results indicated family cohesion to be significantly related to ratings of internalizing and attention problems on the CBCL at age 6, with the same relationships measured at age 11. Children from families with high cohesiveness were

reported to have fewer internalizing and attention problems. Lower family cohesion was associated with more externalizing problems. No significant interactions were found between family variables and birth weight, maternal education, or child's gender. This study identifies family cohesion as a key factor of family environment as related to children's behavior problems.

Farrell and Barnes (1993) investigated the relationship between the effects of cohesion and adaptability (measured by the FACES III; Olson, Portner, & Lavee, 1985) on family members' self-esteem, depression, and anxiety, adolescents' behavior and gpa, and perceptions of family relationship. A random sample of 699 families with an adolescent aged 13-16 in the household along with a biological or surrogate parent was selected. Two interviewers visited each household to obtain consent, interview a parent and the adolescent, and distribute self-administered questionnaires to the parent and adolescent. The more cohesive the family was, the better were the individual family members' functioning, communication between family members, amount of spousal agreements, and behavioral outcomes for adolescent children. Girls and boys differed in terms of adaptability. For girls, the more adaptable the family was, the more positive the outcomes for behaviors (less deviance, misconduct, and higher grades), psychological functioning (less anxiety and depression, higher self-esteem), and family functioning (communication with parents). For boys high levels of family adaptability were associated with better communication with parents and lower levels of depression.

Using a sample of children from a gifted program, Cornell and Grossberg (1987) studied family functioning and its association with personality adjustment, such as anxiety and self-esteem. The authors described personality adjustment as a broad

construct and therefore attempted to operationalize this construct through four standardized measures. A sample of 83 families with a child between the ages of 7 and 11 years participated in this study. The children were reported to have an overall group mean IQ of 139.9. This sample consisted of predominantly White, middle-class families. Parents were asked to complete a family background questionnaire, the Family Environment Scale (FES; Moos & Moos, 1981), to determine family functioning, and the Personality Inventory for Children-Revised (PIC; Lachar, 1982) for personality functioning. The children responded to the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Paget, 1983) and the Coopersmith Self-Esteem Inventory (SEI; Coopersmith, 1981). The child's teacher completed the Behavioral Academic Self-Esteem Scale (BASE; Coopersmith & Gilbert, 1982) to provide additional adjustment information.

A more cohesive family relationship was associated with better overall adjustment, fewer discipline problems, and higher levels of cognitive development and academic achievement. Cohesion was also found to be correlated with higher self-esteem and lower anxiety as reported by the children. In addition, cohesion was found to be associated with higher academic self-esteem as reported by classroom teachers.

Richmond and Stocker (2006) examined the relationship between family cohesion and siblings' externalizing behaviors. Second grade students from 93 intact families with an older sibling were recruited for this study. Participating siblings were 13.9 years old on average. The parent and children were videotaped while interacting during four 5-minute tasks. The first two tasks were positive, and the following two were negative in nature. Family cohesion was assessed by the researchers from watching the family's

interaction and then using the Cohesiveness subscale from the System for Coding Interactions and Family Functioning (Lindahl & Malik, 2000). The adolescent child was asked to complete the Parent-Child Relationships Questionnaire (adapted from Hetherington & Clingempeel, 1992) about each parent. Parents completed the Child Behavior Checklist (Achenbach, 1991) on each of the participating siblings.

Families who were observed to be more cohesive had adolescents with fewer externalizing problems than families observed to be less cohesive. Family cohesion was found to be associated with adolescents' externalizing behaviors after controlling for parent-child hostility and gender.

Smith, Prinz, Dumas, and Laughlin (2001) examined the relationship between family processes and a child's social and academic competence, problem behavior, and early reading achievement. The authors defined family processes as familial communication patterns (ability to listen and communicate with others), family structure (family support, organization, roles, and responsibilities), and beliefs (what they believed about their family's purpose and values about child development and responsibilities). A sample of 718 African American kindergarten students (Males= 55%, Females= 45%) and their families was studied. Family processes ratings were obtained using the Family Relations Scale (Tolan et al., 1997), and children's behaviors using the Child Behavior Checklist (Achenbach, 1999).

Family cohesion, structure and communication were positively correlated with children's social competence. Family structure was negatively related to child problem behaviors and positively related to "academic competence" (possession of learning

skills). However, no significant relationship was found between family processes and actual academic achievement.

The role of family functioning and school success was examined by Annunziata, Hogue, Faw, and Liddle (2006) in a study of 211 at-risk adolescents attending grades 6 to 8, the majority of whom were African-American (97%). All participants completed a 34-item self-report measure assessing risks for drug use and antisocial behavior. A measure (Steinberg, Lamborn, Darling, & Dornbusch, 1994) which examined the relationship between school involvement and delinquent behavior was also administered. The Family Relations Scale (Tolan, Gormin-Smith, Zelli, & Huesmann, 1997) which measures family cohesion as defined by closeness to other members, communication, support, and organizational structure was completed by both a parent and the adolescent). Results indicated that family cohesion was positively related to school engagement. When parental monitoring was moderate to high, adolescents from cohesive families were more engaged in school. Family cohesion had a negative effect on school engagement when parental monitoring levels were low. Some gender differences were noted. For boys, the relation between family cohesion and school engagement was stronger when parental monitoring was high. For girls, high levels of family cohesion and high parenting monitoring had an additive effect leading to higher school engagement. Neither family cohesion nor parental monitoring was found to predict academic achievement.

Family moderators of the relationship between daily stressors and behavioral difficulties were examined by Kliewer and Kung (1998). Family moderators were considered to be family cohesion, high social support, consistent family routines, family adaptability, and low levels of conflict. A sample of 99 families, 40 boys and 59 girls,

ages 8 to 12 years, participated in this study. Stressors or hassles were reported by mothers and the child participant on the Adolescent Perceived Events Scale (Compas, Davis, Forsythe, & Wagner, 1987). Children responded to the Network of Relationships Inventory (Furman & Buhrmester, 1985), which measures family interaction patterns and social support from parents. To measure family cohesion and conflict, mothers completed the Family Environment Scales (Moos, 1974). Family adaptability was assessed by a subscale on the Family Adaptability and Cohesion Scale –III (Olson, Portner, & Lavee, 1985). Family routines were assessed by the Family Routines Inventory (Jensen, James, Boyce, & Hartnett, 1983). Finally, the Child Behavior Checklist (Achenbach, 1991) and Revised Children's Manifest Anxiety Scale (Reynolds & Richmond, 1978) served as measures of adjustment.

Correlations showed that hassles and major family stressors were significantly positively correlated with both internalizing and externalizing problem behaviors. Family cohesion was found to moderate the relationship between hassles and internalizing behavior, that is, children experiencing high levels of family cohesion were less affected by hassles than children experiencing low levels of family cohesion. A significant interaction was found between hassles and externalizing behavior problems of children from families with low cohesiveness, low adaptability, high conflict, and few family routines.

In summary, family functioning has a positive relationship with behavioral and academic outcomes for civilians. Family cohesion was found to be a key factor on positive behavior outcomes in children (Cornell & Grossberg, 1987; Farrell & Barnes, 1993; Lucia & Brelau, 2005). Families with higher levels of cohesion were also found to

be associated with children who exhibited less externalizing behavior (Richmond & Stocker, 2006) and lower amounts of stress (Kliewer & Kung, 1998). Higher social competence was also reported for students from families with greater cohesion, structure, and communication (Smith et al., 2001). Cohesive families were also found to be positively related to higher academic achievement in combination with parental monitoring (Annunziata et al., 2006). Smith et al. (2001) found academic competence to be related to family organization and beliefs.

Family functioning in military families. Only a few studies (e.g., Eastman et al., 1990; Farrell & Barnes, 1993; Hill, 1948; Kelley, 1994b) have examined family functioning and its impact on military families. Eastman, Archer and Ball (1990) examined the relationship between Navy family system characteristics and level of perceived life stress. The survey included the Family Environment Scale (FES; Moos & Moos, 1981), a measure of family characteristics, questions from the Life Experiences Scale (LES; Sarason, Johnson, & Siegel, 1978) which assesses perceived life stress, and questions on perceptions, attitudes, and responses to deployments. The survey was distributed to 3,245 Navy personnel. The 785 couples who responded also reported on 1,575 children. Participants were grouped into four deployment cycles: (a) assigned to ship/not deployed, defined as sailors that had not returned from, or were not scheduled to leave for, a deployment within 90 days; (b) predeployment, scheduled to leave for a deployment within 90 days; (c) reunion, returned from a deployment within 90 days; and (d) shore duty. The sample was representative of Navy families, with a range of ranks, specializations, and duties represented.

Subscale means on the FES for Cohesion, Expressiveness, Conflict, Organization, and Control were comparable with national norms (Moos & Moos, 1981), suggesting that military families were similar in family structure to normal civilian families. FES scores were not related to deployment cycle or type of command assignment (sea versus shore duty). In contrast, life experience (LES) scores were significantly correlated with command assignment and deployment period, in that families assigned to shore duty reported significantly lower levels of overall life stress than did families in other deployment stages. Higher life stress was also associated with lower levels of Cohesiveness, Expressiveness, and Organization, and higher levels of Family Conflict.

Using attachment theory as the foundation, Kelley (2002) conducted a longitudinal study of enlisted Navy mothers and children from 1996 through 1998. Maternal separation anxiety (unpleasant emotional state which may cause worry, sadness, or guilt), adequacy of child care, and child behaviors were examined. Kelley investigated whether children with deployed mothers exhibited higher levels of internalizing and externalizing behaviors than children of nondeployed mothers, and whether mother-child attachment and maternal separation anxiety were affected by deployment. The nondeployed group (n= 83) was assigned to shore duty and not expected to be sent on a deployment in the next 12 months. Deployed group mothers (n= 71) were scheduled to be deployed within the next 60 days. Data were collected for the deployed group approximately 3-6 weeks before the deployment and again about 3-6 weeks postdeployment. Navy mothers along with the child's caregiver were asked to complete measures for (a) attachment (using the Attachment Behavior Q-Set; Waters & Deane, 1985), (b) child behaviors (Child Behavior Checklist; Achenbach, 1991, 1992), and (c)

maternal anxiety (Maternal Separation Anxiety Scale; DeMeis, Hock, & McBride, 1986). Interviews were also conducted with the mothers.

Of the deployed group mothers, 38% reported that they thought the deployment was stressful for the rest of the family, 25% thought that the children experienced emotional difficulties, and 22% reported negative behaviors; 24% reported attachment problems upon the return of the parent. Some mothers (32%) noted a positive effect, while 15% observed no effect as a result of the deployment. The mothers reported that they believed that their children were able to mature without the absent parent and used the opportunity to have the children spend time with other family members, such as grandparents.

Hiew (1992) examined the impact of maternal social support on children's adjustment to three stages of paternal deployment: predeployment, deployment, and reunion. Sixty-six Canadian military families with children in Grades 4 to 6 who had experienced a deployment within the past eight months participated. Mothers completed two questionnaires: the Supportive Functions Questionnaire (SFQ) (Tetzloff & Barrere, 1978) which measures parents' perceived levels of social support, and the Parent Evaluation Form (Pedro-Carroll & Cowen, 1985), a measure of children's emotional adjustment. Social support was loosely defined by the author as the number of people that the mothers felt they could count on when they needed help in any of the four domains measured by the SFQ: (a) parenting, (b) emotional/ social, (c) tangible, and (d) directive guidance support. Teachers completed the Classroom Adjustment Rating Scale (Lorion, Cowen, & Caldwell, 1975) that measures the child's adjustment in the classroom. Interviews were conducted with the children to obtain information on how

stressful they felt their father's deployment was for them at each of the three stages of deployment and how they coped with these stresses. The children's rating of stressfulness was on a 4-point scale from 1= *not upsetting* to 4= *really upsetting*. In addition, the children reported on what they did to cope with the stress at each stage. Descriptions were classified into three types: (a) problem-focused coping, which involved managing or changing the problem or situation; (b) emotion-focused coping, the regulation of emotional distress; and (c) social support seeking, which consisted of a combination of emotion-focused and problem-focused strategies (Folkman & Lazarus, 1980).

Teachers reported significantly fewer acting-out behaviors in the classroom, learning problems, and academic achievement difficulties for children whose mothers scored high on the SFQ. These mothers also reported better child behavior at home than did those with lower social support. Those children who were rated by their parents as well-adjusted at home tended to have teacher ratings of less shy/anxious and fewer learning/academic problems in the classroom. The degree of stressfulness varied significantly with the deployment stage experienced. Children reported the actual parental absence as quite upsetting, the predeployment stage as somewhat upsetting, and reunion as not upsetting.

Coping responses were found to be used significantly more during the deployment stage. During every stage of deployment, emotion-focused coping predominated, followed by social-support seeking, and then problem-focused coping. Across the three stages, emotion-focused coping changed significantly in that it was high during predeployment and deployment, but decreased by reunion where emotional

control was thought to be not as necessary. In general, no significant correlations were found between type of coping strategy and measures of home and school adjustment.

Although Hiew's (1992) study focused on coping in children, Decker (1978) had studied coping strategies in spouses. She designed the Coping with Sea Duty Questionnaire, which focused on coping strategies during separation, and administered it to 108 women who were experiencing separation from their husbands due to deployment. The questionnaire addressed three problem areas: (a) child care problems and concerns, (b) problems with home management, and (c) problems of personal-need satisfaction. Coping was subjectively defined by Decker as the way in which problem situations were dealt with by the subjects. The questionnaire was administered in what the author expected to be the period requiring the most adjustment, the third to fourth month after the deployment began.

Decker (1978) confirmed the assumption that separation-related stresses are reflected in an increase of problems and/or severity of problems during these separations. She reported that 18% of spouses indicated a problem with their child's school performance and grades, 57% experienced discipline problems with their children, 76% had a lowered tolerance for children's behaviors, 68% reported their child as being resentful about the separation, 29% were worried about their financial situation, 53% experienced feelings of anger, and 93% noted feelings of loneliness.

Researchers of military families found that this population was similar in family structure to civilian families (Eastman et al., 1990) although military and civilian families are not comparable on sources of stress. The majority of military families report deployments to be stressful (Eastman et al., 1990; Kelley 2002; Hiew, 1992; Decker,

1978). Less cohesive families reported experiencing more stress (Eastman et al., 1990). These stressors were found to negatively affect a child's grades and behaviors (Decker, 1978).

Although military and civilian families have many things in common, military families have several characteristics that make them unique. The next section describes factors that differentiate the military population from the normal civilian population.

Unique Factors of Military Families

The Lifestyle of Military Families

The military lifestyle is unique, characterized by several potentially stressful circumstances. Bowen (1985) noted that military families face stressors beyond those routinely experienced by civilian families, such as: (a) high rates of mobility, (b) long separations from family members who are on temporary duty elsewhere or on remote assignments, (c) isolation from the extended family, (d) threat of injury, imprisonment, or death of the military member, (e) an expectation that family needs will be subservient to military goals, and (f) according to Black (1993) a high incidence of young children living in the home.

Duty demands. Military personnel are required to accept certain duty demands such as being available for duty 24 hours a day, 7 days a week, 365 days a year. In the military, it is normal to begin work before sunrise and work more than an eight-hour day. Additionally, there are training requirements, practice exercises, and mandatory extra duty shifts (often including 24-hour watch periods). Working 40 hours a week is often the exception rather than the rule in the military, and there is no overtime pay compensation. Work schedules are often unpredictable which may cause family plans to

be canceled due to work conflicts. These individuals may be recalled from leave to return to duty if deemed necessary and be sent on unexpected assignments to war-zone areas (Caliber Associates, 1998).

A survey of Navy families by Caliber Associates (1996) revealed that the demands of military life often leave very little personal time for military members to spend with their families. To further compound these time constraints, often military social functions occur outside normal duty hours and can conflict with family life. There are usually several off-duty military sponsored social or recreational activities designed to enhance unit cohesion in which the military member is expected to participate. In 1996, over 52% of the married junior enlisted personnel indicated that their jobs interfered with their family life to a moderate or great extent (Caliber Associates, 1996).

Relocation. Geographic moves are a fact of life for many families in the United States. According to the U.S. Census Bureau (2000), approximately 20% of the population moves yearly. This leads to approximately nine million school-aged children who are required to change schools. Individuals and their families in the U.S. military are reported to move four times more than their civilian counterparts (Griffith, Stewart, & Cato, 1988). Felner, Primavera, and Cauce (1981) described these transitions and relocations as periods of psychological disequilibrium which can be both an opportunity for psychological growth and an increased vulnerability for psychological disturbance for these relocated military children.

Deployment. Whereas relocation uproots the family, deployment splits it. The number of United States military personnel deployed for war and operations other than

war has been reported to be at an all-time high since 1990. As a result, approximately 3.5 million children have an absent parent at any given time (Ryan-Wenger, 2001).

Military personnel are subjected to deployments of varying lengths and frequencies and may be deployed at a moment's notice. The purposes of deployments include training exercises, peacekeeping missions, humanitarian efforts, and operational activities. The nature and length of the typical mission varies according to the branch of service (Doering & Hutzler, 1982), and can range from a two-day training exercise to a year-long mission halfway around the world. For those in the Navy and Marine Corps, a six-month deployment is standard. In general a military member experiencing a "normal" 20-year military career in the Navy will spend 6 to 8 of those years apart from their family (Caliber Associates, 1996). Family members at home often have to deal with the uncertainty of not knowing the location of their loved ones, whether communication will be available, and when they will return (Kaslow & Ridenour, 1984). In fact, Black (1993) stated that separation from their military spouse is one of the primary reasons spouses are unhappy with the military lifestyle. Wives whose husbands are deployed often report loneliness, lack of companionship, decrease in problem-solving skills, problems disciplining their children, and a sense that the military is not concerned about their well-being. Additionally, spouses whose husbands are deployed are more likely to experience depression and psychosomatic complaints, and are therefore more often subjected to a higher number of mental health referrals. Black concluded that military families are at high risk for experiencing crises due to stressor accumulation.

The impact of the military life style. Black (1993) noted that while any one of these stressors has a potential to overload a family system, these stressors usually act in

conjunction, especially when the family is experiencing a deployment. These stressors are more detrimental to a military family than comparable ones are to a civilian family. Seldom do civilian families have to deal with a combination of so many stressful variables when a parent is away on a work-related assignment as does the military family when the military member is away on deployment.

Black (1993) suggested that the two most important sets of family resources which can help them adapt to separation stress are (a) integration: the strength of a family's common interests, affection, cohesion, and unity and (b) adaptability: a family's ability to be flexible in discussion and decision-making. Clearly there are similarities between the central concepts in Black's article and the central family systems concepts of cohesion and flexibility described above.

Risk of personal injury and death. There is a high risk of personal injury or death for the deployed individual. More than one-half million service members died and nearly one million were wounded during warfare between 1941 and 1991 (Black, 1993). Military families must live with the fear that their loved one may be killed or wounded in combat or military accidents. The stress of deployment combined with the risk of injury and/or death constitutes a unique stressor; civilian families seldom have to deal with this additional stressor during family separations.

Military Stressors and Relocation

General Effects of Military Stressors on the Family

It is unclear how well military families function. LaGrone (1978) described what he called the "military family syndrome," characterized by out-of-control children, authoritarian fathers, and depressed mothers. Based on a review of the case records of

792 children and adolescents seen in a military clinic over a two-year period, LaGrone suggested that a higher incidence of behavior disorders (32%) can be found in the military clinic than in a civilian mental health clinic.

LaGrone's work has been criticized (e.g., by Jensen, Lewis, & Xenakis, 1986; Morrison, 1981) because he did not control for demographic variables (e.g., socio-economic status [SES], parents' educational level, child's age, etc.), and he neglected to compare his case record samples to a civilian population to support his claim that diagnosis of behavioral disorder was more frequent in the military families. So it is unclear if many of the characteristics he identified are unique to military families.

In response to LaGrone's (1978) proposed "military family syndrome," Morrison (1981) conducted a study of 140 military children and 234 civilian children using a semi-structured questionnaire to gather demographic, scholastic, social, family, symptom, and treatment data to determine whether or not there were differences between the two groups in *DSM-III* diagnostic categories. Approximately half of the children in both groups had behavior disorders despite the fact that more of the military children were found to have had a 6-month or longer separation from their father and also to have an alcoholic father.

Using chi-square analyses, Morrison found, contrary to LaGrone, that military children were less likely to have psychoses than civilian children, and comparisons among the remaining 16 diagnostic categories revealed no significant differences between the two groups. However, the samples were reported to differ significantly in age: the military children (11.9 ± 4.2) were younger than the civilian children (12.9 ± 4.5). Morrison concluded that although an age-matched study that also controls for SES, race, and parental educational level may have provided different results, this study

strongly suggested that military and civilian populations do not differ significantly in terms of psychiatric diagnosis.

Also in response to LaGrone's (1978) assertion, Jensen, Lewis, and Xenakis (1986) reviewed the literature concerning the prevalence of psychosocial dysfunction in military families. The review identified specific risk factors such as geographic mobility, authoritarian military structure, father absence, war and combat stress (stress induced from being in a war zone or other dangerous location), and cross-cultural family constellations. (Military families are often cross-cultural as a result of the military member being deployed to an overseas assignment and finding a marriage partner from these foreign countries.)

The authors found that reported prevalence of psychiatric disorders in military children ranged from 1% to 35%. These estimates may be unreliable due to a lack of controls, possible sampling errors, and unclear methods of classification for psychiatric disturbances. Jensen et al. reported that although the majority of military families experience one or more of the potential risks listed above, relatively few families appeared to be overtly dysfunctional. This was attributed to the supportive military network and possibility that severely dysfunctional individuals tend to be screened from the services. It was suggested that future research control for variables such as child's age and sex, family functioning levels, and war and combat stress.

Jensen et al.'s (1986) extensive review concluded that how military families respond to stressors is most likely a function of (a) life experiences, (b) the intensity of military and other life stressors, (c) the availability of resources, (d) the family's attribution of the cause of stressful events, and (e) family and individual characteristics.

Families with a more positive view of military life experiences tend to cope more effectively with stressors. Furthermore, although extended family members may not be nearby, many career military families form close relationships with other such families. After one or two moves, a military family is very likely to find familiar friends from past assignments at their new location, resulting in a high level of cohesiveness between familial groups, which in turn aids in coping (Hunter, 1982).

Bowen (1985) examined how military-related stressors affect family life. This study is one of the broadest ever conducted in terms of the number of subjects (644 married couples). On average, the couples were White and in their early thirties, had been married for 8 years, and had a child under 12 living at home. The majority of couples expressed satisfaction with their familial relationship. The area of least satisfaction was a lack of companionship, attributed to long and irregular duty hours and temporary and remote assignments. The majority of parents were satisfied with their relationships with their children. However, fewer than half of all parents interviewed reported that the United States Air Force provided a good environment for raising their children. Parents attributed this to the transient, irregular, highly mobile, and parent-absent environment that typifies military life (Bowen, 1985). Bowen identified some of the same risk factors for family dysfunction as did Jensen et al. (1986), that is, father absence and geographic mobility.

Watanabe (1985) administered the Offer Self-Image Questionnaire to 135 military adolescents (13 to 18) who had visited the local military clinic for a school or sports physical to investigate whether the demands of a military lifestyle hinder the development of a healthy self-image. Using national norms on self-image for

nonmilitary adolescents, Watanabe concluded that the self-images of military adolescents were as good as, and in some cases better than, those of nonmilitary adolescents. Except for younger males, the scores exceeded those of the reference group. The author speculated that the military adolescent may share and reflect high parental values, attitudes, pride, and accomplishments. He concluded that the military lifestyle was not a negative influence on the military child; however, these individuals may have been biased towards good health and well-being, and over 80% of the subjects were from officer families. These limitations make it difficult to generalize these results to the military population.

Effects of Relocation on the Family

Effects of Relocation on Children in Civilian Populations

Relocation is probably the closest analogy in the civilian world to military deployment. Research that examined the effects of relocation on civilian children has suggested that in some cases, negative impact on children is associated with frequent moves.

Wood, Halfon, Scarlata, Newacheck, and Nessim (1993) reported on 9,915 families with children ages 6-17 responding to the 1988 National Health Interview Survey of Child Health. Of children who moved frequently (above the 90th percentile for age-adjusted moves), 23% had repeated a grade whereas only 12% of children who never or infrequently moved had done so. Eighteen percent of children who moved frequently had four or more behavioral problems versus 7% of children who never or infrequently moved.

Similarly, Simpson and Fowler (1994), using the same data set, found that children who moved three or more times were 2.3 times more likely to have received psychological help, 1.7 times more likely to repeat a grade, and 1.9 times more likely to have been suspended or expelled compared to students who had never moved. Simpson and Fowler concluded that there was no increased risk for children who had moved only once or twice, but for children who had moved more often, there was an increased risk of emotional and behavioral problems. These children were significantly more likely to be depressed, headstrong, hyperactive, antisocial, and immature, and to have peer conflicts.

Other researchers have reported positive or neutral outcomes for relocations. Stroh and Brett (1990b) conducted a comprehensive longitudinal study of children (age 6-18) of employees of Fortune 500 corporations. These families reported an average of three moves during a five-year period. Parents reported that their children displayed no negative short-term or cumulative effects from moving. In addition, fewer behavioral problems in children were associated with fathers' reports of self-confidence and life satisfaction. Mothers' reports of self-confidence and life satisfaction predicted better social adjustment and self-confidence in their children.

Effects of Relocation on Children in Military Populations

One particularly mobile group of children are the dependents of men and women in the military; for example, Ender (2000) found that some military children moved eight times during their elementary and secondary school years. Ender studied 607 men and women between the ages of 15 and 46 who grew up in military families. Respondents on average had moved eight times between birth and their first relocation after high school. Almost all reported that they had lived overseas as a child, for an average of seven years.

Respondents reported geographic mobility as the most stressful aspect of growing up in a military family.

Shaw (1979) studied adolescents' self-perceptions relative to attitudes toward frequency of moves and life in a military family. A "high-move" group consisted of adolescents who had moved five or more times during their lifetime. A "low-move" group consisted of adolescents who had experienced four or fewer moves. The "high move" group perceived themselves less positively than the "low-move" group. Specifically, the high-movers saw themselves as boring, distant, withdrawn, and unhappy. This group perceived intimacy as less stable, more important, and more dangerous than the low-move group. On the other hand, the high-move group viewed moves as more important, interesting, and exciting than the low-move group. Boys viewed moves as easier and more important than did girls.

Pittman and Bowen (1984) surveyed children between the ages of 12 and 18 from 882 Air Force families living in the U.S. or abroad. They found that difficulties in making new friends and integrating socially into a new location were more important for adjustment than difficulties in leaving old friends. Although girls had better relationships with their parents, boys were slightly better adjusted.

Overall, the literature on the effects of relocation on both civilian and military families is mixed. In the civilian literature, it should be noted that the two studies that found no negative effects (Stroh & Brett, 1990b) drew on families with an employee in a Fortune 500 corporation, whereas the two that found evidence that frequent moves have detrimental effects on children (Simpson & Fowler, 1994; Wood et al., 1997) came from the general population. It is quite possible that in the latter, frequent family moves were

symptomatic of other family dysfunctions, perhaps a parent who is unable to keep a job or cannot make social connections to others. In contrast, frequent moves required by an employer would not be causally related to other family problems. In the military literature, there is little evidence for overall harm to children as a result of frequent moves, except perhaps for adolescents (Pittman & Bowen, 1984; Shaw, 1979, 1987), whose social and personal identity development depends on peer relationships, which may be disrupted by a move. Therefore, on balance, it appears likely that except for some adolescents, military relocations may have little or no harmful effects on children.

Parental Absence and Deployment

Effects of Parental Absence on Families and Children

Early studies of deployment conceptualized family stressors as a function of parental absence rather than deployment. From this perspective, parental absence was seen as the sole causal variable. More recent research has examined the effects of deployment as a complex result of several variables, including whether the deployment is to a combat zone or not, family stability, age of children, etc.

Clinical studies of parental absence. Much early research and some more recent research has focused on clinical studies of children with and without psychological disturbances. Typically, researchers assumed that parental absence was stressful and that children without disturbance must have been shielded by protective factors in parents or the children themselves.

Gabower (1960) compared children who were receiving counseling (problem group) at a Naval hospital with a matched control group who were not. Both groups consisted of eight boys and seven girls, all experiencing an absent parent due to a

deployment. Data were gathered mainly from patient case records including notes from counseling sessions. It was unclear whether parents were interviewed specifically for this study or if parental reports were also obtained from case records.

The author found a number of differences between the groups. Parents of the problem group children thought grades were of major importance while parents of the control group gave grades a low priority. Gabower noted that the mothers in the problem group tended to supervise the children whether the military parent was home or deployed. In the control group, the parents shared the responsibility whenever the husband was home. The problem group children expressed resentment toward their father for being gone, but none stated that they needed to have their father home. In contrast, none of the children in the control group expressed resentment toward their fathers for being gone and they all expressed a need for their fathers to be home. Gabower concluded that the behavior of the child is more closely related to the way parents deal with the child than to the conditions of his/her physical environment.

Pedersen (1966) studied the relationship between father absence and emotional disturbance in 27 White male military dependents (ages 11 to 15) who were referred to an Army mental health clinic for emotional difficulties. A control group of 30 children was selected from those visiting the hospital for a routine well-child visit. The control group was matched for birth order, age of parents, father's rank, and socioeconomic status.

Personality characteristics of parents were also examined. Within the clinical group, paternal absence was significantly associated with total maladjustment. Mothers of the clinical group were found to be significantly more maladjusted, as indicated by MMPI scores, than mothers of the control group. However, maternal adjustment was not

found to be correlated with extent of father absence or degree of child disturbance. No significant differences were found for adjustment levels of fathers.

Pedersen (1966) argued that maternal behavior may play a role in the child's reaction to father absence. In addition, it was suggested that within the normal ranges of adjustment, some degree of father absence may facilitate emotional adjustment in children. Results should be interpreted with caution as all subjects were from officer's families and of the same race.

Pierce (1978) studied 52 children (40 boys and 12 girls, ages 6 to 17) who were receiving counseling at a child guidance center. All of the children had experienced a military induced separation from their fathers by the age of 7. Using the Rorschach "T" response he found that children with an absent parent learned to control their emotions by becoming more defensive. The children demonstrated four times as much anxiety as was considered normal for their age. He speculated that his results indicated that early parent absence has negative effects on the later development of children in that it makes children more dependent and helpless when they get older.

Huebner, Mancini, Wilcox, Grass, and Grass (2007) used focus groups to explore the feelings of uncertainty and ambiguous loss which accompany a parental deployment. Ambiguous loss was defined as having a family member who may be psychologically present but physically absent, which may leave a person feeling uncertain and unclear about the loss and possibly its duration. The sample consisted of 107 adolescents aged 12-18 who had a parent currently deployed. Participants were recruited through camps for children with a deployed parent in Washington, Hawaii, Texas, Virginia, and Georgia. There were a total of 14 focus groups consisting of both boys and girls with the groups

divided by age. Focus group responses fell into four main categories: (a) overall perceptions of uncertainty and loss, (b) boundary ambiguity, (c) changes in mental health, and (d) relationship conflict.

The majority of responses were negative (nervous, worried, sad, lonely) with a few positive ones (proud). Participants reported feeling that they had lost someone that they could rely on for security and assistance, and that they had additional responsibilities and a change in routines. Thirty-four participants reported changes in their mental health as a result of deployment. Concerns included depression, anxiety, isolation, sadness, and changes in eating and sleeping habits. Relationship conflicts were reported by the adolescents as a result of increased emotionality in the household leading to increased arguments and yelling. Some of the subjects reported concerns with their at-home parents and their stress levels as a result of deployment.

Crumley and Blumenthal (1973) reviewed the psychiatric evaluations of 200 children (ages 3 to 18) at an Army guidance clinic between 1969 and 1970. Of the children, 63% were boys and 37% were girls. From this sample, 30% of the children had a deployed parent at the time of referral to the clinic while 70% of the children had a parent either in the reunion stage or the about to deploy stage. The researchers concluded that the entire deployment cycle is a disturbance to the development of the child. They found a number of reactions to the father being absent including rage, denial and fantasy, irrational guilt, separation anxiety, fear of abandonment, depression, feelings of ambivalence toward the missing parent, regressive symptoms, aggression, hostility directed toward others and the self, and difficulty making and keeping friends.

According to Crumley and Blumenthal, if there were already problems in the relationship between the child and the father, the separation seemed to increase the problems.

Yeatman (1981) studied a sample of 258 children from a military pediatric clinic. The parents of these children completed a researcher-designed retrospective questionnaire on the severity and prevalence of somatic and behavioral problems in children experiencing parental deployments.

Replies indicated that 54% of the families had experienced a parental absence due to a deployment. Of these, approximately two-thirds reported resulting adjustment problems in their children. The most frequently reported adjustment problems were: (a) aggressiveness, (b) withdrawal, (c) insecurity, (d) poor self-esteem, (e) phobias, (f) nightmares, night terrors, and insomnia, (g) somatic complaints, especially stomachaches, headaches, and asthma attacks, (h) paranoia about loss of love or punishment, (i) disobedience and discipline problems, (j) decreased academic performance, and (k) resentment and hatred towards the deployed parent. Adjustment problems during the separation were not found to be significantly different for any age or gender group with the exception of children under two, who seemed to have the most difficult time readjusting to the parent's return.

Flake, Davis, Johnson, and Middleton (2009) looked at the psychosocial profile of children (5-12 years) experiencing a parental deployment. A total of 101 at-home parents completed a deployment packet which consisted of demographic and psychosocial questions. The psychosocial questions were a combination of measures that included: the Pediatric Symptoms Checklist (PSC) (Jellinek, Murphy, Robinson, Feins, Lamb, & Fenton, 1988) which measures the child's externalizing, internalizing, and attention

behaviors; the Parenting Stress Index-Short Form (PSI-SF) (Reitman, Currier, & Stickle, 2002), which assesses the level of stress parents experience while raising their child; and the Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermelstein, 1983) which looks at the global stress level of the rater.

Of the 101 Army parents who participated in this study, 32% reported their child to be at high risk for psychosocial morbidity. Approximately 42% of the parents reported clinically significant levels of parenting stress. There was also an overall increase of general stress for the at-home parent. The authors concluded that the most significant predictor for child psychosocial behaviors was parenting stress.

Chandra, Lara-Cinisomo, Jaycox, Tanielian, Burns, Ruder, and Han (2010) examined the health and well-being of military children from the perspective of the child and nondeployed parent. Participants were families with children attending the National Military Family Association 2008 Operation Purple. Operation Purple is a free camp for military children designed to help them cope with a deployment. Participants (*N*= 1,507) were between the ages of 11 and 17. The nondeployed parent and child were interviewed using a computer-assisted program. Most of the questions from the interviews were compiled by the authors using existing measures covering the topics: academics, anxiety, behavior problems, emotional difficulties, peer functioning, family functioning, maternal mental health, and deployment related experiences.

Results indicated that the children in this study experienced more emotional difficulties when compared to the national sample. Older children and girls of all ages were reported to have significantly more difficulties with school, family, and peer relations as a result of a deployment. Lower levels of the nondeployed parent's mental

health were significantly related to the number of challenges reported by children during a deployment and at the return of the military parent.

Lyle (2006) collected demographic data from 13,000 active-duty Army personnel records. These servicemen had a child between the ages of 6 and 19 and were deployed at the time of data collection. Standardized test scores from the Texas Assessment of Academic Skills (TAAS) (math scores only) were then obtained by the author. Only math scores were used for this study because it is the only subject area available for all grade levels. Lyle found that parental absence adversely affected test scores by a tenth of a standard deviation. The author concluded that even though a military deployment appears to have a fairly small negative effect on educational achievement, a student who falls behind even just a little bit one year may fall further and further behind with each subsequent year.

Engel, Gallagher, and Lyle (2008) conducted a records review of 56,116 children of enlisted Army personnel enrolled in a Department of Defense school between 2002 and 2005. Demographic information as well as deployment status were gathered. Standardized scores from the Terra Nova Multiple Assessment were obtained. The authors reported a modest negative effect on a student's test scores if their parent was deployed in the past year. Test scores were reduced by 0.42%. Effects were most significant for math and science. Lowered scores were less evident for language arts, social studies and reading.

Positive effects of parental absence. Although the majority of literature on separation has found negative effects, some researchers have noted some positive or neutral outcomes. Kersey (1981), a psychologist and early education specialist, provided

anecdotal evidence from her work with military children suggesting that positive effects can result from the restructuring of roles due to an absent parent, giving children more responsibility and freedom. Under these circumstances authoritarian parenting styles are dismissed and the family leans towards a more cooperative approach.

A comparison study by McIntire and Drummond (1978) suggests that the stressors related to military life including parental separations have no long-term effect, based on retrospective reports of stress. McIntire and Drummond surveyed 117 (62 male, 55 female) high school sophomores, 69 military (Air Force) and 48 civilian. The partcipants responded to a semantic differential of 19 social-vocational and familial role concepts. Based on prior studies, the authors hypothesized that military children, particularly males, would have lower self-esteem, but this was not found. On the contrary, military male children had a more positive image of their fathers than the civilian children, and a more positive perception of their mothers as disciplinarians. However, they tended to view their larger social-psychological environment as more negative. Female military and nonmilitary students showed no significant differences. The authors concluded that contrary to previous research, the military household appears to have no negative influence on a child's self-concept development or on the ability of the male military dependent to view his military parent positively. Unfortunately, these authors did not examine the possible influence of moderating variables such as socioeconomic status or military rank.

In summary, research on clinical populations generally represent the older studies in the area, and often seemed to be based on populations of convenience, namely the children being seen at the local military clinic (e.g., Crumley & Blumenthal, 1973;

Gabower, 1960; Pierce, 1978; Yeatman, 1981). The results of these studies suggest that deployment caused distress in the children (Crumley & Blumenthal, 1973; Huebner, Mancini, Wilcox, Grass, & Grass, 2007; Kersey, 1981; Pedersen, 1966; Pierce, 1978; Chandra et al., 2010). Some of the studies confirmed that the presumed stress of deployment was moderated by other variables: maternal coping (Gabower, 1960), child-father relationship (Crumley & Blumenthal, 1973), parenting stress (Flake et al., 2009). In all, these clinical studies were useful for identifying variables that appear to be relevant to the effects of deployment, but they have not been large enough or controlled enough to firmly establish what the relationships among them are.

Effects of Stages of Deployment on Families and Children

There has been a general trend in research toward examining deployment from a broader perspective than simply the capacity of children to adapt to the absence of a parent. These more sophisticated studies have compared similar populations at different stages of deployment, beginning with deployed versus not deployed, then extending their questions to different stages of the deployment cycle. In both these approaches, investigators have been particularly concerned with whether deployment has been to a combat zone on the assumption that this would heighten deployment stress.

Comparisons between Families with Deployed and Not-Deployed Parents

One of the few studies conducted with military families after Desert Shield/Storm (Kelley, Hock, Smith, Jarvis, Bonney, & Gaffney, 2001) compared children with a deployed Navy parent, those with an at-home Navy parent, and those from civilian families. The research investigated: (a) how military and civilian children differed on a behavioral measure, the Child Behavior Checklist (Achenbach & Edelbrock, 1983); (b)

differences between military children experiencing and not experiencing a deployment; and (c) which deployment phase (pre-deployment, deployment, or post deployment) had the most effect on children's behavior. The Child Behavior Checklist was completed by the mother and a child-care provider as a comparison. Data were collected from the military sample twice, three to six weeks prior to deployment (pre-deployment phases) and three to six weeks following a 5-6 month deployment. The civilian sample also completed the measure twice, about one year apart.

The children in the military sample consisted of 64 boys and 63 girls, with ages ranging from eight months to eight years. The children in the civilian sample included 16 boys and 16 girls averaging 2.5 years of age at the beginning of the study. Military children demonstrated a slightly higher level of externalizing behavior than civilian children. The deployed military group appeared to show more anxiousness and sad feelings as reported by both mothers and child care providers. The care givers, but not the parents, reported higher levels of externalizing behaviors for the children in the deployed parent group.

Chartrand, Frank, White and Shope (2008) conducted a cross-sectional survey to study the effects of wartime deployments on the behavior of young children (1.5 to 5 years) in military families. The sample consisted of 169 military families who had a child enrolled in an on-base military childcare center. Parents were asked to provide demographic information as well as complete three instruments: the Child Behavior Checklist (CBCL) (Achenbach & Rescorla, 2000); the Parenting Stress Index-Short Form (PSI-SF) (Abidin, 1990), and the Center for Epidemiologic Studies –Depression Screener (CES-D) (Rasloff, 1977). Once parent consent was received, the childcare center

provider who knew the child best was asked to respond to the CBCL- Teacher Report Form (TRF).

The children were divided into two groups: those with a deployed parent (*N*= 55) and those with a non-deployed parent (*N*= 114). Parents with a deployed spouse and children aged three years or older had significantly higher depression scores than those with a non-deployed spouse. After the authors controlled for stress and depression levels, children aged three years or older with a deployed parent had significantly higher externalizing and total scores on the CBCL parent and teacher (TRF) measures compared to same-aged peers with a non-deployed parent.

Multiple deployments. Wong and Gerras (2010) studied the factors that predicted stress levels in adolescents during a deployment and indicators which helped them to cope with multiple deployments. Surveys were sent via email to 34,500 soldiers, of which 2,006 responded. Of these soldiers, 718 of their spouses and 559 of their children (ages 11-17) also completed parallel versions of the instrument. The survey included demographic and descriptive questions about the military families. It also contained items selected by the authors from two questionnaires: the State-Trait Anxiety Inventory (Spielberger, 1983) and the Generalized Anxiety Disorder Subscale of the Screen for Child Anxiety Related Emotional Disorders (Birmaher, Khetarpal, Brent, Cully, Balach, Kaufman, & Neers, 1997). The survey also asked about the adolescents' overall ability to cope with repeated deployments. In addition, the authors constructed a Child Perspective Stress Index based on the children's surveys. A second part of the study involved individual interviews of over 100 adolescents concerning their experiences with deployments.

This study revealed that the factors most associated with low levels of stress in adolescents during a deployment were: high participation in activities, a strong family (as reported by the soldier), and the adolescent's belief that America is supportive of the war. The best predictors of the adolescent's ability to cope with a deployment were: a strong at-home parent, belief that America supports the war, and his/her belief that the deployed parent is making a difference. The number of total deployments in the child's lifetime did not appear to be related to stress levels.

Routine versus combat deployment. Kelley (1994b) found differences in family functioning and child behavior between families experiencing a peacetime (routine) or wartime (Persian Gulf War) Navy. Kelley collected data from 61 mothers of children between the ages of 5 and 13 whose husbands were experiencing a six-or seven-month Navy deployment. The mothers were assessed at three points, that is, (a) predeployment (three to four months prior to separation), (b) middeployment (12 to 16 weeks after deployment began), and (c) postdeployment (three to four weeks after deployment ended). The mothers completed three self-report instruments: the Family Adaptability and Cohesion Scales (FACES III) (Olson, Sprenkle, & Russell, 1979); the Parenting Dimensions Inventory (PDI) (Slater & Power, 1987); and the Child Behavior Checklist (CBCL) (Achenbach, 1991). All measures were administered at each of the three time points.

Fourteen of the families participating in the study experienced a rerouting of a routine deployment to a combat deployment when Iraq invaded Kuwait in 1990. These fourteen families were matched with families experiencing the routine (noncombat) deployment. The two categories were analyzed separately and results were compared. In

the noncombat category, family organization levels were affected by the age of the child and phase of deployment. Having younger children (less than 8 years) in the house decreased the level of family organization, the extent to which family activities and responsibilities are organized and scheduled, from predeployment to middeployment. Families with older children (greater than 8 years) remained constant in their family organization levels. In families experiencing a noncombat deployment, mothers of boys reported higher levels of family adaptability than mothers of girls. Family cohesiveness was higher in the postdeployment phase than the predeployment or middeployment phases. Mothers also reported significant increases in externalizing and internalizing behaviors during the deployment as compared to the other periods. Finally, higher levels of these behaviors were related to lower levels of family cohesiveness.

The combat versus noncombat deployment groups yielded different results. Family cohesion levels were significantly lower in the combat category. These families also reported significantly more child internalizing and externalizing behaviors, and, in contrast to the children experiencing noncombat deployments, child behavior did not improve over time. Kelley suggested that combat deployments are associated with greater disturbances to family adjustment and more lasting negative effects on child behavior.

Oldaker (1969) investigated the relationship between father absence and hazardous duty assignment during the Vietnam War, and the academic achievement of children from military families. The sample consisted of 1,200 students in Grades 2, 4, and 6. Students whose fathers were absent performed better on Grade 2 mathematics and

Grade 6 language arts than those whose father was present. No relationship was found between hazardous duty assignment and student achievement.

Deployment Examined in Stages

Some research has been specifically directed toward assessing differences in stress at different points in the deployment cycle. Bey and Lange (1974) interviewed 40 military wives about their deployment experiences. These authors divided the deployment cycle into three main components: predeployment (the 3-month period prior to the husband leaving), deployment (the period during which the husband was absent), and postdeployment (for 3 months following his return). During predeployment, feelings of disbelief, numbness, and increased emotional distance were reported as the actual deployment neared. During deployment there were feelings of anger which were often directed towards the military. After deployment, the spouses expressed excitement and worry about what it would be like after the military member returned. Feelings of depression were common when the spouse returned because of the difference between the idealized expectation and the reality. Bey and Lange (1974) found that the most common problems were intimacy, communication between the spouses, and issues regarding discipline of their children.

Routine versus combat deployment in various stages. Jensen et al. (1996) compared children and families with and without a deployed parent prior to and during Operation Desert Storm. The families were randomly selected from those living on a military installation near Washington D.C. with at least one child aged 4 through 17. The non-deployed spouse and 383 children completed parent and self-report instruments concerning family and child functioning and life stressors.

Children of deployed and nondeployed military members were compared cross-sectionally, as well as longitudinally, using data collected prior to the start of Operation Desert Storm. Results indicated that children of deployed parents experienced elevated self-reported symptom levels of internalizing behaviors, particularly on depression, measured by the Children's Depression Inventory (Kovacs & Beck, 1977). Anxiety was measured by the Revised Children's Manifest Anxiety Scale (Reynolds & Richmond, 1978). The at-home spouse also reported significant increases in depression on the Center for Epidemiologic Studies-Depression Scale (Radloff, 1977) following their spouse's deployment, although these higher scores were still below clinically significant levels. Children with increased symptoms during deployment also had at-home parents with increased symptoms. Jensen et al. (1966) suggested that children's difficulties during deployments are best understood as a family problem, although they were careful to note that they did not find that the at-home parent caused their children's increased symptoms during a deployment.

Parental coping was measured by the Psychological Coping Resources Scale (Pearlin & Schooler, 1978). No differences were found as a function of deployment, nor was coping related to parents' or children's outcomes. Other findings indicated that boys, more than girls, as well as younger children demonstrated a higher risk for elevated behavior symptoms. Although Jensen et al. (1996) did not measure coping styles in children, they hypothesized that younger children tend to utilize problem-focused coping styles, while older children use a more emotion-focused coping technique. Children who use problem-focused coping experience more anxiety-related difficulties than children who use emotion-focused coping.

Results suggested that combat deployment is likely to be associated with increased depression in both the children and the remaining caretaker and with increased levels of family stress. These effects were significant even when predeployment family and child adjustment was controlled. Again, even though Jensen et al. (1996) found an increase in internalizing behaviors, they remained below clinical levels. Jensen et al. hypothesized that many military families learn to cope with the many stressors of military life and thus may be better prepared to deal with a wartime deployment. The authors speculated that the availability of social support systems on military bases may provide additional psychological support and ameliorate stressful periods.

Return from deployment. Some researchers have drawn a distinction between pre-deployment and post-deployment periods, rather than grouping them together as not deployed. While reunions are expected to be a time of excitement and happiness for family members, they often bring about mixed feelings (e.g., Bey & Lange, 1974; Parry, 1986), including apprehension of the changes that are about to come. The at-home family members had to adjust and take on new roles when the military parent deployed. It follows that upon his return the family must again adjust and perhaps redistribute roles. In fact, some researchers (e.g., Bey & Lange, 1974; Jacobs & Hicks, 1987; Parry, 1986) have suggested that reunion is more stressful than separation. In a study of 102 military families, Jacobs and Hicks (1987) found that 40% experienced a decrease in their marital functioning, 40% experienced no change, and 20% experienced an increase in their marital functioning after being reunited. Parry (1986), from his work with families at a military Family Service Center, suggested that one of the reasons why reunions may be difficult are the "irreversible firsts" that occur while a spouse is on deployment, such as

the birth of a baby. Based on personal observations, he stated that the readjustment period is usually between three to eight weeks, with six weeks being the most common.

Many authors offer anecdotal evidence based on interviews with military families on the difficulties experienced at reunion. For example, Bey and Lange (1974) interviewed 40 military wives while their husbands were serving a one-year deployment, and reported that there were usually high amounts of tension within the household upon the military member's return. One of the most difficult problems was related to the disciplining of children. It was suggested that because the military member was used to an environment where orders are given and taken, he expects to return to a similar environment with his family. This is not a dynamic to which the at-home spouse and children are usually accustomed. Adjustments also have to be made by the children as they have become used to accepting discipline only from the non-military spouse.

Bey and Lange (1974) also suggested that communication is an area of great difficulty. Both husbands and wives had idealized what the return of the military member would be like. Husbands often exhibit depressive symptoms and irritability when any demands are placed on them by family members. Wives often feel let down by their husbands' withdrawal and depressive symptoms. Several months of re-acclimation are required before all members of the family adjust to living together again. Bey and Lange did not attempt to quantify their data but rather chose to report recurrent themes that they found. These authors also did not include a comparison group of those whose husbands were absent due to noncombat missions.

Armstrong (1981) and Kersey and Schwenke (1982) described the returning spouse as an intruder who disrupts the family's functioning. It can be difficult for the

family to reintegrate the military member back into the family system and reassign him a role as a disciplinarian. Gonzales (1970) had reported that some children prefer to have limited contact with their fathers when they reunite. Based on his clinical work with military children, he suggested that some children may avoid their fathers completely from anger of being abandoned or cling to their fathers out of fear that he may leave again.

In the Huebner et al. (2007) focus groups study described above, it was found that reintegration of the returning parent was difficult and caused changes to family roles and rituals. The authors commented that it often seemed as if reunion and reintegration of the family was more difficult than the absence itself.

There have been mixed findings on which deployment stage is the most difficult. Some researchers report an increase in the internalizing (Kelley et al, 2001; Jensen et al., 1996) and externalizing (Kelly, 1996b) behaviors exhibited by the child while a parent is deployed. Other studies suggest that it is the reunion stage which is more stressful for families (Jacob et al., 1987; Parry, 1986). Children often have a difficult time readjusting to an added disciplinarian in the home (Bey et al., 1974) or may feel anger and a fear of abandonment towards the returning parent (Gonzales, 1970). The researchers do agree that combat deployments have higher levels of negative effects on a child's behaviors than families experiencing noncombat deployment (Kelley 1996b; Jensen et al., 1996)

Mediating and Moderating Variables in Effects of Deployment

Recent studies have tended to focus on only a few variables that may be relevant to family functioning during deployment, such as length of deployment (Jensen, Grogan, Xenakis, & Bain, 1989) and occurrence in peacetime (routine deployment) or wartime

(Kelley, 1994a). Factors associated with the family itself include individual ages, sex, parental attitudes, available social supports, preexisting family relationships, history of coping and adaptability skills, and past experiences with separation (Jensen, Martin, & Watanabe, 1996). This section will consider a number of variables that appear to function as mediating or moderating variables.

Stress as a mediating variable. Most research on the effects of deployment has used the term *stress* in describing them, but in practice had measured behavioral changes or emotional responses directly. Nonetheless, it has been implicitly assumed that the deployment affects these variables through the mechanism of stress; that is, that stress is a mediating variable between deployment and effects on the family. Stress issues have been discussed previously and will not be repeated here, but it should be noted that few studies have attempted to measure stress to assess its assumed function as the mechanism behind the effects of deployment.

Family functioning as a moderating variable. Family functioning has also been described previously. Much of the reviewed research has alluded to similar constructs, such as LaGrone's (1978) "military family syndrome," Shaw's (1987) "intrinsic adaptive capacities of the family," or Black's (1993) review identifying cohesion and adaptability as major themes in the literature. However, it has been a principal focus of interest in only a few studies (e.g., Eastman et al., 1990; Farrell & Barnes, 1993; Kelley, 1994b). Broadly speaking, family functioning can be seen as moderating the effect of deployment on family members' reactions. It is presumed that a more stable, better functioning family will be able to cope better with stressors, including those that are brought on by

deployment, which suggests that harmful effects would be muted for a well-functioning family.

The following sections review additional variables that have been found to moderate the effects of deployment on children and the family: age, gender and presence of siblings, and whether it is the mother or father who is deployed.

Effects of Age of Child

A number of previously reviewed studies have noted age effects in passing. See Kelley (1994b) in particular. In addition, Gabower (1960), Breger (1981), and Hillenbrand (1976) all agreed that age is a major factor in a child's adjustment to separation. Gabower (1960), in her study comparing children who were receiving counseling with a matched control group, found that paternal absence before the age of five increased the likelihood that children would exhibit aggressive behaviors that required counseling.

Breger (1981), a psychiatrist at a Naval hospital, reported clinical evidence from his work with military children and concluded that young children are the most vulnerable to separation. He suggested that the beginning of elementary school is an especially vulnerable time. This period happens to coincide with a phase when children are most likely to experience separation anxiety.

Oldaker's (1969) study of 1,200 students in Grades 2, 4, and 6 concluded that children in second grade and below were either too young to be fully aware of, or were more greatly protected from the reality of, the dangers of their father's overseas assignments. He further concluded that sixth grade students had developed sufficient maturity and understanding to cope with an absent parent. It was only at the fourth grade

level in combination with low socioeconomic status that an absent father had a negative effect on achievement.

Based on their experience at a military mental-health facility, Amen, Jellen, Merves, and Lee (1988) described the impact of parental deployment from a developmental perspective. Predeployment was found to be a difficult time for preschoolers. At this age, the authors contended, they were old enough to be aware that something was going on in the household, but not old enough for parents to prepare them for an upcoming separation. Without adequate preparation, these young children did not have enough time to constructively work through their feelings. Once the military parent was deployed, these preschoolers displayed difficulty negotiating the developmental tasks associated with object-constancy and separation-individuation. These children were also seen to be more clinging and dependent on the at-home parent. Amen et al. (1988) argued that this interferes with the independence seeking of preschoolers. In combination with a young child's inability to understand large amounts of time, this can result in severe grief reactions, marked by eating and sleeping problems, mood swings, irritability, and withdrawal. At the reunion period, some preschoolers were overjoyed, demanding of attention, and in need of reassurance that the military parent would not leave again. Other preschoolers rejected the returning parent. This type of reaction was usually temporary and a form of punishment a preschooler may use towards the returning parent, Amen et al. suggested.

Amen et al. (1988) reported that the majority of elementary-age children experienced guilt during the predeployment phase. These children appeared to enjoy the prospect of having the at-home parent to themselves but were also worried about their

father who was about to deploy. Similar to the preschoolers, elementary-age children tended to cling excessively to the at-home parent while the military parent was deployed. If the child had a close relationship with the father, his absence tended to cause feelings of abandonment and severe loneliness. During the reunion phase the elementary-age child often felt anger and/or jealousy along with happiness over the parent's return. It often took several weeks for the family to readjust to the father's return.

Amen et al. (1988) argued that adolescents may feel trepidation about their father's upcoming separation in the predeployment stage. Some children in this age group may express their anger, resentment, and fears in a rebellious manner while others react with denial, aloofness and the tendency to remove themselves psychologically from the family unit. Once the deployment has occurred, according to the authors, adolescents usually adjust better than the two younger age groups, especially if they have had previous deployment experience. On a positive note, Amen et al. stated that it is during this period that adolescents display increased independence and become more responsible. They believed that reunion is usually the easiest for this older age group unless the returning parent runs a stricter household than the adolescent experienced with the at-home parent.

Pincus, House, Christenson, and Adler (2001) described their collective experiences as military psychiatrists. They stated that children respond to deployment differently based on their developmental age. Infants (< 1yr) are most likely to appear listless and exhibit a decrease in eating. Toddlers (1-3 yrs) are most likely to respond the way the at-home parent responds. In other words, if the at-home parent is adjusting well, the toddler will also most likely adjust positively. If the at-home parent has difficulty

dealing with the deployment, the toddler may become tearful, sullen, throw tantrums, or have trouble sleeping. Preschoolers (3-6 yrs) may become irritable, depressed, aggressive, and fear the other parent will also leave. Toddlers have also been seen to regress in their developmental skills (thumbsucking, baby talk). School-aged children (6-12 yrs) are likely to complain and act out at home and/or school. Depression may be exhibited as they are old enough to realize the military parent may miss important events such as birthdays. Teenagers (13-18 yrs) have a tendency to be irritable, rebellious, or aggressive. It is also possible for them to lose interest in school, peers, and extracurricular activities.

With the increase of war time deployments as a result of Operation Iraqi Freedom and Operation Enduring Freedom, young children have been found to be negatively affected by single and multiple deployments, according to Barker and Berry (2009). In their study, 57 families with at least one young child (0-47 months) and an active duty member were surveyed once at least 3-4 months into a deployment (Survey 1) and then a second time approximately 4-6 weeks after the military member returned home from deployment (Survey 2). The families were categorized into one of three groups: those experiencing their first deployment, multiple deployment (those having experienced 2-4 deployments), and families that were currently not deployed. The single deployment group consisted of 21 participants (11 families completed the deployment survey, 14 families completed the reunion survey, and 4 families completed both surveys). The multiple deployment group had 22 respondents (15 families completed the deployment survey, 12 families completed the reunion survey, and 5 families completed both surveys). The not-deployed group consisted of 14 families.

The surveys were author-created based on deployment and attachment/child development literature. Both surveys collected demographic information. Survey 1 obtained retrospective ratings of the child's observed behavior responses (OBRs) and intense attachment behaviors (IABs) before deployment and then current OBR ratings. Items were rated on a 4-point Likert scale (*never, rarely, sometimes*, and *often*). Space was also given for subjective responses from the parents. The second survey requested information about significant events which occurred during the deployment and for the parents to rate OBRs and IABs of the child during the reunion. The nondeployment survey requested families to provide demographic information and the frequency of OBRs and IABs. These families rated their child's behavior 3 months before the survey administration as the predeployment ratings. Comparisons were made between this group's current IAB ratings and the deployed group's reunion IAB ratings.

Barker and Berry (2009) found that in comparison to children whose parents had not recently deployed, children with a deployed parent demonstrated increased behavior problems at deployment and attachment behaviors at reunion. Children described to have "anxious" and "difficult" temperaments showed increased behavior problems during a deployment. Older toddlers and preschoolers were also more prone to behavior problems than infants. The at-home parent stress levels, the total time away across multiple deployments, and the length of each deployment all were found to be related to behavior problems as well as increased child-attachment behaviors at reunion.

In summary, the age of children appears to be related to how they respond to a deployment. Younger children (Breger, 1981; Barker & Berry, 2009), particularly second graders and below (Oldaker, 1969) seem to be the most vulnerable and have

extreme difficulty adjusting to deployments. Adolescents (Oldaker, 1969) were found to be mature enough to cope. Those in sixth grade and above (Amen et al., 1988) had the experience and maturity to adjust easily to changes in family structure due to a deployment. Researchers found that children will respond differently to each deployment phase depending on which development stage they are experiencing (Pincus et al., 2001; Amen et al., 1988).

Effects of Gender of Child and Presence of Siblings

Previously reviewed studies have touched on these topics also. These include Jensen et al. (1986), who reviewed the available literature concerning the prevalence of psychosocial difficulties in military families. The authors found gender of child to play a role such that boys more than girls appear to be at an increased risk for separation problems. However, it appears that only a single study focused on these variables as moderators of the effects of deployment.

Hillenbrand (1976) conducted an exploratory survey to investigate the influence of birth order and number and sex of siblings on children's dependency, aggressiveness, and verbal and mathematical ability. The sample consisted of 73 boys and 53 girls whose parental absence due to deployment averaged 26 months. Of the sample, 77 children were from officer families and 49 were from enlisted families. The author examined (a) intelligence, with The Kuhlmann-Anderson Test, Form EF, 7th Edition; (b) behavior in the classroom, with the Dependency Striving Scale (Beller, 1955); (c) child's adjustment, with the Rating Scale for Pupil Adjustment (Science Research Associates, no date given); (d) parental identification, with a 58-item list of adjectives adapted by the author from Shippee-Blum (1959); (e) family makeup with the Herbst Day at Home Measure (Herbst,

1952); and (f) family demographics. Hillenbrand found that among those boys with brothers, the younger brother tended to be more aggressive. First born sons were found to have a tendency to view their mother as the dominant parent. For girls, maternal dominance was also associated with lower aggression and dependency. Boys with older sisters were found to be more aggressive and dependent, less socially and emotionally mature, and more impulsive. Girls with older sisters were described as more aggressive. Hillenbrand found the more the father was absent the greater the likelihood the male child would suffer from depression. She speculated that, under the circumstances of an absent father, a dominating mother with whom her children can identify may serve an adaptive function for the family.

On verbal and mathematical ability, Hillenbrand (1976) found that among sixth graders, with increased father absences there was an increase in the mathematics and analytical ability of the eldest son. Maternal dominance was positively correlated with higher scores for boys in verbal and quantitative abilities and total intelligence scores. On the whole, parental absence of the father seemed to have less of an impact on the daughter. Hillenbrand did find, however, that there was a small but significant decrease in quantitative ability for daughters whose fathers were absent.

According to teacher interviews, boys with older sisters tended to be poor achievers in the classroom. On the other hand, girls with older sisters were high achievers. Girls who had older brothers had higher I.Q. scores and better quantitative skills.

Based on this study, it appears that a child's behavior during a deployment may be influenced by whether or not they have a brother or sister. Whether the sibling is older

or younger also plays a role. In addition to behaviors, having siblings may also affect achievement (Hillenbrand, 1976).

Effects of Maternal Deployment

Applewhite and Mays (1996) appear to have conducted the only investigation targeted at maternal deployment. One hundred female military members were randomly selected from an Army installation in Maryland. They were matched for military rank with 100 male military members from the same installation. The female military members had 139 children whereas the male military members had 149, ranging in age from 4 to 18. The authors measured a child's experience with parental separation with an emphasis on the first separation of more than 30 consecutive days, current psychosocial functioning, the level of family stressors experienced during the past twelve months, and basic demographic data. The questionnaire combined the Psychosocial Functioning Inventory (Timberlake, 1979) and the Family Stressor Index (McCubbin, Patterson, and Wilson, 1982) with items written specifically by the authors for this research. Face validity was reported to be established by the authors although no details or other psychometric information was given.

The questionnaire was mailed to the 200 military members; 151 responses were included in the data analysis. *T*-tests indicated no statistically significant differences between the maternal deployed and paternal deployed in sample group means for current age, number of brief separations, length of time at current residence and length of first extended separation. However, children in the military mother group were older at the time of the first separation (4-years and older for the military mother group and 2-years and older for the military father group). More of the children from the military father

group were first born. The military mother group experienced significantly more moves than the military father group. Despite these demographic differences results of multivariate analyses indicated that children who had experienced an extended maternal separation had not been more adversely affected by the experience than children who experienced an extended paternal separation.

The Emotional Cycle of Deployment

As research on the effects of deployment has become more advanced, increasing attention has been paid to more precisely defining the stages of deployment. Clinical evidence suggests that the military family adapts differently to each stage of deployment, and that effects may differ greatly even within each stage. Two models (i.e., Logan, 1987 and Pincus et al., 2001) represent the most sophisticated theoretical representations to date of the effects of deployment on the family. Both were developed on the basis of prior findings and the authors' clinical experience, and a thorough review of the literature suggests neither one has been tested empirically.

The Emotional Cycle of Deployment model. Logan (1987) developed a model called the "Emotional Cycle of Deployment" (ECOD). This model consists of seven "emotional" stages which occur during the three phases of deployment, that is, (a) the period before deployment, (b) the time during deployment, and (c) reunion, when the deployment has ended. In Logan's model, Stages 1 and 2 of the seven stages occur before the actual deployment. In Stage 1 of this emotional cycle, about 4 to 6 weeks before the military member leaves, the family feels an anticipation of loss. Family members may have feelings of anger or depression while the military member experiences guilt. The second stage occurs in the days preceding the military member's

departure. The family goes through a period of detachment and withdrawal. During this period the family members feel the need to protect themselves. Withdrawal occurs and is often interpreted by the other spouse as rejection and this, in turn, creates more negative feelings.

Stages 3, 4, and 5 occur during the deployment. Stage 3 is described by Logan (1987) as one of emotional disorganization, when the at-home spouse may feel lonely, deserted, and without purpose. Emotions also include shock that the deployment has occurred and/or guilt from the feeling of relief that the second stage is over. It is during this time that there is a disruption caused by a change in the family system, roles, and routines due to the absence of the military member. Four to six weeks after the deployment has occurred, the spouse may evolve into Stage 4. This is the stage for recovery and stabilization with feelings of comfort and balance. Logan (1987) believed that this stage is one of the benefits of being a military spouse. At this point, things are starting to fall into place. Reorganization of family structure and the redistribution of responsibilities have been dealt with by the spouse. The military spouse is now able to take this opportunity to initiate new activities, accept different responsibilities, and be more independent, all while being securely married. The fifth stage occurs towards the end of deployment, usually about four to six weeks before the military member returns home. Anticipations of homecoming are felt along with feelings of joy and apprehension. Concerned that the family system will have to go through another change, the spouse reflects upon how the return of the military member will change their family life. Children will once again be a part of a dual rather than a single parent household.

Stage 6 occurs upon the military member's return. The family members may be together physically but are often apart emotionally and behaviorally. Roles must be renegotiated and changes which may have occurred during the deployment may be integrated into the family's routine. The seventh and final stage is the time for reintegration and stabilization. This occurs from 4 to 6 weeks after the deployment ends. In this stage there is again the sense of being a couple and a family. Logan (1987) describes this stage as one of using "we" and no longer "my" by the spouse when referring to community items. The family unit has once again been re-established and everyone is comfortable with their roles and routines.

The revised Emotional Cycle of Deployment model. Pincus, House, Christenson, and Adler (2001) revised Logan's (1987) Emotional Cycle of Deployment (ECOD). These four military psychiatrists integrated their professional experiences to form a more current view of the cycle of deployment with concomitant emotional responses. Pincus et al. stated that there are five stages of deployment rather than Logan's three phases. These stages are (a) predeployment, from the time of notification of deployment to when the military member leaves; (b) deployment, the first month of deployment; (c) sustainment, months two to five of deployment; (d) re-deployment, the month before the military member is to return home, typically month six; and (e) post-deployment, three to six months after deployment. This ECOD applies to deployments lasting six months or greater. Each stage is characterized by its own time frame, family members' behaviors and emotional challenges.

In Stage 1, predeployment, family members typically feel anticipation of loss with feelings of denial. Training for the deployment mission has begun and there is a sense of

physical and mental distance among family members. Anxiety about the upcoming departure may lead to arguments. Members may feel it is easier to be angry than to confront the pain and loss associated with the upcoming separation.

During Stage 2, deployment, mixed emotions are common. Some family members may feel initial relief that they no longer have to dread the date of departure while others are disoriented. Many family members report feelings of numbness, sadness, being alone, and abandonment. One major worry during this stage for the at-home spouse is lack of confidence as to whether or not he or she can handle crises at home. The at-home spouse may become overwhelmed from all of the responsibility from being a "single" parent.

The sustainment stage (Stage 3) is usually the period where new routines have been established and new sources of support have been found. The military family has readjusted their family structure and patterns to compensate for the temporary loss of a family member. Support groups through the military such as the Family Readiness Group can provide a network of people experiencing similar emotions and problems that can share coping strategies.

Stage 4, re-deployment, is typically one filled with excitement and apprehension. Family members are excited that the deployment is about to end but at the same time worried about the adjustment that will have to occur again. The at-home spouse may feel concerned that they may lose their new-found independence. Children may also be apprehensive about an added disciplinarian in the home.

Stage 5, post-deployment, begins with a honeymoon period where all family members are happy to be together again. This is followed by the military member

reintegrating into the family and the renegotiation of routines. Tension can occur because family members had expected to return to the same roles and routines as before the deployment. This is usually a difficult task as the at-home parent has become more autonomous, children have grown, and the individual experiences may have altered each of the family members' outlooks on life.

This reunion stage is also reported to be challenging to children with different responses based on developmental age. Babies may not recognize the returning parent and cry when held. Toddlers may be slow to warm up and avoid the returning parent. Pre-schoolers may have feelings of guilt and report feeling scared by the separation. School-age children typically demand a lot of attention. Teenagers are likely to be moody, avoid the returning parent, and appear not to care. Pincus et al. emphasized that this post-deployment stage is extremely important for the successful re-integration of the military member back into the family.

Summary of the Review of Literature

The literature that has examined military families and the effects of deployment is scattered. According to Jensen et al. (1986), many of the early studies of military families were not theory driven (e.g., LaGrone, 1978; Shaw, 1979) or empirically based, nor were terms operationalized (e.g., Kersey, 1981) or not operationalized consistently across studies, or studies looked simplistically at one or two variables to describe complex outcomes (e.g., Decker, 1978). Results of these studies were often descriptive and explanations were assembled post-hoc (McCubbin et al., 1976; McCubbin et al., 1996). Research was often anecdotal in nature (Bey & Lange, 1974; Lagrone, 1978) and firm conclusions have not been possible because of its sporadic nature. The lack of a

theoretical base led to research which provided breadth, but not depth (McCubbin et al., 1976), indicating the need for more methodologically sound studies to increase our knowledge of military families.

In the past three decades, methodological rigor has improved, and more studies have been based on large samples of representative families (e.g., Decker, 1978; Eastman et al., 1990; Ender, 2000; Flake et al., 2009 and Jensen et al., 1996 each studied over 99 families). One major advance has been the movement toward guiding research on a firm theoretical foundation of attachment theory (Kelley, 2002; Kelley et al., 2001) and other models (e.g., Huebner et al., 2007). The use of well-validated measures has increased, and the FACES measures have become something like the standard in the field for measuring family structure (Farrell & Barnes, 1993; Kelley, 1994b). Nonetheless, most studies in the field have been focused only on a few variables and have been undertaken from a narrow perspective.

Different definitions of deployment have been used across studies, for example, deployment only (Decker, 1978), deployed/not deployed (e.g., Gabower, 1960; Chartrand etal., 2008), or prior to deployment, deployment, and post-deployment (e.g., Bey & Lange, 1974; Kelley, 1994a; Kelley, 1994b). However, deployment effects depend crucially on when during the deployment cycle they are measured (Bey & Lange, 1974; Jensen et al., 1996; Parry, 1986).

Theoretical background. A systems approach to families appears to offer the optimum theoretical base for research on military families (Braden & Sherrard, 1987; Bronfenbrenner; 1986; Minuchin, 1974; Minuchin & Fishman, 1981). This approach can help determine the types of family patterns which are necessary for healthy functioning

within a military family. It can further explore what types of families are better able to endure and develop within the military community and why some families are more vulnerable to the stresses (deployments, in this case) of life in the military. The best-developed version of this approach is the Circumplex Model of Marital and Family Systems (Olson et al., 1979). In this model, family functioning is seen mainly as the product of two dimensions: cohesion and adaptability. An extreme position on either dimension is dysfunctional; the ideal for family functioning is a moderate level on both (Olson & Gorall, 2006). An advantage of the Circumplex Model is its associated FACES IV measure (Gorall, 2002), which is designed to quantify the two dimensions.

A useful model of family stress was outlined by McCubbin and Patterson (1983), in which a family's response to a stressor depends on three things: (a) the actual stressor, (b) the family's resources in meeting the demands of the stressor, and (c) the meaning attached to the event by the family. Research has been conducted in both civilian and military settings regarding family functioning, stress, and children's behaviors. Farrell and Barnes (1993) demonstrated the positive relationship between family cohesion and adaptability and individuals' psychological functioning, and Kliewer and Kung (1998) showed that family cohesion moderated stress's effect on children. In military families, Eastman et al. (1990) established that military families were similar in family structure to normal civilian families, and that parental deployment was stressful.

Deployment's effects on the family must be understood in the context of the military lifestyle. This includes stressors not commonly found in civilian life, including: (a) high rates of mobility, (b) long separations from family members, (c) isolation from the extended family, (d) threat of injury, imprisonment, or death of the military member,

(e) an expectation that family needs will be subservient to military goals, and (f) a high incidence of young children living in the home, and often these stressors act in conjunction, especially during deployment (Black, 1993; Bowen, 1985). Earlier research on deployment, and some more recent research, generally recorded deployment as an either/or state: either the military parent was present or absent. The implicit assumption of this division was that stress and any consequent effects on the family are essentially constant during each of these periods. However, a number of researchers (e.g., Bey & Lange, 1974; Jensen et al., 1996; Parry, 1986) argued that different stages during the cycle have different effects, and Logan (1987) and Pincus et al. (2001) developed detailed models predicting that stress will vary over time, even within stages.

Research on military families. A series of studies sparked by LaGrone (1978) debated whether or not military families functioned as well as civilian families. Studies varied widely in method (clinical record reviews, general surveys, etc.) and came to widely varying conclusions. However, the studies that drew from more representative samples and were more controlled (e.g., Morrison, 1981; Watanabe, 1985) tended to show no greater levels of dysfunction in military families.

Results of studies on the effects of relocation on both civilian and military families were mixed. However, most concluded that parental deployment caused distress in children (Pittman & Bowen, 1984; Shaw, 1979, 1987).

A number of studies specifically examined effects at different stages of deployment, the main focus of the current study. Kelley (1994b) and Kelley et al. (2001) compared children of deployed and non-deployed military parents and found some negative effects of deployment and especially combat deployment. Barker and Berry

(2009) reported that compared to not-deployed parents, children of deployed parents exhibited an increase in behavior problems. Other researchers (e.g., Bey & Lange, 1974; Jensen et al., 1996; Parry, 1986) found not only that deployment adversely affected family functioning, and increased negative emotions such as anger and anxiety, but that different stages of deployment, even reunion, were associated with different symptom patterns. Several studies (e.g., Eastman et al., 1990; Farrell & Barnes, 1993; Kelley, 1994b) argued that family functioning can be seen as moderating the effect of deployment on family members' reactions, such that harmful effects may be muted for a well-functioning family. Age of child was noted by several researchers (Breger; 1981; Gabower, 1960; Hillenbrand, 1976) to interact with deleterious effects of deployment such that preschoolers were most affected. Hillenbrand (1976) found stronger effects among boys, and Applewhite and Mays (1996) found no worse effects when the deployed parent was the mother than when the parent was the father.

The majority of literature concerning the effects of parental absence due to a military deployment suggests that adjustment problems for children are common, though temporary (e.g., Black, 1993; Crumley & Blumenthal, 1973). Frequently reported problems include increased aggression (Hillenbrand, 1976), anxiety (Pierce, 1978), somatic complaints (Yeatman, 1981), clinging behavior to the at-home parent, and both externalizing and internalizing behaviors. Fewer overall deployments regardless of length seem to be better for all children (Jensen et al., 1989). It appears to be difficult to separate which behavior changes are a result of the deployment itself and which are due to increased stress on the part of the at-home parent (Barker and Berry, 2009; Flake et al., 2009) and/or the family system as a whole.

A number of studies found that parental absence as a result of a military deployment has little or no effect (Pederson, 1966) or even positive effects on a child (Kersey, 1981). Some of the literature also suggests that how a family copes with the pressures and resulting problems which accompany the military lifestyle may determine whether these stressors are viewed as adaptive challenges or detrimental influences (e.g., Heubner et al., 2007). It has been suggested that responses are a function of (a) previous experiences, (b) intensity of the stressor, (c) availability of social support, (d) socioeconomic status, (e) family attribution regarding the stressor, (f) child participation in activities and (g) family and individual characteristics (Jensen, Lewis, & Xenakis, 1986; Wong & Gerras, 2010; McCubbin, Dahl, & Hunter, 1986).

Rationale for the Study and Research Questions

The United States military has become increasingly aware of the influence of family on the performance of military personnel. Research with military families has provided evidence that problems within a military member's family may negatively affect performance, increase the likelihood of separation from the armed forces, and lead to retention difficulties (Nice, 1981). The war in Iraq as well as heightened global concerns about terrorism have resulted in military personnel and their families being faced with frequent and extended deployments. Deployments are a well-documented source of stress for military families (Bowen, 1985; Eastman et al., 1990; Jensen et al., 1986). Deployment cycles may last anywhere from six months to more than a year. These deployment cycles, estimated at 30-50% of the time, are a major disruption to family life.

Previous studies have suggested that fighting, defiance, fear, depression, anxiety, and school difficulties are common among children of military families whose fathers are absent (Dickerson & Arthur, 1965; Lagrone, 1978; White, 1976). The loss of a parent to deployment may increase feelings of anxiety in younger children or lead to school problems in older children (Jensen et al., 1989). Yeatman (1981) found that children experience disciplinary problems, phobias, and somatic complaints during parental separations or shortly after their return.

Healthy family functioning, especially family cohesiveness, has been found to be associated with lower levels of stress in the civilian literature (Kliewer & Kung, 1998). Low levels of family cohesiveness and the occurrence of an undesirable life event have been found to be associated with a psychiatric diagnosis for children (Cuffe et al., 2005). In addition, cohesive families were found to have more academically achieving children (Annunziata et al., 2006). Family functioning appears to have a positive relationship with behavioral and academic outcomes.

Generally, the study of military families and the effects of deployment in particular have been disorganized, ad hoc, and not driven by any larger model. Most research has implicitly treated families as alike and has drawn broad conclusions. In many of these studies, terms were not clearly operationalized, and changed across studies. Past research has resulted in mixed and contradictory findings.

This study investigated the relationship between the functioning of the family system and individuals within the system during the various stages of deployment. More specifically, this study is the first to test the Models of the Emotional Stages of Deployment, and to examine the impact of deployment on children's behavior and

academics, and to study how family functioning contributes to or ameliorates adverse effects on children.

Research Questions

Question 1: Does deployment stage affect behavioral and academic functioning of the child and levels of family stress? More specifically, are the behavioral and academic functioning and family stress levels during the "not-deployed" stage the least adversely affected? Does the behavioral and academic functioning of the child decrease mildly and family stress levels increase mildly during the "late reunion" and "early predeployment" stage? Does the behavioral and academic functioning of the child decrease moderately and family stress levels increase moderately during the "late deployment" and "early reunion" stages? Does the behavioral and academic functioning of the child decrease greatly and family stress levels increase greatly during the "late predeployment" and "early deployment" stages?"

Question 2: Is healthy family functioning associated with positive behavioral and academic functioning of the child?

Question 3: Is there an interaction between deployment stage and family functioning, such that deployment has stronger negative effects on behavioral and academic performance of the child at lower levels of family functioning?

Question 4: In addition to its direct effect, does deployment have an indirect negative effect on behavioral and academic functioning of the child by affecting stress? That is, does deployment lead to higher levels of stress, and does stress itself lead to negative effects on the child by increasing negative behaviors and lowered academics?

Question 5: Does child gender effect behavioral and academic functioning of the child, such that girls would show better functioning than boys?

Question 6: Does age of the child interact with other effects such that younger children would show stronger negative effects of deployment?

Question 7: Does coping interact with other effects such that families with higher coping scores would show less strong negative effects of deployment?

Question 8: Do deployment stages in which the military parent is absent due to a deployment, compared to deployment stages in which the parent is present (as in many previous studies), have a negative effect on behavioral and academic functioning of the child and family stress?

CHAPTER III

METHOD

Overview and Goals

This study examined the relationships among deployment, family functioning, and children's behavioral and academic performance. There were three principal goals of the study: gathering current data under present conditions, use of a family systems approach to measure family functioning, and an empirical test of Emotional Stages of Deployment models.

Statement of the Problem and Purpose of the Study. As noted in the Literature Review, there have been relatively few studies of the effects of military deployment on the family, especially in recent decades. These studies have reported mixed findings, with some showing negative effects on children, others no effects, and a few positive effects. However, the studies have varied greatly in their designs, measurements, and populations, and interactions with variables such as deployment stage and age and gender of child have made it difficult to determine relationships between deployment and its effects. Also, very few studies have been conducted since there have been significant changes in the U.S. military and society as a whole. Thus, one goal of this study was to gather current data that reflects these changes.

Little research on military families has examined the effects of deployment from a family systems perspective. This research, therefore, appears to be only the second study (the FACES III was used by Kelley, 1994b) to employ a measure of family functioning that is grounded in the Circumplex Model in a study of the effects of deployment.

In most of the previous research, stages of deployment were defined as merely deployed or not deployed or, at most, as predeployment, deployment, and reunion. Usually, these distinctions were based on anecdotal and clinical reports, rather than on any empirical evidence regarding differences between them. For example, "not deployed" could include periods of stability when no deployment was anticipated, stressful times immediately preceding deployment, and stressful but exciting times of reunion. More sophisticated models of different stages (which take into account variations in stress within these divisions) have been proposed by Logan (1987) and Pincus et al. (2001), but neither of these models appears to have been tested empirically.

Research Participants

In an urban county in the Southeastern United States, 201 Navy families were recruited to take part in this study, thus power was sufficient for hypothesis testing. These families have a child who attends the school district's public school system, which is in no way affiliated with the military. These families should not have felt coerced or obligated to participate as no one on the military base was aware of their decision to accept or decline the invitation to join this research study. The participating families varied in how long they have been active in the armed forces as well as in the military member's rank. Participants were Navy families with children ages 6-12 (approximately grades K to 5) and 72 teachers. Children 5 years and younger and adolescents ages 13-18 were excluded from the study because the former likely could not comprehend the impact a military-induced separation will have on them and adolescents are facing multiple normative stressors associated with puberty and school transitions (Huebner et al., 2007) making it difficult to determine whether behavioral and academic changes are a result of

a parental deployment. Children with dual military parents and families who relocated within the last three months were also excluded from this study. Relocation has been reported to be a stressful aspect of military life (Ender, 2000). Families in which either the mother or father is the military parent were recruited, but only families where the father is the military parent responded to the recruitment. Step-parents were considered parents for this study.

Research Design

This study investigated possible negative effects of a military deployment on a child's behavior functioning and academic achievement and levels of family stress, with family cohesiveness and adaptability as moderating variables. The roles of the child's age and gender as they relate to the deployment–behaviors and deployment–academics relationship were also examined.

A natural experiment is similar to a true experiment. In a true experiment, participants are randomly assigned to groups by the experimenter. In the case of a natural experiment, although assignment of participants to groups is not controlled by the experimenter, it is assumed that participants were assigned to groups by a random or nearly random process. In the current study, the stage of deployment was not controlled by the researcher and could not be randomly assigned, but across the sample of military families, the stage of deployment in which a family is functioning should be effectively random—that is, it is highly unlikely that the stage of deployment a family is in will be related to any other characteristic of interest, such as age of the child or the level of family functioning. The not-deployed stage served as a control group, because it

represents the typical condition of families. Other stages of deployment were compared to the not-deployed stage to estimate the effects of deployment on children.

While it is not possible to definitively establish causality with such a design, it is possible to infer some causal directions among the variables. Obviously, a deployment is more likely to be a cause of subsequent distress in a child than the other way around.

This study was also cross-sectional in design. In a cross-sectional research design, changes in a population over time are studied by collecting data at one point in time, but from samples that vary in the stage that they are experiencing. Changes over time are ideally studied in a longitudinal design in which the same individuals are tested repeatedly. However, due to the high relocation rate of military families, it is often difficult to involve them in a longitudinal study, and to capture all stages of deployment for a single family would require a period of a year or more. As an alternative, a cross-sectional design can be thought of as a simulated longitudinal design that involves describing differences in the characteristics of subsamples that are experiencing different stages of the longitudinal process. The current study gained some of the advantages of the longitudinal design by sampling families at different stages of deployment.

Variables. Independent or presumed causal variables included: (a) deployment (in which the military parent is either absent from or present in the home), (b) stage of deployment (including not only deployed/not deployed, but the various stages of anticipation and adjustment defined by Logan, 1987, and others), (c) age of child, (d) gender of child, (e) gender of military parent, and (f) socioeconomic status of the family.

The moderating variables were family functioning as measured by the FACES IV, and family coping strategies as measured by the Family Crisis Oriented Personal

Evaluation Scales (F-COPES). Family stress level (measured by the Perceived Stress Scale, PSS) was treated as a mediating (intervening) variable; that is, a dependent variable of deployment but a presumed causal variable of other dependent variables. Dependent variables were measures of behavioral and academic functioning of the child as measured by the Devereux Behavior Rating Scale – School Form (Parent and Teacher) and change in grades between deployment stages.

Measures

Family functioning. This research employed the Family Adaptability and Cohesion Scale (FACES), version IV. According to Brassard (1986) this is one of the most widely used measures of family functioning. The originators of the Circumplex Model (Olson, Sprenkle, & Russell, 1979) developed the FACES as a self-report empirical assessment of family types. FACES provides information on a family's cohesion, flexibility, and communication levels. It can be administered to one or more family members, including children. A copy of the FACES IV can be found in Appendix B.

The FACES instrument has gone through several revisions since its creation, with changes attempting to improve reliability and validity. The current version, FACES IV, was created because earlier versions (FACES I, II, and III) had linear relationships with family functioning rather than the curvilinear relationship hypothesized by the Circumplex Model (Olson & Gorall, 2006). FACES IV (Olson et al., 2002) has corrected this. Also, the previous versions did not adequately measure the high extremes of cohesion (enmeshment) or flexibility (chaos). FACES IV taps the full range of these dimensions.

Tiesel and Olson (1997), informed by experts from the field of marriage and family therapy, originally developed 97 items for the FACES IV. Face and content validity were tested using a random sample of practitioners from the American Association of Marriage and Family Therapy. Items were reduced to 60 and then further reduced following a principal components analysis. This newest version has been found to be reliable and valid for research and clinical use. It is able to discriminate between healthy and problematic-functioning families with clinical validity (Gorall, 2002).

To assess the psychometric properties of the FACES IV, Tiesel and Olson administered it to 2,359 individuals from nine states. To assess the convergent validity of this measure, the General Functioning scale of the Family Assessment Device (FAD; Epstein, Baldwin, & Bishop, 1983) and the Health/Competence scale of the Self-Report Family Inventory (Hampson, Hulgus, & Beavers, 1991) were also administered. Correlations were strongest between the Chaotic and Disengaged subscales, indicating acceptable convergence. The Enmeshed and Rigid subscales showed low convergence. Correlations were all negative and in the expected direction, which supports the curvilinear hypothesis in that families with higher scores on the FACES IV subscales demonstrate more problematic functioning (Tiesel & Olson, 1997).

Reliability and validity of the FACES IV were reported by Tiesel and Olson (1997) to be very good. Cronbach's alphas for the four subscales (Cohesion, Flexibility, Family Communication, and Family Satisfaction) ranged from .75 to .87. Test-retest reliability assessed at three week intervals yielded coefficients ranging from .83 to .93. Factor analysis indicated that the items loaded on four distinct factors, Enmeshed,

Disengaged, Chaotic, and Rigid, with coefficients ranging from .35 to .80. This provides support for the validity of the scale.

FACES IV is a 42-item, paper and pencil, self-report instrument. An individual 12 years and older may complete this measure. Scales assess functioning on two main dimensions of the Circumplex Model: Cohesion and Flexibility. Higher scores indicate greater cohesion or flexibility. Moderate levels of each are considered healthy. Responses are based on a five- point Likert scale ranging from 5 = *Strongly Agree* to 1 = *Strongly Disagree*. Raw scores are converted to percentiles based on the normative population; hence, as shown in Figure 1, those in the bottom 15% of the population on Flexibility would be considered Rigid. Also provided is a Balanced/Unbalanced ratio score. This score allows for the assessment of function/ dysfunction in a family system and assesses curvilinearity. The higher the ratio over 1, the more balanced the family system and the lower the ratio, the more unbalanced the system. In addition, 10 items each are included to assess Family Communication and Family Satisfaction.

Behavior functioning. The Devereux Behavior Rating Scale-School Form, Ages 5-12 (DSF; Naglieri, LeBuffe, & Pfeiffer, 1993) (see Appendix C) was used to assess behavioral functioning of the children. Behavior rating scales have historically been used by clinicians to measure behavior functioning through a variety of perspectives. Rating scales have multiple advantages. They generally have numerous items which cover a broad range of behaviors. These scales may be completed by any observer of a child, such as a parent, guardian, or teacher, to assess the child's behavior over a period of time (Martin, Hooper & Snow, 1986). Observations are made in the subject's natural environment by persons who are familiar to the subject. This prevents the subject from

being inhibited by the presence of a stranger in their setting. These familiar raters tend to be knowledgeable about the child's behaviors in a variety of settings over a period of time. They are generally standardized with available normative data based on a comparison group. Finally, rating scales tend to be low cost and are not time consuming (Elliot, Busse, & Gresham, 1993).

One criticism of rating scales is that they may be prone to bias. Observer bias may occur as a result of the rater's emotional investment in the subject or distortions of recall (as when rare but memorable events are given undue weight). Response bias is also possible when there is a halo effect or the rater's understanding of the behavioral criteria is unclear. Raters may also vary in leniency or severity or restrict the range of responses to the middle (Elliot, Busse & Gresham, 1993).

The DSF was created to measure the four areas of problem behaviors that are specified in the federal definition of serious emotional disturbance found in the Education for All Handicapped Children of 1975 (PL 94-142) and the Individuals with Disabilities Education Act of 1990 (PL 101-476). The four areas of problem behaviors, which are also the four subscales of the DSF, are Interpersonal Problems (IP), Inappropriate Behaviors/Feelings (IBF), Depression (D), and Physical Symptoms/Fears (PSF).

The DSF version for Ages 5-12 is a 40-item paper and pencil instrument that takes an average of 5 to 10 minutes to complete. There are 10 items in each of the four subscales. The items are rated on a scale of 0 to 4 (0 = *never*, 1 = *rarely*, 2 = *occasionally*, 3 = *frequently*, and 4 = *very frequently*). Raw scores for each of the subscales yield standard scores (mean = 10, *SD* = 3). The sum of the 40 items is used to obtain a Total Test standard score (mean = 100, *SD* = 15). Different norm tables are

provided for males and females. Normative comparisons can be made at the Total Scale, subscale, and item levels. Scores that are outside of the normal range are considered to suggest atypical behavior at each level. A standard score which is one *SD* above the mean on the Total Scale and the four subscales are indicated as cutoffs by the authors for determining significant emotional or behavioral problems.

The authors selected the items for this scale based on a review of (a) the original Devereux scales (Spivak & Spotts, 1966; Spivak et al., 1967); (b) the diagnostic criteria in the *Diagnostic and Statistical Manual of Mental Disorders*, Third Edition-Revised (*DSM-III-R;* American Psychiatric Association, 1987); (c) revisions proposed for the *DSM-IV* (American Psychiatric Association, 1994); (d) other behavior rating scales; and (e) the literature on behaviors in children that indicate social-emotional-behavioral problems. Field testing reduced the item pool to a final set of 40 items (Goh, 1995).

The DSF was standardized at more than 30 sites across the United States in 1991. The standardization sample consisted of 3,153 children and adolescents ages 5-18 years, and was representative of the U.S. population in terms of age, sex, geographic region, race, ethnicity, and socioeconomic status according to 1990 census data. Ratings were obtained from parents (60%) and teachers (40%) for students in general and special education.

The internal reliability coefficients for the DSF ranged from .92 to .97 for the Total Scale and .73 to .94 for the four subscales. Test-rest reliability ranged from .52 to .85 for the Total Scale and from .34 to .86 for the four subscales. It was noted by the authors that the greater the time interval between administrations, the lower the coefficient. Interrater reliability ranged from .40 to .53 for the Total Scale and from .36

to .60 on the four subscales. Intrarater reliability ranged from .57 to .58 for the Total Scale and from .56 to .77 for the four subscales (Naglieri et al., 1993).

Judgmental methods were used by the authors to establish content-related validity of the DSF. Construct-related validity was investigated by item-total correlations. Naglieri et al. (1993) found that most of the items correlated significantly with the total score. Six validity studies, designed to examine the effectiveness of the DSF in discriminating between normal and clinical children (i.e., children with emotional disturbance, multiple *DSM-III-R* disorders, etc.) were reported by the authors. Consistent results were reported by these studies indicating that clinical children scored significantly higher than control group children on the Total Scale as well as the four subscales. When using one *SD* above the mean as the cut-off score, the Total Scale was determined to be effective in differentiating clinical from normal children. Overall correct classification rates ranges from 73.2% to 93.0% for the 5 to 12 age group. In addition, across the six validity studies, the DSF was found to be more accurate in predicting normal group membership (83-100%) than clinical group membership (47-93%).

In a critical instrument review by Goh (1995), it was concluded that the Devereux Behavior Rating Scale – School Form is a "well designed instrument" that competes strongly against other available behavior rating scales. It is a "useful" and "practical" assessment tool for working with children and adolescents (p. 331).

Since the Devereux was to be used for comparisons between groups, and not for diagnostic purposes, scores were not converted to standard scores. The figures reported below are for raw scores, except where indicated.

Stress. The Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983) was used to measure stress levels (see Appendix D). The PSS is a self-report designed to measure the degree to which situations in one's life are appraised as stressful. The questions are general so that the scale can be used to measure stress whether it is due to a relocation, a traumatic accident, a deployment, etc. For example, "In the last month, how often have you been upset because something happened unexpectedly?"

The PSS is a 10-item self-administered questionnaire. Each item is rated on a 5-point scale ranging from 0 = *never* to 4 = *very often*. Responses are summed. The higher the score the higher the level of stress experienced by the respondent. Cohen and his colleagues (1983) reported coefficient alphas for the PSS to range from .84 to .85 for a sample of college students and .86 for a sample of adults in a smoking cessation program. The authors reported test-retest correlations of .85 for the sample of college students when administered the scale two days apart, and .55 for the sample of adults in the smoking-cessation program when administered the scale six weeks apart.

Coping strategies. The Family Crisis Oriented Personal Evaluation Scales (F-COPES; McCubbin, Olson & Larsen, 1981) was used to measure family coping strategies (see Appendix E for permission letter and F for a copy of the scale). This is one of the few instruments available that identifies the coping strategies of the entire family, rather than just an individual (Sorensen, 1993).

The F-COPES was designed to measure the coping dimensions of the Double ABC-X Model developed by McCubbin et al. (1981). This model was a revision of the ABC-X formulation developed by Hill (1949), which was designed to investigate family stress due to father-absence during World War II, and which emphasized dimensions

similar to coherence and flexibility. Therefore, it appears to be particularly appropriate for use in the proposed study.

The F-COPES was originally derived from a convenience sample of 119 college students. Items were developed to identify problem-solving and behavioral strategies utilized by families who are undergoing challenging life circumstances. Coping strategies identified from the professional literature were included in the original pilot instrument that consisted of 49 items. Factor analysis on the 49 items reduced the item list to 30. Since its creation, this scale has been used to measure coping in over 90 studies (McCubbin et al., 1981).

The measure has five sub-scales: Acquiring Social Support, Reframing, Passive Appraisal, Mobilizing Family to Acquire and Accept Help, and Seeking Spiritual Support. The Acquiring Social Support subscale consists of 9 questions that measure the family's ability to obtain and utilize social support from relatives, friends and neighbors. The Reframing subscale is comprised of 8 questions and measures the family's ability to redefine problematic situations to make them less stressful. The Passive-Appraisal subscale has 4 questions that are used to measure the family's ability to accept a difficult situation by minimizing their reaction. The Mobilizing Family to Acquire and Accept Help subscale contains 4 questions that measure the family's ability to seek out and use community resources. Lastly, the Seeking Spiritual Support subscale has 4 questions that are used to measure the family's ability to acquire spiritual support.

The F-COPES is a 30-item paper and pencil instrument which takes an average of 15 minutes to complete. The items on this instrument are scored on a 5-point Likert-type scale (1 = *strongly disagree*, 2 = *moderately disagree*, 3 = *neither agree nor disagree*, 4 =

moderately agree, and 5 = *strongly agree*). Subscale scores are obtained by summing the number chosen by the respondents for each item. Four items require reversal (5 =1, 4 =2, etc.) to ensure that all items are weighted in a positive direction for analysis and interpretation of the results. These reversed items comprise the Passive Appraisal subscale. A total F-COPES score ranges from a low of 30 to a high of 150. Effective coping in response to challenges is indicated by a higher overall score (McCubbin et al., 1981).

In order to establish the psychometric properties of the F-COPES, comparative data were developed for both the subscales and the total score. A total of 2,740 husbands, wives, and adolescents were surveyed as a normative sample. The instrument has been used with several thousand respondents and has been found to have internal consistency in the subscales with alphas ranging from .63 to .83 (Fischer & Corcoran, 1994), considered to be good.

A test-retest reliability study was conducted by the instrument's authors using a sample of 116 participants with a mean age of 30. The time lapse between the first and second test administration was 4 weeks. Test-retest reliabilities for the subscales were: Social Support: .78, Reframing: .61, Spiritual Support: .95, Mobilizing Resources: .78, and Passive Appraisal: .75, and Total score: .81. The authors suggest that the more concrete behavioral items on the Social Support, Spiritual Support, and Mobilizing Resources subscales provided greater response consistency over time than the factors relating to more cognitive adjustment items on the Reframing and Passive Appraisal subscales. Additionally, the normed sample was randomly split into two halves and

factor analyses conducted on both. The authors used this as a "validity check" (McCubbin, Thompson, & McCubbin, 1996, p. 459).

Reliability analysis was conducted that compared alpha levels for the normative sample with this research. Cronbach's alpha for the subscales were all at acceptable levels: Social Support = .83, Reframing = .82, Spiritual Support = .80, Mobilization of Resources = .71, and Passive Appraisal = .63.

Background Questionnaire. A questionnaire was created by the author (see Appendix G) to gather background characteristics about the sample. It contained questions about the student's age, grade, birth date and gender. It asked for the age and gender of any siblings. It also helped to establish the stage of deployment the family was experiencing at the time of the study and the departure and/or return date of the military member and the length of deployment. Location of deployment was obtained to determine whether it was a combat zone. Rank of military parent and occupation of the at-home parent were also sought to estimate each family's socioeconomic status.

Academic data. Following return of the above mentioned measures and the consent form, the researcher electronically retrieved two sets of report card grades (current grades and grades from approximately 7 months before, so that families would be in a different deployment stage) using a district-wide computer-based inventory system. A comparison between grades in the same or similar subjects (English, math) should be a sensitive indicator of change in academic performance. Since children generally earn grades fairly consistently over time within a particular subject, a small decline or improvement over time should be easily detected. Academic performance

also has the advantage of being the only objective measure available across deployment stages.

Procedure

Military families from an urban county in the Southeastern United States were invited to take part in this study. This location is the home of two large Naval bases. Approval was given by the Institutional Review Board at the researcher's University. Permission to conduct the study was sought from the school district surrounding the bases. Once the project was approved by the county's Institutional Review Board, the school district granted their permission. In addition, the researcher had discussed the potential project with the principals of the five elementary schools closest to the base, who had all agreed to cooperate if and when the project was approved. For demographic purposes, the schools maintain lists of students who are military dependents for and agreed to provide their names and contact information upon approval by the school district. Once a list of students was obtained from the schools, the names were screened electronically through the district-wide database for enrollment dates. Those students who relocated to this school district within the last three months were excluded from the study and removed from the mailing list because they did not meet the residency requirements. Questionnaire packets were mailed to approximately 600 families that appeared to meet the study criteria.

The questionnaire packets included letters of introduction, the measures described above, and an informed consent form (see Appendix H) for participation in this study. Mailings contained three items: the Parental Informed Consent, a stapled packet with the Background questionnaire, FACES-IV, DSF (for the parents), PSS, and F-

COPES, and a stamped return envelope to encourage participation. The packets were addressed "To the parents of _____". One student from each family was invited to participate. In the case of families with more than one child in the school district, one child was chosen at random by means of a table of random numbers.

Because the study topic is of direct interest to military families, a high return rate was expected. Previous similar studies yielded rates of approximately between 40% and 80% (Applewhite & Mays, 1996; Eastman et al., 1990; Jensen et al., 1995).

After responses were received, the grades of the child participants were obtained. A copy of the DSF was also submitted to the participating student's classroom teacher for completion along with a teacher consent form (see Appendix I). This allowed for the comparison of behaviors between home and school. Following this the consent letters were separated from the packets to protect confidentiality.

Participant Protection

Because there was no manipulation of the child's environment nor direct interaction with either the children or parents, concerns for the safety and well-being of participants were minimal. They appear to fall into two categories: indirect effects on the child from adult participant, and loss of confidentiality. Indirect harmful effects might occur if the parent, in filling out the rating scales, were afterwards to treat the child in a prejudicial manner. This was unlikely.

Confidentiality was protected as follows. The Informed Consent and questionnaire packet included matching randomly-assigned identification numbers, so that, after all data had been gathered, the number was removed from the Informed Consent so as to eliminate the link between data and individual identities. The principal

investigator was the only individual who had access to questionnaire data. For all data, names of students were replaced with the family identification numbers. Grades were stored in an Excel spreadsheet maintained by the researcher. Electronic backups of the data were saved in a separate confidential and secure location in the researcher's home. Informed consent forms were kept in a locked file cabinet, separate from the other materials.

Families should not have felt pressured to participate as their identities were anonymous. The command where the military member works did not know of the family's involvement with this study.

Background to Data Analysis

This section addresses some preliminary issues regarding the data to be analyzed: (a) how stage of deployment was treated, (b) summary of predictor and outcome variables, (c) the basic model of relationships expected among the variables, and (d) a restatement of the hypotheses in terms of the variables.

Based on responses to the Background questionnaire (see Appendix G), the families' stage of deployment was categorized in two ways, first as deployed versus not deployed so that results could be compared to earlier studies that categorized parents this way, and second as seven phases of deployment based on Logan's (1987) model: (a) early predeployment phase, greater than 5 weeks before a deployment; (b) late predeployment phase, five weeks or less before a deployment; (c) early deployment phase, up to five weeks after the deployment begins; (d) late deployment phase, greater than five weeks after the deployment begins; (e) early reunion phase, up to five weeks after military member returns from deployment; (f) late reunion, greater than five weeks

after the military member returns from deployment and up to 3 months; and (g) not deployed, not currently scheduled to leave for a deployment.

Most analyses were conducted not on phases of deployment per se, but on the phases re-grouped into hypothesized levels of strain due to deployment. There were several reasons for this. First, it was not clear ahead of time whether all the phase groups would have a sufficiently large number of participant families to be able to test them as distinct groups. Second, the Emotional Stages of Deployment models were never quantified in terms of how much disturbance was expected to occur at each phase. Instead, Logan (1987) and Pincus et al. (2001) had predicted some general effects at different time periods in the cycle of deployment. The present research is an attempt to extend these and make them more concrete and testable. Third, the effects predicted by these theorists and other researchers did not fall into a simple, linear pattern. Rather, it was predicted that strain due to deployment would increase from none, to minimal, to high, and then gradually decline. It was not clear how such a pattern could be tested simply. Finally, as a first test of the models, it was felt that comparing four levels of strain hypothesized to have a roughly linear relationship to deleterious effects would be stronger than a complex, seven-group division of the participants.

Therefore, it was hypothesized that stages would fall into approximately this order from least to most adverse effect: (a) the not deployed group, (b) the late reunion and early predeployment groups, (c) the late deployment and early reunion groups, and (d) the late predeployment and early deployment groups.

In summary, there were five main predictors: Deployment Stage (measured dichotomously and in four presumed stages of strain), scores on the Family Adaptability

and Cohesion Scale (FACES IV) to measure family functioning, child's age and gender, and scores on the Family Crisis Oriented Personal Evaluation Scales (F-COPES) to measure family coping strategies. There were four main outcome variables: the Devereux Behavior Rating Scale (DSF, or Devereux) to assess behavior functioning of the children at home (parent form) and at school (teacher form), change in report card grades, and Perceived Stress Scale (PSS) scores to assess family stress levels. It was hypothesized that perceived stress could affect the other outcome variables. In addition, the subscales of the Devereux and FACES IV were used independently. For all the outcome measures, mean scores were compared between groups when predictors were categorical, or by correlations when predictors were continuous.

Figure 2 illustrates the basic model of relationships expected among the variables. It was expected that deployment stage, stress, family functioning, and child age and gender would all have direct effects on behavioral and academic functioning of the child. Furthermore, deployment stage was expected to also affect stress. Coping was not expected to have a direct effect. It was expected that coping would have moderating effects through its effects on stress and family functioning. Finally, it was expected that Deployment Stage and Family Functioning would interact such that deployment stage would have stronger negative effects on behavior and academic functioning of the child in families that had lower levels of family functioning.

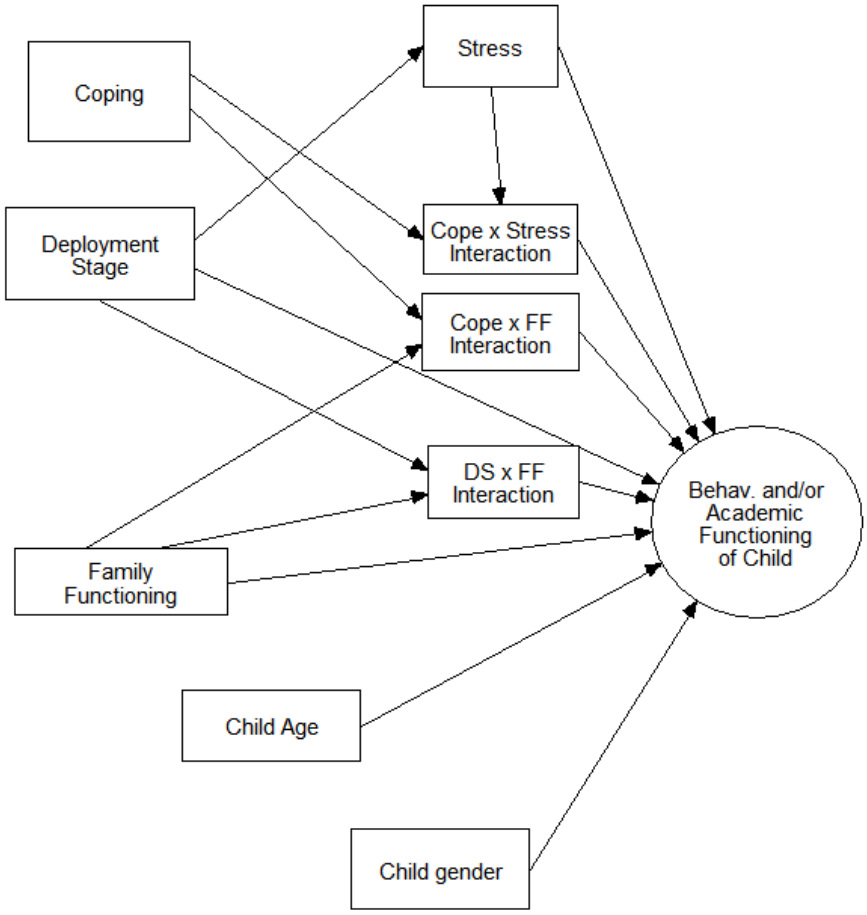


Figure 2. Basic model of hypothesized relationships among variables. FF: family functioning. DS: deployment stage.

Hypotheses. Hypothesis 1: Deployment stage would have an adverse effect on behavioral and academic functioning of the child and family stress, such that stages would fall into approximately this order from least to most adverse effect: (a) the not deployed group, (b) the late reunion and early predeployment groups, (c) the late deployment and early reunion groups, and (d) the late predeployment and early deployment groups. That is, different stages of deployment would be associated with

progressively more stress and harmful effects on the child, regardless of other variables' effects.

Hypothesis 1a: Deployment stages, in the order described above, would be associated with progressively higher (more disturbed) Devereux Behavior Rating Scale scores.

Hypothesis 1b: Deployment stages, in the order described above, would be associated with progressively negative effects on grades.

Hypothesis 1c: Deployment stages, in the order described above, would be associated with progressively greater negative effects on grades.

Hypothesis 1d: Deployment stages, in the order described above, would be associated with progressively higher Perceived Stress Scale scores.

Hypothesis 2: Healthy family functioning, as operationalized by higher overall scores on the FACES IV, would be associated with positive behavioral and academic functioning of the child and lower perceived stress, independent of other variables.

Hypothesis 2a: Higher overall scores on the FACES IV would be associated with lower (less disturbed) Devereux Behavior Rating Scale scores.

Hypothesis 2b: Higher overall scores on the FACES IV would be associated with higher grades.

Hypothesis 2c: Higher overall scores on the FACES IV would be associated with lower Perceived Stress Scale scores.

Hypothesis 3: There would be an interaction between Deployment Stage and Family Functioning, such that Deployment Stages (considered both as

dichotomous groups as in Hypothesis 8 and in the order described in Hypothesis 1), combined with lower levels of Family Functioning as measured by the FACES IV, would have stronger negative effects on behavioral and academic performance of the child. That is, deployment would have stronger negative effects when the family functioning is not healthy.

Hypothesis 3a: The interaction between Deployment Stage (absent vs. present) and Family Functioning would be associated with higher DSF scores as rated by parents, indicating greater emotional disturbance.

Hypothesis 3b: The interaction between Deployment Stage (absent vs. present) and Family Functioning would be associated with a greater negative effect on grades.

Hypothesis 3c: The interaction between Deployment Stage (in 4 ordered groups) and Family Functioning would be associated with higher DSF scores, indicating greater emotional disturbance.

Hypothesis 3d: The interaction between Deployment Stage (in 4 ordered groups) and Family Functioning would be associated with a greater negative effect on grades.

Hypothesis 4: In addition to its direct effect, deployment stage (considered both as dichotomous groups as in Hypothesis 8 and in the order described in Hypothesis 1) would have an indirect effect on behavioral and academic functioning of the child by affecting stress. That is, deployment would lead to stress, and stress itself would lead to negative effects on the child.

Hypothesis 4a: Deployment stage (absent vs. present) would be associated with higher DSF scores, indicating greater emotional disturbance, through its association with higher measured stress.

Hypothesis 4b: Deployment stage (absent vs. present) would be indirectly associated with lower grades through its association with higher measured stress.

Hypothesis 4c: Deployment stage (in 4 ordered groups) would be indirectly associated with higher DSF scores, indicating greater emotional disturbance, through its association with higher measured stress.

Hypothesis 4d: Deployment stage (in 4 ordered groups) would be indirectly associated with lower grades, through its association with higher measured stress.

Hypothesis 5: Child gender would have an independent (main) effect on behavioral and academic functioning of the child, such that girls would show better functioning than boys.

Hypothesis 5a: Girls would receive lower DSF scores as rated by parents, indicating less emotional disturbance.

Hypothesis 5b: Girls would receive lower DSF scores as rated by teachers, indicating less emotional disturbance.

Hypothesis 5c: Girls would receive higher grades and will show less decline in grades as a result of deployment than boys.

Hypothesis 6: Age of the child would interact with other effects such that younger children would show stronger negative effects of deployment.

That is, each of the Hypotheses 1a through 2c and 4a through 4b would be stronger if the child is younger.

Hypothesis 7: Coping as measured by the Family Crisis Oriented Personal Evaluation Scales (F-COPES) would interact with other effects such that families with higher Coping scores would show less strong negative effects of Deployment. That is, each of the Hypotheses 1a through 2c and 4a through 4d would be weaker if the F-COPES score is stronger.

Hypothesis 8: Deployment stages (considered as dichotomous groups) would have an independent effect on functioning of the child and family stress. That is, stages in which the military parent is absent due to a deployment, combined (referred to as *parent absent*), compared to deployment stages in which the parent is not deployed, combined (referred to as *parent present*), would have an independent (main) negative effect on behavioral and academic functioning of the child and family stress.

Hypothesis 8a: Parent absence, compared to parent presence, would have an independent (main) positive effect on Devereux Behavior Rating Scale (DSF) ratings of the child by the parent. (That is, children of absent parents would have higher mean DSF scores, indicating greater emotional disturbance.)

Hypothesis 8b: Parent absence, compared to parent presence, would have an independent (main) negative effect on grades. (That is, children whose parents are absent would be more likely to show a drop in grades than children whose parents are present.)

Hypothesis 8c: Parent absence, compared to parent presence, would have an independent (main) positive effect on stress levels as measured by the Perceived Stress Scale (PSS). (That is, parental absence would be associated with higher stress scores.)

Data Analysis

Three phases of data analysis were conducted. The first consisted of summaries of background and measures scores, with frequency distributions for categorical variables (gender, deployment stages, etc.) and means and standard deviations for continuous variables (age, DSF scores, etc.). The second phase tested the hypotheses, and the third was exploratory.

The hypotheses fell into several categories as far as analyses are concerned. Some predicted simple (two-variable) relationships, others included an indirect (mediating) effect, and others included interactions (moderating effects).

Two-variable relationships: Hypotheses 5a-5c were that girls would manifest fewer symptoms than boys. Hypotheses 8a-8c predicted that deployment (parent absent), compared to non-deployment (parent present), would be associated with greater disturbance on the part of the child as measured by the three dependent variables (tested separately): higher mean Devereux scores, greater mean decline in report card grades, and higher mean Perceived Stress Scale (PSS) scores. In these hypotheses the predictors were dichotomous and the outcome measures were continuous. They were tested by *t* test.

Hypotheses 1a-1d predicted that deployment stage, sorted into four groups predicted to vary in adverse effect, would be associated with progressively greater

disturbance on the part of the child. These were tested by four-group one-way ANOVAs. Since the overall *F* test was significant, planned trend contrasts across group means were conducted to determine linear, quadratic, and cubic relationships and paired comparisons to identify which groups differ significantly from others. Hypotheses 2a-2d predicted that higher scores on the FACES-IV measure of family functioning would be associated with lower scores on the measures of child disturbance. That is, both predictor and outcome variables were continuous, so these hypotheses were tested by Pearson correlation coefficients.

Indirect effects: Hypotheses 4a-4f predicted that deployment stage, in addition to its direct effects, would have indirect mediating effects through its direct effect on stress. That is, it was expected that deployment, stress, and the dependent variables would all be significantly related. Since deployment stage was quasi-randomly assigned to the families, it could not be the result of other variables, and so the causal process would be: some stress that is unrelated to deployment (financial problems, new school, etc.) could be associated with behavioral and academic functioning of the child, some stress could be due to deployment, having the same effect, and there could be direct effects of deployment that are not mediated through stress. These effects were tested by path analysis.

Interaction effects: Hypothesis 7 predicted that Coping would have moderating effects through interactions with Stress and Family Functioning, respectively. That is, it was expected that under stress, families with better coping strategies would show less effect on behavioral and academic functioning of the child, and similarly, families that are poorly functioning but have relatively effective coping strategies would show less

harmful effects. Hypotheses 3a-3e predicted that Deployment effects would be moderated by level of Family Functioning, such that families with higher functioning would show less adverse effects of deployment. Finally, Hypothesis 6 predicted that Age of the child would moderate other major predictors such that other predicted effects would be stronger for younger children. This was tested by repeating previous tests with age included as a variable. Multiple regressions were used to accommodate these interaction effects.

CHAPTER IV

RESULTS

Participants

A total of 620 surveys were distributed to military families within a 7-month period; 201 surveys were returned for a return rate of 32.4%. The participants in this study consisted of the families of 201 students, from five elementary schools, from kindergarten to fifth grade, ages 6 – 11. Once the parent surveys were received, a teacher questionnaire was sent to the student's teacher. The teacher response rate was 100% with 72 participants.

Demographics of children. Of the 201 children, 105 (52.2%) were boys, and 96 (47.8%) were girls. Parents reported the ethnicities of the children as: White, non-Hispanic: 144 (71.6%), Black: 29 (14.4%), Mixed: 21 (10.4%), and Hispanic: 7 (3.5%). Ages are shown in Table 1 and grade levels in Table 2. The children's average age was 8.03 (*SD*= 1.35). Of the 201 children, 179 (89.1%) had between one and four siblings, not necessarily living in the home. Those with any siblings had an average number of 1.55 (*SD*= 0.70), with ages ranging from 7 months to 32 years and an average age of 6.80 (*SD*= 4.50).

As Table 2 shows, the goal of recruiting children for the study who were in Grades K through 5 was achieved, with a single child reported to be in Grade 6. This report was obtained toward the end of the school year, so it is possible that the parent responded to the survey in reference to the grade the student would be attending the following year. Since some children do not attend kindergarten, it is not surprising that only 7.5% of the children were in this grade.

Table 1
Ages of Children Reported on in Study

Age	Frequency	Percent
6	21	10.4
7	64	31.8
8	46	22.9
9	35	17.4
10	27	13.4
11	8	4.0
Total	201	100.0

Table 2
Grades of Children Reported on in Study

Grade	Frequency	Percent
K	15	7.5
1	44	21.9
2	63	31.3
3	34	16.9
4	26	12.9
5	18	9.0
6	1	.5
Total	201	100.0

Demographics of parents. In all 201 families, the father was the military parent, so it was not possible to determine if effects on children differed with deployment of mothers and fathers. All fathers were in the Navy. Their years of service ranged from 6 to 24 (mean= 14.6, *SD*= 2.0). As the small *SD* suggests, a quite narrow range of years of service was represented. Half of the parents had service of 14 or 15 years.

The ranks or paygrades of military parents were of interest in describing the sample, and for comparison to other studies on military families. Virtually all military personnel fall into one of two rank categories: enlisted personnel (including non-commissioned officers, such as sergeants and petty officers) and commissioned officers (usually referred to simply as officers). The latter group consists of persons who may be empowered to command, rather than merely to supervise, other personnel. Typically, officers are college graduates and are trained in leadership. Parallels to officers, non-commissioned officers, and lower-ranking enlisted personnel in civilian life might be executives, managers, and workers.

Table 3 displays the distribution of ranks (technically known as *rates* for enlisted personnel in the Navy) of the father. In both the enlisted and officer ranks, the lower ranks were not represented. Perhaps this was because these tend to be filled by younger personnel, who might not have had children of grade school age. The ranks represented in the sample are also the commonest ranks in the Navy (ICF International, 2008). Among Naval officers, these ranks encompass 68.0% of officers. Only 25.0% are O-1 or O-2, and only 7.0% are above O-5. Among enlisted personnel, these rates include 49.9%. An additional 46.8% are E-1 through E-4, and only 3.3% are rated higher than E-7. Therefore, the absence of lower ranks does not necessarily indicate that the sample was unrepresentative of military families.

It might also be noted that there was no difference between ranks in the proportion of military family members who were deployed, nor in the other measures of stress presumably caused by deployment, or as measured directly by the Perceived Stress Scale. These were tested by 1-way ANOVAs for continuous measures of deployment

stress, and by chi-square for categorical measures (e.g., deployment phase). No results approached significance. Thus, any differences found between families in different phases of deployment cannot be attributed to differences in rank of the military parent, as might have been the case, if, for example, more senior officers were required to stay at the base.

Table 3
Rank of the Military Parents (all Fathers)

Grade	Rate or Rank	Frequency	Percent
E-5	Petty Officer Second Class	21	10.4
E-6	Petty Officer First Class	46	22.9
E-7	Chief Petty Officer	31	15.4
O-3	Lieutenant	21	10.4
O-4	Lieutenant Commander	72	35.8
O-5	Commander	10	5.0
	Total	201	100.0

At the time of the survey, 54 parents (26.9%) were deployed. Appendix J shows the location of the deployments by region of the world. Number of deployments during the child's lifetime ranged from 1 to 5, with a mean of 3.2 (*SD*= 0.8). See Table 4.

Respondents reported their marital status, living arrangement when the military parent was not deployed, and family structure (including whether one partner was a step-parent). One hundred and eighty-four (91.5%) respondents reported that this was their first marriage, 11 (5.5%) reported this as their second marriage, and 6 (3.0%) reported that they were separated. The 201 families included 70 (34.8%) in which one partner was a step-parent; 196 (97.5%) reported living with a partner and children. The remaining 5

(2.5%), who reported being in a one-parent household, were among the 6 separated (the sixth individual was separated but living with a partner). No respondents reported being divorced or widowed. The parent completing the survey was the mother in 175 (87.1%) of the cases, with the remaining 26 (12.9%) being completed by the father.

Occupations reported by the mothers are listed in Appendix K. Only 54 responded to this question. Of these, 26 reported "home," "homemaker," "none," or "student," and thus were assumed to have no income-producing employment. Therefore, it appears that only 28 (14.9%) mothers had outside income.

Of the 201 families, only 2 (1.0%) reported that the child or family was receiving supportive or counseling services. Only 5 (2.5%) reported living on the base, again probably reflecting the relatively high ranks of the military parents.

Table 4
Number of Deployments during Child's Lifetime

	Frequency	Percent
1	6	3.0
2	24	11.9
3	99	49.3
4	65	32.3
5	7	3.5
Total	201	100.0

Deployment phases and stages. Respondents reported the date on which they completed the questionnaire and a number of other dates that were used to calculate the deployment phase they were experiencing at that time. These included the date of the most recent return from a deployment, the expected date of departure for the next

deployment, and, if currently deployed, when the parent left and the expected date of return. There were several illogical relationships; for example, in a few instances, the next deployment was stated as coming before the current date, but a re-examination of the original questionnaires clarified these. In the example just noted, it was presumed that several parents completing the form in the summer of 2009 had mistakenly written "2009" when "2010" was intended.

Table 5 shows how families were categorized into phases. As described in the previous chapter, families were categorized as being in one of Logan's (1987) seven phases of deployment. *Days relative* refers to the number of days before a deployment or days since the beginning of a current deployment or a return from deployment. Days relative is shown in the top row, as it defines the following rows. For example, if a military parent was more than 91 days (1/4 year, or 3 months) away from a deployment at the time the questionnaire was completed, the family was categorized as *not deployed*. Otherwise, the predeployment, deployment, and reunion periods were divided into early or late phases, with 35 days (5 weeks) as the dividing point, consistent with phases defined by Logan (1987) and Pincus et al. (2001). No family fell into both predeployment and current deployment phases or predeployment and reunion phases; that is, the phases were distinct and mutually exclusive. For comparison purposes, Table 5 also shows the terms used and periods included when referring to deployment as simply deployed/not deployed, or parent absent/present.

Table 5
Deployment Phases and Comparisons Between Different Terms Used in Different Definitions of Deployment

Days relative	92+	91-36	35-1	0-35	36-190 (approx)	0-35	36-91	92+
Phase	Not deployed	Predeployment		Deployment		Reunion		Not deployed
		Early	Late	Early	Late	Early	Late	
Logan's Category		**1**	**2**	**3**	**4 & 5**	**6**	**7**	
Deploy-ment	Not deployed (parent present)			Deployed (parent absent)		Not deployed (parent present)		
Stage & hypo-thesized strain level	1: None	2: Mild	4: High		3: Moderate		2: Mild	1: None

A major thesis of the present study is that there is not a simple relationship between a deployment phase and the level of family stress it creates. Therefore, the seven deployment phases were grouped into four stages (see Table 5, bottom row) reflecting hypothesized levels of stress (referred to as strain), based on the literature suggesting different levels of apparent effects. That is, it was hypothesized that over a deployment cycle, stress due to deployment would rise from none, when the parent was not deployed and more than 91 days away from a deployment (Stage 1), to mild, in the early predeployment phase (Stage 2), to high, in the immediate predeployment and early deployment phases (Stage 4). Stress due to deployment was then expected to taper off gradually to moderate, in the late deployment and early reunion phases (Stage 3), and to

mild, in the late reunion phase (Stage 2). This yielded four groups with a fairly even distribution of families (Table 6), so that analyses would not be based on a small number in any one group.

Table 6
Hypothesized Strain Level Groups

Stage, or hypothesized strain level group	Phases included	Frequency	Percent
1: No strain	(no phase)	59	29.4
2: Mild strain	1, 7	33	16.4
3: Moderate strain	4, 5, 6	49	24.4
4: High strain	2, 3	60	29.9
Total		201	100.0

Here it should be noted that *stage* refers to these four groups, as distinct from the seven *phases*. Whereas the phases are objectively determined, based on the military family member's present circumstances, the stages are *hypothesized* to differ in their effects, and a principal thesis of this study is that effects will in fact vary as expected. The stages are *hypothesized family stress level groups*.

Table 7 shows the number of families falling into the seven phases and four stages. It is important to note that the stages are not simply an expanded version of the dichotomous deployed vs. not deployed. The two definitions of deployment are not redundant, and only partially overlap. As Table 7 shows, exactly half of the families at the high strain level had a deployed family member, half did not, and the moderate strain level is similarly divided. On the other hand, no families in the lowest-strain categories

had a deployed member. The point-biserial correlation between the two measures was r_{bis}= .511 (N= 201, p< .001), so that they shared 26% of the variance (r_{bis}^2) between them.

Table 7
Classification into Deployment Phases, Compared to Stages

Phase	Stage	Frequency	Percent
1. Early pre-deployment	2: Mild	20	10.0
2. Late pre-deployment	4: High	30	14.9
3. Early deployment	4: High	30	14.9
4 & 5. Late deployment	3: Moderate	24	11.9
6. Early reunion	3: Moderate	25	12.4
7. Late reunion	2: Mild	13	6.5
No Logan phase	1: None	59	29.4
Total		201	100.0

It should also be kept in mind that the stage levels are distinct from stress as measured by the Perceived Stress Scale. The latter was a measure of actual stress, which might have been partly due to deployment and partly due to other causes, such as marital or financial problems. Among other things, the present study attempted to determine what proportion of actual stress was due to deployment stress as defined by the hypothesized stress level groups. To keep the distinction clear, the term *strain* will be used below to refer to stress on the family hypothesized or presumed to be due to deployment or stage in the emotional cycle of deployment.

Scales. Scales, other than the Devereux-Teacher, were presumably completed by a parent on the date reported on the questionnaire and therefore reflected the state of the family during their current deployment phase. Moderating and mediating variable

measures included the Family Adaptability and Cohesion Scales (FACES IV), the Family Crisis Oriented Personal Evaluation Scales (F-COPES), and the Perceived Stress Scale (PSS). In addition, the Devereux Behavior Rating Scale-Parent and -Teacher were dependent variables. As described in the previous chapter, each Devereux-Teacher scale was completed by the child's teacher soon after the questionnaire was returned, and therefore also reflected the child's behavior during the current deployment phase. All measures were scored according to instructions in their respective manuals, except for the FACES IV.

The FACES IV package includes an Excel spreadsheet that conducts the required complex scoring and classifications when raw data are entered. The FACES IV scoring program generates 29 scores for each family. These include 6 distinct raw scores, for the balanced cohesion, disengaged, enmeshed, balanced flexibility, rigid, and chaotic scales. The balanced cohesion and flexibility scales in effect are designed to assess the Circumplex Model's two main dimensions within the normal range, and the others assess the unhealthy extremes of the two dimensions. Other types of FACES IV scores include level, dimension, percentile, and ratio scores. The level scores simply group continuous scores into ordinal scales for easier reporting. Dimension scores are used for plotting the family onto the graphic representation of the Circumplex Model.

The two types of FACES IV predictor scores that most directly indicate family functioning, according to Olson et al. (2007), are the percentile scores and the ratio scores. A percentile score is the percentile at which a family's raw score on the scale falls compared to norms. Thus, a percentile score above 50 indicates a score higher than the U.S. general population average on that scale. A ratio score is the ratio of positive

(healthy) scores on a dimension divided by negative (unhealthy) scores. The ratio scores are defined as: Cohesion Ratio = Balanced Cohesion / (Disengaged + Enmeshed / 2) and Flexibility Ratio = Balanced Flexibility / (Rigid + Chaotic / 2). The effect of the ratio score is that more cohesion (or flexibility) is considered healthier, unless the family is so high on the dimension that it becomes enmeshed (or chaotic), which then detracts from healthy family functioning. The total ratio score is the average of the cohesion and flexibility ratio scores.

Finally, Family Communication and Family Satisfaction scales are reported. These are intended for use in counseling and are reported here for completeness. Table 8 presents the continuous scores reported by the FACES scoring system. Table 9 shows the distribution of families into the various categorical "levels."

Table 10 shows the overall scores for the F-COPES, PSS, and both parent and teacher versions of the Devereux. Appendix L displays the intercorrelations among these scales. These intercorrelations show moderately high relationships among the outcome measures, as would be expected. For example, subscales of the Devereux-Parent and Devereux-Teacher were correlated at between $r = .60$ and .80 (both $p < .001$), and Devereux total scores from the two sets of respondents were related at $r = .78$ ($p < .001$). Thus, the Devereux scales were similar enough between the two sets of respondents to allow for confidence that the children were being evaluated similarly, but different enough so that they might give different perspectives on the children's behavior.

Table 8
Family Adaptability and Cohesion Scales (FACES IV) Continuous Scale Scores (N= 201 for all)

Scale	Minimum	Maximum	Mean	*SD*
Cohesion-related measures				
Cohesion raw	13	35	29.0	4.56
Disengaged raw	7	24	14.0	4.40
Enmeshed raw	7	20	12.2	2.67
Balanced cohesion percentile	10	99	68.0	24.35
Disengaged percentile	10	55	22.7	10.30
Enmeshed percentile	10	36	17.8	5.27
Cohesion ratio	0.74	4.7	2.4	0.81
Cohesion dimension	2.8	100.5	66.8	25.72
Flexibility-related measures				
Flexibility raw	14	34	25.7	4.74
Rigid raw	15	28	21.8	2.39
Chaotic raw	7	26	16.4	4.11
Balanced flexibility percentile	10	99	64.0	23.98
Rigid percentile	24	70	45.1	9.91
Chaotic percentile	10	64	28.5	11.61
Flexibility ratio	0.67	2.21	1.4	0.34
Flexibility dimension	7.8	92.3	59.8	22.70
Overall measures				
Total ratio	0.90	3.3	1.9	0.52
Family communication	16	49	37.9	8.76
Family communication percentile	10	97	61.1	31.33
Family satisfaction	18	50	36.4	8.64
Family satisfaction percentile	10	99	52.1	32.45

Table 9
Family Adaptability and Cohesion Scales (FACES IV) Levels (N = 201 for all)

Scale Level	Frequency	Percent
Balanced Cohesion		
1 Somewhat connected	23	11.4
2 Connected	40	19.9
3 Very connected	138	68.7
Disengaged		
1 Very low	136	67.7
2 Low	57	28.4
3 Moderate	8	4.0
4 High	0	0.0
5 Very high	0	0.0
Enmeshed		
1 Very low	188	93.5
2 Low	13	6.5
3 Moderate	0	0.0
4 High	0	0.0
5 Very high	0	0.0
Balanced Flexibility		
1 Somewhat flexible	13	6.5
2 Flexible	68	33.8
3 Very flexible	120	59.7
Rigid		
1 Very low	2	1.0
2 Low	82	40.8
3 Moderate	101	50.2
4 High	16	8.0
5 Very high	0	0.0
Chaotic		
1 Very low	109	54.2
2 Low	64	31.8
3 Moderate	27	13.4
4 High	1	0.5
5 Very high	0	0.0

Table 9 (continued)
Family Adaptability and Cohesion Scales (FACES IV) Levels (N = 201 for all)

Scale Level	Frequency	Percent
Family Communication		
1 Very low	35	17.4
2 Low	41	20.4
3 Moderate	9	4.5
4 High	62	30.8
5 Very high	54	26.9
Family Satisfaction		
1 Very low	56	27.9
2 Low	23	11.4
3 Moderate	27	13.4
4 High	53	26.4
5 Very high	42	20.9

Table 10
Scores on the F-COPES, PSS, and Devereux (N= 201 for all)

	Mini-mum	Maxi-mum	Mean	Percentile compared to Norms	*SD*
Family Crisis Oriented Personal Evaluation Scales (F-COPES)					
Acquiring social support	9	41	27.5	53	7.80
Reframing	18	40	32.2	69.5	4.85
Seeking spiritual support	4	20	13.7	16	4.07
Mobil family to acq & accept help	4	18	9.1	20	3.13
Passive appraisal	11	20	16.2	99	1.84
Overall coping	66	134	98.7	63	14.70
Perceived Stress Scale (PSS) overall	7	32	19.8	—	5.16
Devereux-Parent					
Interpersonal problems	0	19	5.6	37	4.45
Inappropriate behaviors/feelings	0	22	7.7	43	4.27
Depression	0	17	6.1	59	4.16
Physical symptoms/fears	0	19	8.3	63	4.58
Overall Devereux-Parent	2	67	27.6	52	15.60
Devereux-Teacher					
Interpersonal problems	0	21	4.8	32	4.70
Inappropriate behaviors/feelings	0	26	6.5	39	5.05
Depression	0	18	5.6	51	4.17
Physical symptoms/fears	0	19	5.7	57	3.94
Overall Devereux-Teacher	0	75	22.6	54	16.38

Student grades. Additional outcome measures were changes in students' grades in both reading and mathematics. Grade change scores were considered important for two reasons. First, they were the most objective of the various measures. Although a teacher's grade might be somewhat influenced by his or her knowledge of the student's

deployment phase, it was presumably based mainly on relatively objective criteria of academic performance. Second, these were the only scores that allowed for repeated measurement, hence change over time. All other measures could only be compared between groups; grade improvement directly reflected change between student performance in different phases.

In the school district where the study was conducted, grades were assigned quarterly, and the quarterly periods were identical for all schools in the district. Each quarter consisted of 45 days in session, so depending on whether or not a quarter included a long holiday (e.g., winter break), quarters were 9-12 calendar weeks long. Student grades were obtained for the grading period closest to the time the surveys were completed. These were considered *current* grades. If a questionnaire was received within 3 weeks before the end of a quarter, the current grade was considered to be the one at the end of the quarter. If received near the beginning or middle of a quarter, or over the summer, the previous quarter's grades were considered current. Grades were also obtained for the quarter three quarters (approximately 7 months) prior to the current quarter. These were considered *prior* grades. The time period of 7 months was chosen because that would virtually insure that the child's family had been in a different deployment phase from the current one. Prior grades ranged from fall, 2008 to spring, 2009. It happened that the 15 students in kindergarten were reported on at the end of the school year, so all had grades from 3 quarters prior.

The + or – system was used (B+, C-, etc.) in the grade records. Letter grades were converted to numerical scores in the customary 4.0 form. Tables in Appendixes M and N show the distribution of reading grade scores for the prior and current quarters,

respectively, and Tables in Appendixes O and P show the same for math grades. As might be expected, there was a wide range of grades awarded, with about 4-10% of grades falling at D or below, and about 8-15% As. For all four sets of grades, the median grade was between B- and B. Therefore, change in grade from one period to another was expected to be a sensitive indicator of change in academic performance.

The deployment phase each child was in for the prior grade period was determined. The middle school day of each quarter was used to represent the quarter. Table 11 shows the distribution of children falling into each possible combination of prior deployment phase and current deployment phase. For example, in the first column, it can be seen that 7 children were in the Late Deployment phase during their prior grade period and in the Early Predeployment phase during their current grade period. Apart from 46 children who were in the not deployed phase in both periods, not a single one was in the same deployment phase at both periods (shown by the 0s in the main diagonal). A much larger proportion of children (137/201, 68.2%) were in the Not deployed phase during the prior period than during the current period (78/201, 38.8%). This was presumably simply due to a pattern of recent major deployments.

Table 11
Number of Children Falling into Each Combination of Deployment Phase During the Prior Grade Period and Current Grade Period

	Deployment phase of current grade period							
Deployment phase of prior grade period	Early predep	Late predep	Early deploy	Late deploy	Early reunion	Late reunion	Not deployed	Total
Early predep	0	0	0	4	0	0	0	4
Late predep	0	0	0	0	0	0	0	0
Early deploy	0	0	0	0	0	2	0	2
Late deploy	7	3	1	0	1	6	12	30
Early reunion	1	1	0	1	0	0	12	15
Late reunion	0	1	1	3	0	0	8	13
Not deployed	19	23	5	26	4	14	46	137
Total	27	28	7	34	5	22	78	201

Finally, deployment phases during the prior grade periods were combined into the four stages, or hypothesized strain level groups. Therefore, it was possible to determine changes in grades for children who received grades first in a presumed high-strain stage and later in a low-strain stage, for others in a low-strain stage followed by a high-strain stage, and others with no change in hypothesized strain. Table 12 shows the distribution of children falling into the various strain level groups during the prior grading period and the current grading period. Thus, for example, 22 students were in a moderate-strain

deployment stage when their prior grades were earned, and a no-strain stage during the current grading period. Finally, change in hypothesized level of strain was computed by subtracting the prior level (1 to 4) from the current level (1 to 4). The distribution of children experiencing different degrees of change is shown in Table 13. Twenty-four children had experienced a reduction of strain of -2, e.g., from Level 4 to Level 2, or Level 3 to Level 1. Thirty-three children had experienced no change (0), e.g., were in Level 1, 2, or 3 during both grading periods. These children represent those shown in Table 12 along the main diagonal.

Table 12
Number of Children Falling into Each Combination of Hypothesized Deployment Strain Levels During the Prior Grade Period and Current Grade Period

	Deployment strain level of current grade period				
Deployment strain level of prior grade period	Level 1: No strain	Level 2: Mild strain	Level 3: Moderate strain	Level 4: High strain	Total
Level 1: No strain	30	21	40	46	137
Level 2: Mild strain	7	1	7	2	17
Level 3: Moderate strain	22	9	2	12	45
Level 4: High strain	0	2	0	0	2
Total	59	33	49	60	201

Table 13
Number of Children Experiencing Decreases (Negative Change), No Change (0 Change), or Increases (Positive Change) in Strain Due to Deployment Stage

	Children	
Change in strain level	Frequency	Percent
-2	24	11.9
-1	16	8.0
0	33	16.4
+1	40	19.9
+2	42	20.9
+3	46	22.9
Total	201	100.0

Preliminary Analyses

It was of interest to examine the relationships between the secondary predictors of age and gender of child and the outcome measures. A total of 13 outcome measures were obtained: the 4 Devereux subscales and total, completed by both the parent and teacher; improvement in grades on both math and reading; and the Perceived Stress Scale (PSS) scores. Table 14 shows that there was no significant relationship between any of these measures and age of child. Table 14 also shows that the only outcome measures for which there were significant differences between males and females were the Devereux scales of interpersonal problems and inappropriate behaviors and feelings as rated by their teachers, such that boys had higher scores, and on reading improvement, such that

girls improved more in reading grades. For the most part, however, it appears that age and gender need not be taken into account in the analyses, as they do not co-vary significantly with the outcome measures.

Table 14
Correlations Between Age and Outcome Measures and Comparison of Outcome Measures by Gender (N= 201 for all)

	Correlation with age	Males (*n*=105)		Females (*n*=96)		Differ-ence
Outcome measure	*r*	Mean	*SD*	Mean	*SD*	$t_{(199)}$
Devereux-Parent						
Interpersonal problems	.061	6.0	4.61	5.1	4.24	1.41
Inapprop. behaviors/feelings	-.098	7.9	4.68	7.4	3.77	0.84
Depression	-.062	6.2	4.24	6.0	4.09	0.34
Physical symptoms/fears	-.072	8.3	4.63	8.3	4.55	0.02
Devereux-parent total	-.047	28.4	16.31	26.8	14.82	0.73
Devereux-Teacher						
Interpersonal problems	.123	5.5	5.12	4.0	4.08	2.28*
Inapprop. behaviors/feelings	.040	7.3	5.50	5.7	4.39	2.24*
Depression	-.048	5.6	4.11	5.6	4.26	-0.05
Physical symptoms/fears	-.067	6.0	4.07	5.4	3.79	1.09
Devereux-teacher total	.019	24.4	17.24	20.7	15.24	1.59
Math grade improvement	-.023	.0059	0.44	.0138	0.46	-0.12
Reading grade improvement	-.011	-.1199	0.51	.0514	0.60	-2.18*
Perceived Stress Scale total	-.095	20.2	5.42	19.3	4.84	1.22

*p< .05.

Overall test of differences in phases. As a preliminary test, differences among the simple, objectively defined phases were tested. Thus, the main dependent variables were tested with the seven deployment phases instead of the four stages. (*N*s of the groups varied from *n*= 13 for late reunion to 59 for not deployed.) In effect, this was an overall test of whether different phases of deployment were associated with different negative effects on the family and child. This is like the omnibus test in an ANOVA, which establishes that groups differ, but which does not take into account which groups have higher or lower scores. The latter was tested in the following section, by means of the specific and concrete hypotheses.

As Table 15 shows, for all five outcome measures, the deployment factor based on the seven phases was highly significant ($p < .001$ for all except Devereux-Teacher, for which it was $p < .01$). Figures 3 and 4 illustrate the means of the outcome measures across the seven phases.

It appears that, with the exception of the early pre-deployment and not-deployed phases, effects were a fairly linear function of the chronological progression through anticipation of deployment, deployment, and reunion, progressing from most stressful to least stressful. This was essentially the pattern incorporated into the four-level measure, of course, with the highest level including the second and third phases, moderate the fourth and fifth, and mild the first and sixth phases.

Table 15
Summary of 1-way Analyses of Variance for Effects of Actual Deployment Phases on Outcome Measures

Measure Effect	*SS*	*MS*	$F_{(6, 194)}$
Devereux-Parent			
Between Groups	6745.1	1124.2	5.20***
Within Groups	41907.1	216.0	
Total	48652.2		
Devereux-Teacher			
Between Groups	4918.3	819.7	3.27**
Within Groups	48708.7	251.1	
Total	53627.0		
Math improvement			
Between Groups	5.1	0.86	4.72***
Within Groups	35.2	0.18	
Total	40.4		
Reading improvement			
Between Groups	18.1	3.01	12.99***
Within Groups	45.0	0.23	
Total	63.1		
Perceived Stress			
Between Groups	2054.1	342.3	20.33***
Within Groups	3266.9	16.8	
Total	5320.9		

**$p < .01$. ***$p < .001$.

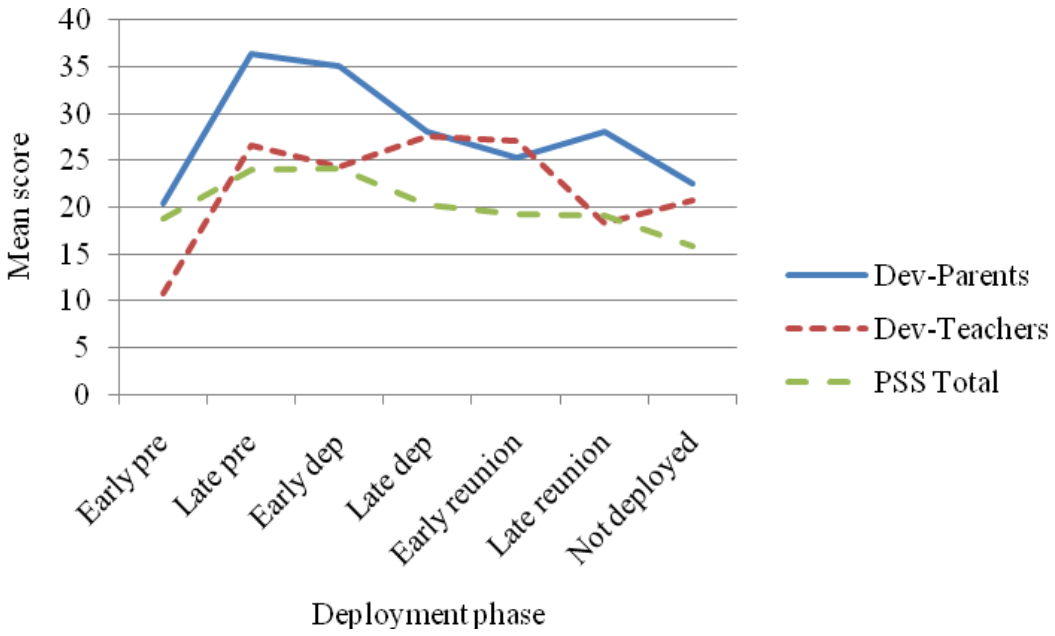


Figure 3. Mean scores for Total Devereux rated by parents (Dev-Parents) and by teachers (Dev-Teachers) and Perceived Stress Scale (PSS Total) by actual deployment phase.

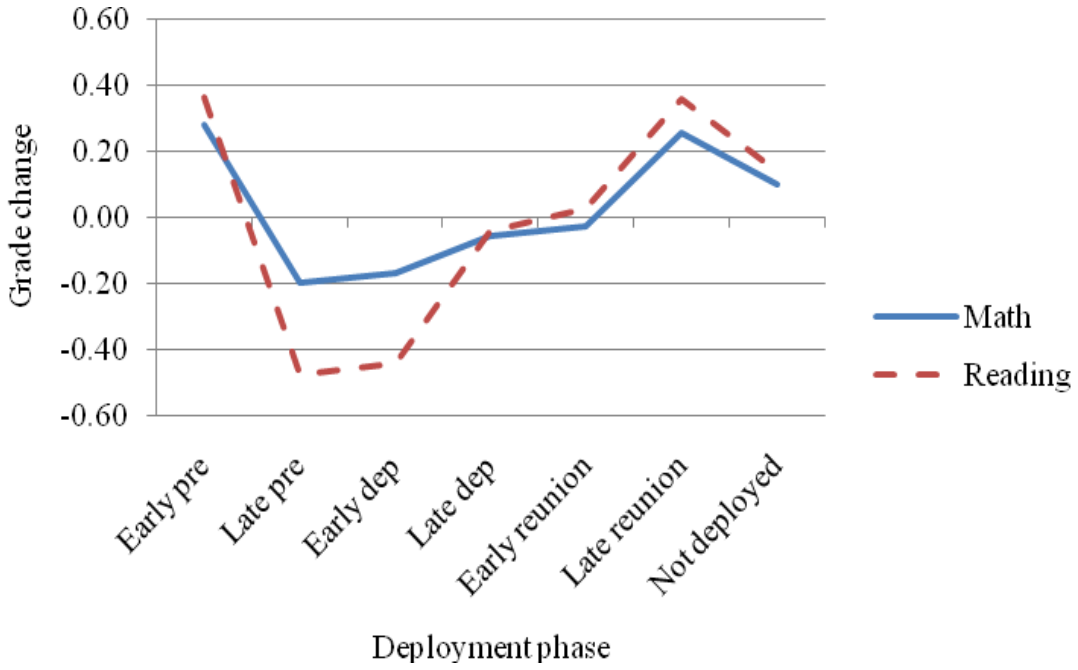


Figure 4. Mean improvement (positive scores) or decline (negative scores) in math and reading by actual deployment phase.

Finally, it was of interest to determine whether different subscales of the Devereux might be affected differently at different phases of deployment. The two sets of Devereux scores were re-run replacing the Total with the four subscales. For both the parent ratings and teacher ratings, interpersonal problems was not significantly different across the phases, but other subscales were (most strongly for physical symptoms/fears and depression, $p < .001$). Figure 5 shows the mean subscale scores for the Devereux-parent ratings (somewhat stronger than the results for teacher ratings). It is evident that the subscales showed essentially the same effects of deployment phase, so that using the Total score only in those analyses where the Devereux was an outcome measure was probably a good representation of the subscales.

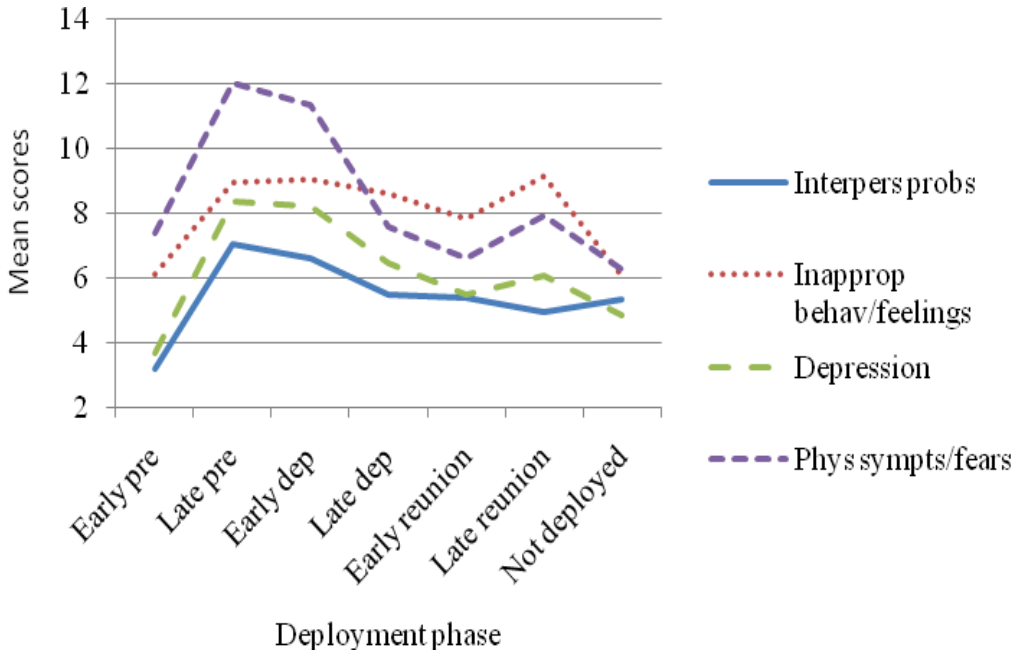


Figure 5. Mean subscale scores for Devereux-Parent by actual deployment phase.

Hypothesis Tests

Hypothesis 1: It was predicted that deployment stage (hypothesized strain level) would have an effect on behavioral and academic functioning of the child and level of stress experienced by the family. Specifically, it was expected that families in various stages would experience different levels of strain, and the effects on behavioral and academic functioning would also vary according to stage as follows: (a) the not deployed group (that is, families in the not deployed stage, Level 1) would experience no adverse effects, (b) the late reunion and early predeployment groups (Level 2) would experience mild effects, (c) the late deployment and early reunion groups (Level 3) would experience moderate effects, and (d) the late predeployment and early deployment groups (Level 4)

would experience the most adverse effects. Levels (stages) of strain were shown in Table 5.

Hypothesis 1a: Deployment stages, in the order described above, would be associated with progressively higher (more disturbed) Devereux Behavior Rating Scale scores.

Hypothesis 1b: Deployment stages, in the order described above, would be associated with progressively greater negative effects on grades.

Hypothesis 1c: Deployment stages, in the order described above, would be associated with progressively higher Perceived Stress Scale scores.

As Figures 6 and 7 show, the means for these outcome variables fell into approximately the hypothesized order, except that for several, the second group showed lower levels of presumed effects of strain than the first group. To reduce complexity, for the Devereux scores, only the total score scales are shown. The results for the subscales were similar and are displayed in Appendixes Q and R.

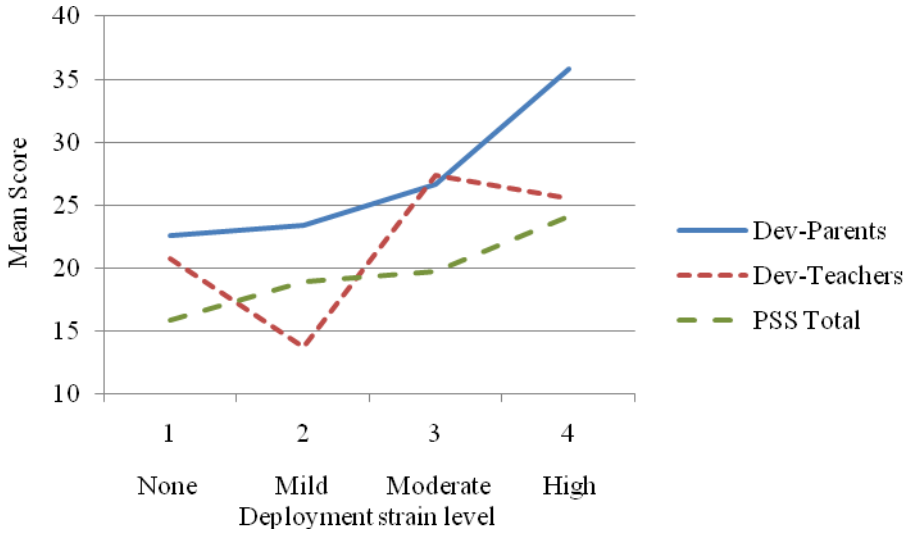


Figure 6. Mean scores for Total Devereux rated by parents (Dev-Parents) and by teachers (Dev-Teachers) and Perceived Stress Scale (PSS Total) by hypothesized level of strain due to deployment.

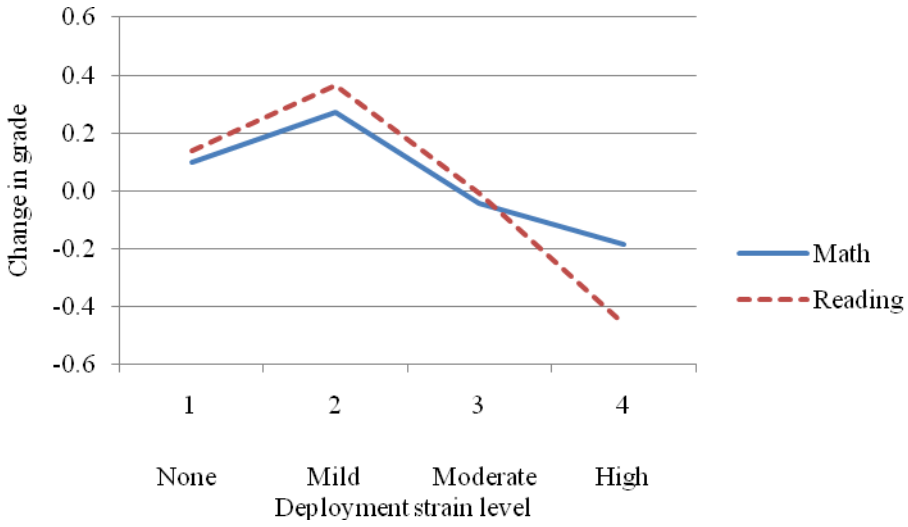


Figure 7. Mean improvement (positive scores) or decline (negative scores) in math and reading by hypothesized level of strain due to deployment.

Table 16 shows the results of 1-way ANOVAs for each of these variables. In each section, the *overall* row indicates that, overall, there was a significant difference among the groups presumed to be experiencing different levels of strain due to deployment. As with any ANOVA, however, this is uninformative about which group had higher scores than others. The other terms break down the difference among groups into *linear* (straight-line), *quadratic* (U-shaped or inverted-U shaped), and *cubic* (*N*- or *S*-shaped) terms. This is done sequentially. That is, all possible liner effects are accounted for first. If there is significant variance remaining, the quadratic effect is tested to determine if a U-shaped relationship between the variables can account for the remainder, etc.

For each outcome measure, the overall and linear terms were strongly significant, showing that not only did the groups differ on all outcome scores, but the overall relationships were such that higher levels of strain due to deployment stage produced more deleterious effects. Thus, over all, Hypotheses 1a-1c were clearly supported. The other terms indicated that level did not have simple effects, however. The significant quadratic terms for math and reading improvement reflect the inverted-U shape clearly evident in Figure 7, indicating that the improvements in math and reading grades at Level 2 were probably true effects, and not due to chance. The significant cubic terms for the Devereux-Teacher, math, and Perceived Stress Scale scores, similarly, suggest that the S-shaped lines for those variables in Figures 6 and 7 are not merely chance effects.

Table 16
Summary of 1-way Analyses of Variance for Effects of Hypothesized Deployment Strain Levels on Outcome Measures

Measure Effect	*SS*	*MS*	*F*[a]
Devereux-Parent			
Overall	6152.73	2050.91	9.51***
Linear	5234.79	5234.79	24.27***
Quadratic	808.75	808.75	3.75
Cubic	23.62	23.62	0.11
Within (error)	42499.48	215.73	
Devereux-Teacher			
Overall	4392.56	1464.19	5.86***
Linear	2181.53	2181.53	8.73**
Quadratic	323.85	323.85	1.30
Cubic	2656.20	2656.20	10.63***
Within (error)	49234.46	249.92	
Math improvement			
Overall	5.11	1.70	9.52***
Linear	3.84	3.84	21.44***
Quadratic	1.17	1.17	6.51*
Cubic	0.87	0.87	4.86*
Within (error)	35.28	0.18	
Reading improvement			
Overall	18.01	6.00	26.23***
Linear	13.41	13.41	58.62***
Quadratic	5.44	5.44	23.77***
Cubic	0.53	0.53	2.32
Within (error)	45.07	0.23	
Perceived Stress			
Overall	2041.07	680.36	40.86***
Linear	1827.71	1827.71	109.78***
Quadratic	22.64	22.64	1.36
Cubic	72.37	72.37	4.35*
Within (error)	3279.86	16.65	

[a] Degrees of freedom for each: Overall (3, 197), linear, cubic and quadratic: (1, 197).
*p< .05. **p< .01. ***p< .001.

To test whether the specific, unexpected differences between Levels 1 and 2 were chance effects, post-hoc comparisons were performed. The most liberal test, least-significant difference or LSD, was used because the results were counter to expectations. The difference between these groups for Devereux-Parents was significant at $p = .041$, and for reading improvement at $p = .033$. The difference for math improvement fell just short of significance at $p = .065$. The others did not approach significance.

As noted above, the grade improvement scores are unique among the outcome measures in that they represent a change in grades between two grading periods in which the child's family may have been experiencing different deployment phases. This allows a more sensitive assessment of the effects of deployment on grades. Since both the deployment phase and grade are available for two different grading periods, it is possible to compare change in strain due to deployment to change in grades over the same time period. Figure 8 shows change in grades as a function of change in hypothesized strain. Since both measures are on essentially continuous scales, they can be compared by correlation coefficients, testing the strength of their linear association. These were, for math grade change × strain change, $r = -.247$, $p < .001$, and for reading, $r = -.376$, $p < .001$. Thus, as the deployment strain increased from one time period to another, grades declined; when deployment strain decreased, grades improved.

As with the previous analyses, it was of interest to determine whether the unexpected increases in grades between the -2 and -1 groups were statistically significant. As previously, the most liberal comparison was used, in this case simply a *t* test between the groups. For math, results were $t_{(38)} = 0.32$, $p = .754$; for reading, $t_{(38)} = 1.45$, $p = .154$. Thus, the differences were most likely due to chance.

For students with no change in deployment strain, grades improved on average approximately .10 grade points. Going from no to high strain, a 3-level increase, results in an average drop of .22 in math and .45 in reading. Thus, the difference between students in these situations is up to .55 grade points, or nearly two grades, as between a low A- and a B, or between a B and a high C+.

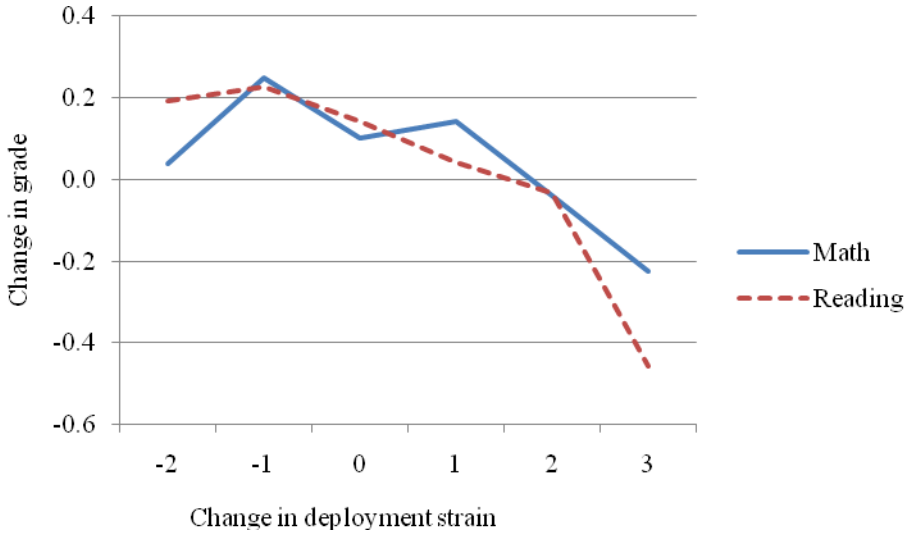


Figure 8. Mean improvement (positive scores) or decline (negative scores) in math and reading grades by decrease or increase in hypothesized level of strain due to deployment.

Hypothesis 2. It was predicted that healthy family functioning would be associated with positive behavioral and academic functioning of the child and lower perceived stress, independent of other variables. Family functioning was operationalized by nine scores derived from the FACES IV.

Hypothesis 2a: Higher scores on the FACES IV would be associated with lower scores on the Devereux Behavior Rating Scale, indicating less disturbed behavior.

Hypothesis 2b: Higher scores on the FACES IV would be associated with higher grades.

Hypothesis 2c: Higher scores on the FACES IV would be associated with lower Perceived Stress Scale scores.

As described above, the two types of FACES IV predictor scores that most directly indicate family functioning are the percentile scores and the ratio scores (Olson et al., 2007). Correlations between these scores and the outcome measures are displayed in Table 17. Note that the two balanced scores and the ratio scores are intended to indicate health; that is, the higher the score, the more functional the family is on that dimension. For the other components of the dimensions (disengaged, enmeshed, rigid, and chaotic), higher scores on each indicate extremes, assumed in the Circumplex Model to be unhealthy. Results are fairly complex and depend on specific relationships between predictors and outcome measures.

With one exception, the relationships between the FACES IV scores and the Devereux scores were similar, whether obtained from parents or teachers. As hypothesized, both Parent and Teacher Devereux scores were significantly negatively related to balanced cohesion and balanced flexibility. They were positively related to both disengaged and enmeshed scores on the cohesion dimension, suggesting that either extreme of cohesion is related to family disturbance. On the flexibility dimension, the significant negative correlations between the balanced scale and Devereux scores indicate that greater flexibility, within the normal range, was associated with lower behavioral disturbance. However, the results for the extreme scales were mixed. Only the chaotic score showed the expected relationship with Devereux scores. The results for rigid scores

suggest that a rigid family structure may convey some protective benefits against disturbance. The ratio scores (described in the FACES IV manual, Olson et al., 1996, as indicating "the level of functional vs. dysfunctional behavior perceived in the family system," p. 1) show strong support for Hypothesis 2a, that healthy family functioning would be associated with lower Devereux scores.

Table 17
Correlations Between FACES IV Measures and Outcome Measures (N= 201 for all)

		Outcome measures				
FACES IV scores		Devereux-Parent	Devereux-Teacher	Math	Reading	PSS
Percentile scores						
Balanced Cohesion	*r* =	-.438***	-.470***	.027	.243***	-.306***
Disengaged	*r* =	.437***	.463***	-.050	-.192**	.196**
Enmeshed	*r* =	.290***	.201**	-.147*	-.323***	.293***
Balanced Flexibility	*r* =	-.368***	-.301***	-.036	.152*	-.366***
Rigid	*r* =	-.123*	-.124*	-.003	.128*	-.041
Chaotic	*r* =	.193**	-.024	.146*	-.080	.286***
Ratio scores						
Cohesion	*r* =	-.513***	-.444***	.042	.242***	-.364***
Flexibility	*r* =	-.348***	-.212**	-.052	.136*	-.405***
Overall Total	*r* =	-.508***	-.411***	.016	.230***	-.412***

*$p < .05$. **$p < .01$. ***$p < .001$.

With regard to grades, the relationships with the FACES IV scores were much stronger for reading than for math. The balanced and ratio FACES scores were all positively associated with reading improvement, indicating that healthy family

functioning was associated with better school performance. However, none of these were significantly related to math grades. In terms of the percentile scores, in which extremes were hypothesized to be deleterious, most results were in the expected direction, although the results for the rigid and chaotic scores were exceptions, suggesting that a rigid family structure was associated with improvement in reading, and a chaotic family structure was associated with improvement in math. Overall, however, it appears that Hypothesis 2b (that FACES IV scores would be associated with grade improvement) was supported for reading, but not for math. All FACES IV scores were significantly related to Perceived Stress Scale (PSS) scores as expected, with the exception of the rigid score, so that Hypothesis 2c was well supported.

Here it may be helpful to clarify the relationship among Hypotheses 1, 2, and 3. Hypothesis 1 examined the relationship between deployment stage (level of strain) and behavioral and academic performance of the child. Hypothesis 2 was concerned with the relationship between health of family functioning and behavioral and academic performance of the child. Hypothesis 3 examined the effects of the combination of the two predictors in the first two hypotheses (deployment strain and family functioning) on the outcome measures.

Hypothesis 3. It was predicted that there would be an interaction between deployment stage and family functioning, such that presumably stressful deployment stages would have stronger negative effects on behavioral and academic performance of the child when combined with lower levels of family functioning as measured by the FACES IV. That is, deployment would have stronger negative effects when the family functioning was less healthy. Hypothesized deployment strain was defined both as

dichotomous groups (deployed/not deployed, for comparison to some previous research using this definition), and as Levels 1-4 as described in Hypothesis 1.

Hypothesis 3a: The interaction between deployment stage (deployed/not deployed) and family functioning would be associated with higher Devereux scores, indicating greater emotional disturbance when poorer family functioning was combined with deployment.

Hypothesis 3b: The interaction between deployment stage (deployed/not deployed) and family functioning would be associated with a greater negative effect on grades, indicating poorer academic performance when poorer family functioning was combined with deployment.

Hypothesis 3c: The interaction between deployment stage (in 4 ordered groups) and family functioning would be associated with higher Devereux scores, indicating greater emotional disturbance when poorer family functioning was combined with more stressful stages of deployment.

Hypothesis 3d: The interaction between deployment stage (in 4 ordered groups) and family functioning would be associated with a greater negative effect on grades, indicating poorer academic performance when poorer family functioning was combined with more stressful stages of deployment.

Since it is clear that the principal FACES IV scores were related to the outcome measures in similar ways, to reduce complexity, only the overall Total Ratio score was used as a predictor in these analyses.

It is difficult to visualize relationships among three variables if two are continuous. A 3-dimensional scatterplot proved to be unsatisfactory. It had originally

been thought to trichotomize one of the continuous variables to allow representation in line graphs, but this loses the precision of the continuous measure. Therefore, the data will be displayed using multiple scatterplots. Within each graph, a regression line is plotted to represent the closest possible fit between the two continuous variables. If the line extends from the lower left to the upper right, it indicates a positive relationship; if from the upper left to lower right, a negative one.

For comparison with previous research, analyses were conducted with the dichotomous definition of deployment (Hypotheses 3a & 3b). Figure 9 shows the relationship between family functioning and Devereux-Parent scores for the families in which the military member was not deployed. Figure 10 shows the same for deployed families. It is clear that in both groups, there is a strong relationship between the Devereux and family functioning, as indicated by the relatively tight clustering around the regression line and the strong and significant *r*s. The relationship is, as expected, such that healthier family functioning is associated with lower Devereux scores. However, the regression lines are quite similar for the two groups, suggesting that deployment makes little difference to the relationship between family functioning and the child's behavioral disturbance. This was tested with a multiple regression in which family functioning and deployment were predictors and the Devereux score the outcome measure (Table 18). In multiple regression results, *B* represents the unstandardized regression weight for each predictor. *SEB* is its standard error. β (beta) is the standardized regression weight; that is, the *B* weight that would result if all variables had been standardized (rescaled to have a mean of 0 and *SD* of 1). The results confirm that there was a strong effect of functioning

on the Devereux-Parent scores, but no significant interaction between family functioning and deployment.

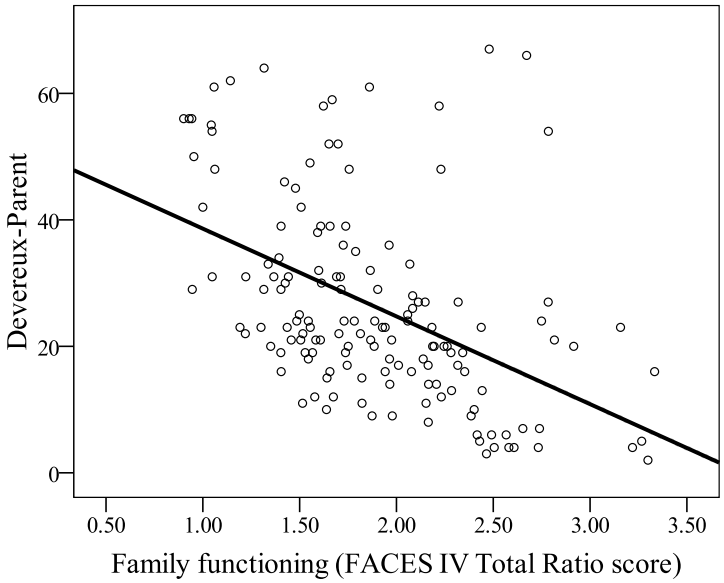


Figure 9. Relationship (r= -.47, N= 147, p< .001) between family functioning and child's behavioral disturbance (Devereux-Parent), for non-deployed families.

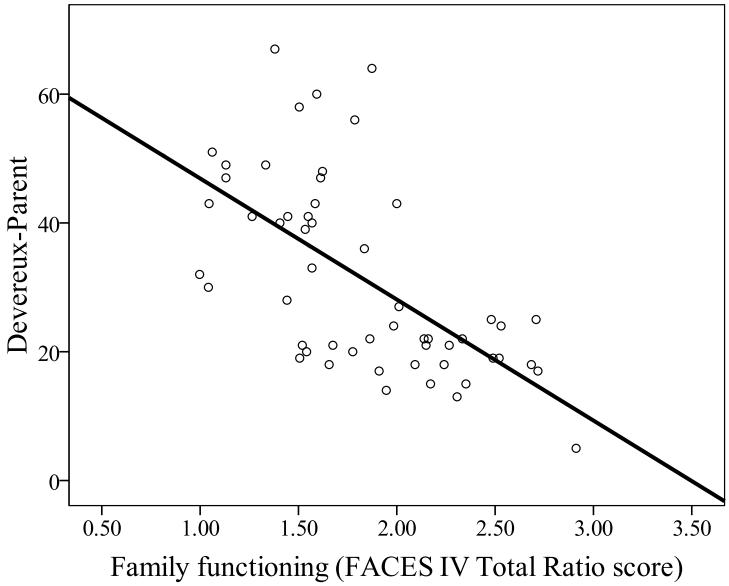


Figure 10. Relationship (r= -.61, N= 54, p< .001) between family functioning and child's behavioral disturbance (Devereux-Parent), for deployed families.

Table 18
Results of Multiple Regression with Deployment (Father Deployed or Not) and Family Functioning as Predictors, and Devereux-Parent Scores as Outcome

	Weights and significance				
Predictor	*B*[a]	*SEB*[b]	β[c]	*t*	*p*
Deployment	13.22	8.19	.377	1.62	.108
Family functioning	-13.87	2.07	-.464	-6.70	<.001
Deployment × family functioning	-4.92	4.28	-.269	-1.15	.252

Note. Deployment: whether or not father was deployed. Family functioning: FACES IV Total Ratio score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight.

With Devereux-Teacher scores as the outcome measure, parallel results are shown in Figures 11 and 12, and Table 19. As with the Devereux-Parent results, there is a strong negative relationship between family functioning and behavioral disturbance at both levels of deployment. Deployment also showed a significant main effect (Table 19, p= .040). This can be seen in the figures by comparing the regression lines in the two figures. In Figure 12, the line is higher in the scatterplot area, indicating that on average, deployed fathers had children who were higher in scores on this measure of behavioral disturbance. However, the interaction between family functioning and deployment was not significant. Thus, with deployment defined as simply deployed or not, Hypothesis 3a was not supported.

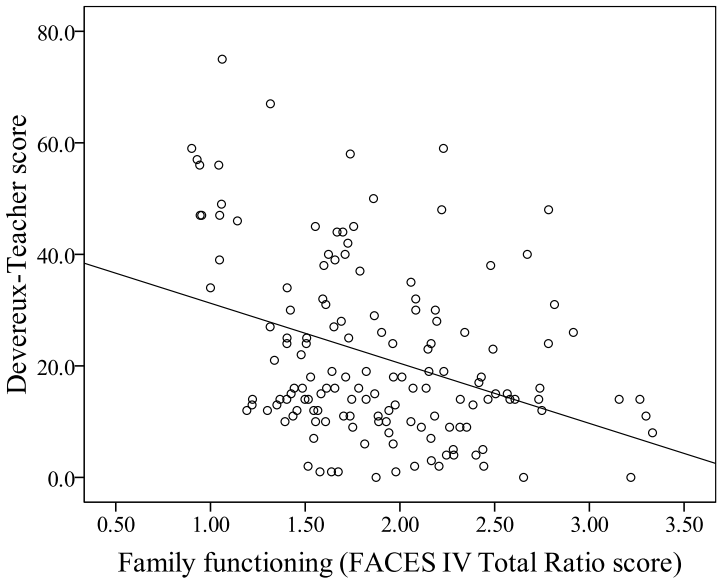


Figure 11. Relationship (r= -.36, N= 147, p< .001) between family functioning and child's behavioral disturbance (Devereux-Teacher), for non-deployed families.

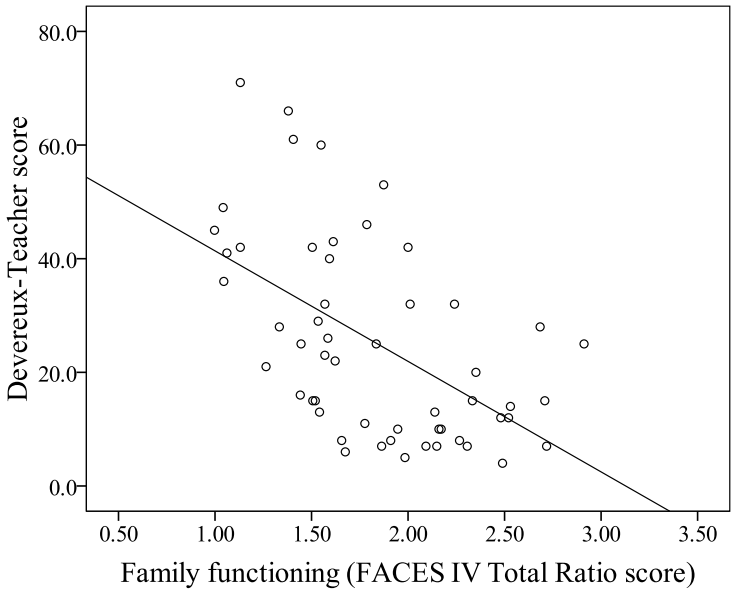


Figure 12. Relationship (r= -.54, N= 54, p< .001) between family functioning and child's behavioral disturbance (Devereux-Teacher), for deployed families.

Table 19
Results of Multiple Regression with Deployment (Father Deployed or Not) and Family Functioning as Predictors, and Devereux-Teacher Scores as Outcome

	Weights and significance				
Predictor	*B*[a]	*SEB*[b]	β[c]	*t*	*p*
Deployment	18.82	9.10	.511	2.07	.040
Family functioning	-10.78	2.30	-.343	-4.68	<.001
Deployment × family functioning	-8.68	4.76	-.452	-1.82	.070

Note. Deployment: whether or not father was deployed. Family functioning: FACES IV Total Ratio score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight.

Hypothesis 3b, that the interaction between deployment (deployed/not deployed) and family functioning would be associated with a greater negative effect on grades, was tested next. Multiple regressions were conducted with math grade improvement as the outcome measure. Figures 13 and 14 and Table 20 show the results. In this case, deployment was the only significant term. The difference was such that children in families with a deployed parent declined in math grades.

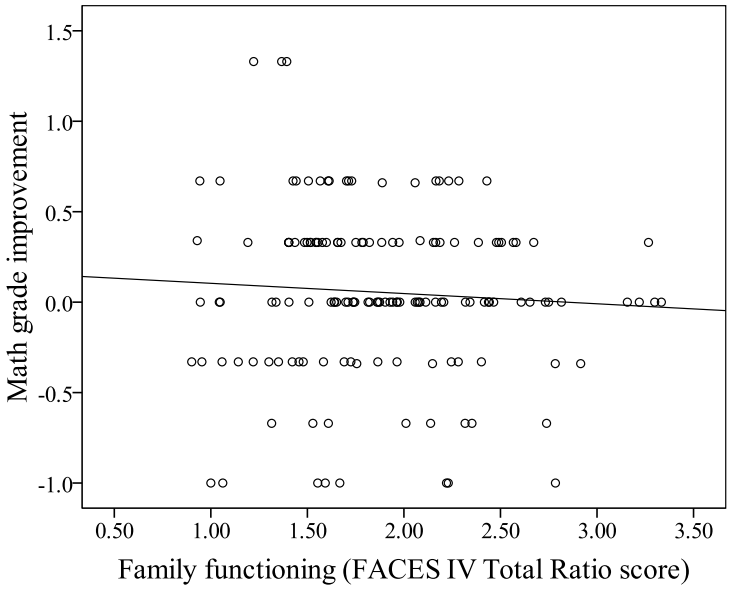


Figure 13. Relationship (*r*= -.06, *N*= 147, *n.s.*) between family functioning and child's math grade improvement, for non-deployed families.

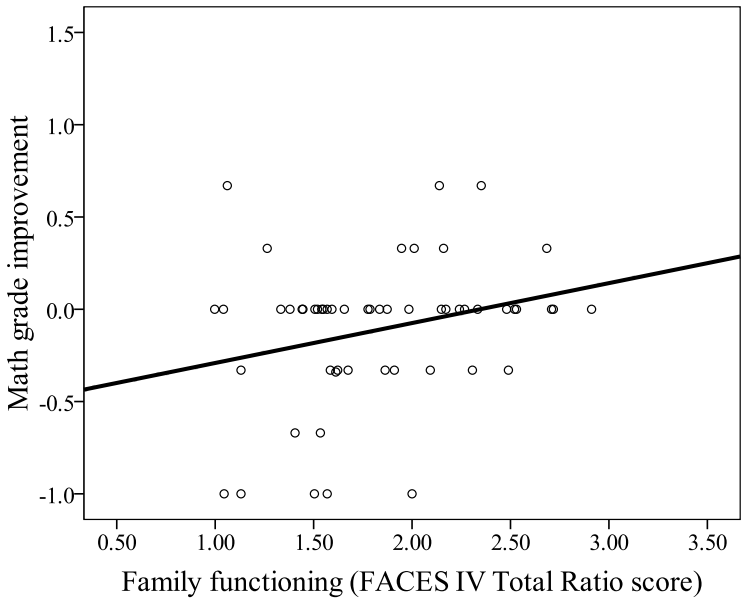


Figure 14. Relationship (*r*= .27, *N*= 54, *p*< .05) between family functioning and child's math grade improvement, for deployed families.

Table 20
Results of Multiple Regression with Deployment (Father Deployed or Not) and Family Functioning as Predictors, and Math Grade Improvement as Outcome

	Weights and significance				
Predictor	*B*[a]	*SEB*[b]	β[c]	*t*	*p*
Deployment	-.668	.271	-.661	-2.46	.015
Family functioning	-.057	.069	-.066	-0.83	.410
Deployment × family functioning	.273	.142	.518	1.92	.056

Note. Deployment: whether or not father was deployed. Family functioning: FACES IV Total Ratio score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight.

Finally, the effect of deployment (as father either deployed or not deployed) on the relationship between family functioning and reading grade improvement was tested. As Figure 15 shows, in non-deployed families, there was virtually no relationship between functioning and grade change. However, in deployed families (Figure 16), the relationship was quite strong ($r = .48$, $p < .001$). The positive relationship indicates that in this group, the healthier the family functioning was, the more reading grades improved (or, more precisely, the less reading grades declined in the current grading period, in which the father was deployed). Table 21 indicates that not only did deployment have a strong main effect on reading grades, but the interaction between family functioning and deployment was also strongly significant ($p = .008$). This is shown in the figures by the fact that data points do not cluster closely around the regression line in Figure 15, but do in Figure 16. Thus, Hypothesis 3b was strongly supported for reading, but not for math.

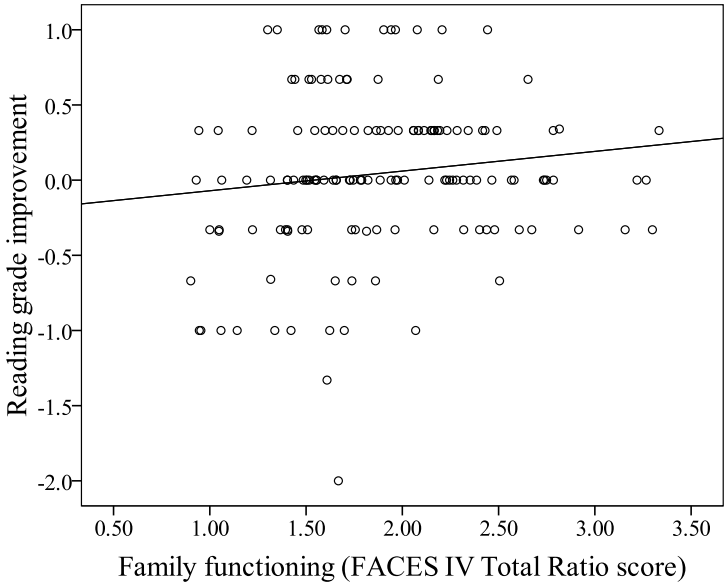


Figure 15. Relationship (*r*= .13, *N*= 147, *n.s.*) between family functioning and child's reading grade improvement, for non-deployed families.

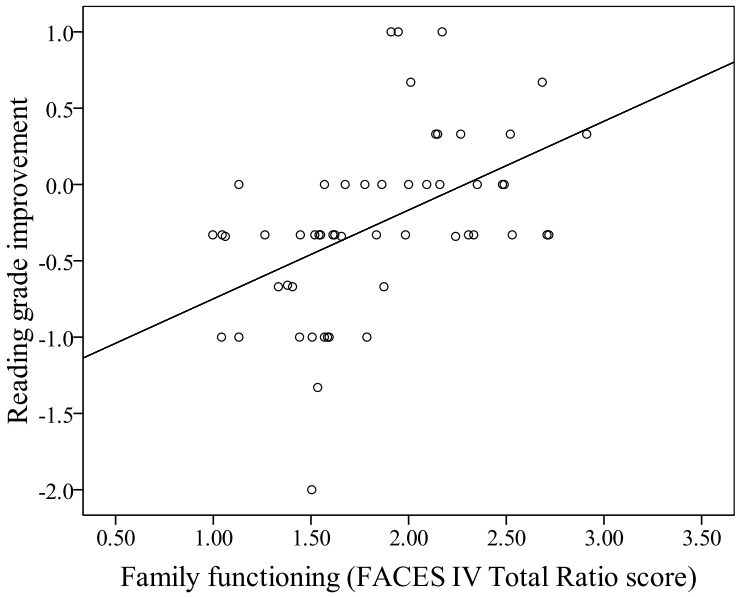


Figure 16. Relationship (*r*= .48, *N*= 54, *p*< .001) between family functioning and child's reading grade improvement, for deployed families.

Table 21
Results of Multiple Regression with Deployment (Father Deployed or Not) and Family Functioning as Predictors, and Reading Grade Improvement as Outcome

	Weights and significance				
Predictor	*B*[a]	*SEB*[b]	β[c]	*t*	*p*
Deployment	-1.129	.321	-.894	-3.51	<.001
Family functioning	.131	.081	.122	1.61	.109
Deployment × family functioning	.451	.168	.684	2.68	.008

Note. Deployment: whether or not father was deployed. Family functioning: FACES IV Total Ratio score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight.

To test Hypotheses 3c and 3d, similar analyses were conducted, but with the 4-level definition of strain used as the predictor for the effects of deployment. Figures 17 through 20 show the relationship between family functioning and Devereux-Parent scores for each of the four levels of presumed strain. At Level 2 (mild strain), there was essentially no relationship between family functioning and behavioral disturbance as rated by the parent (Figure 18). At higher levels of presumed strain (Figures 19 & 20), as expected, there was a strong negative relationship, such that, at these levels of deployment strain, higher family functioning was associated with fewer behavioral disorders. However, this relationship also held true for families at Level 1 (presumably no strain, Figure 17), so the picture is not clear. As Table 25 shows, the interaction between level of deployment strain and family functioning was significant (although not strong), so the different pattern of relationships at different deployment strain levels cannot be dismissed as merely due to chance.

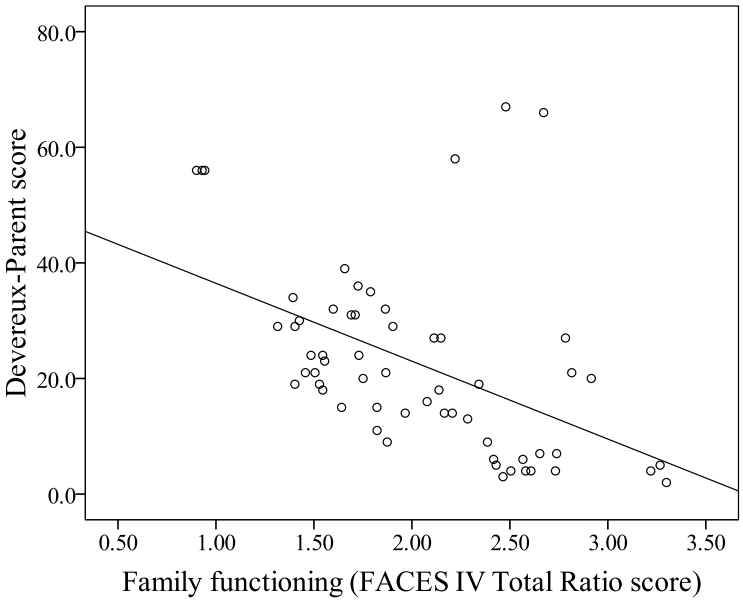


Figure 17. Relationship (*r*= -.48, *N*= 59, *p*< .001) between family functioning and Devereux-Parent score, for families at Level 1 (no strain) of hypothesized deployment strain.

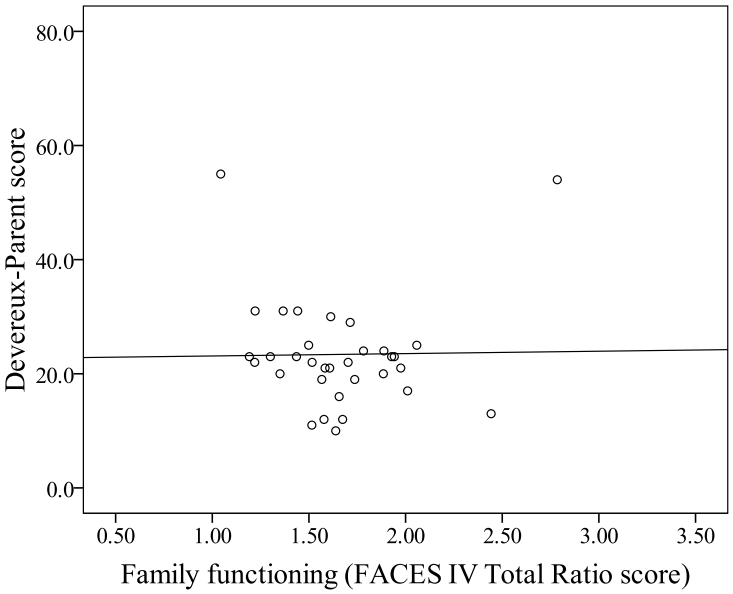


Figure 18. Relationship (*r*= .02, *N*= 33, *n.s.*) between family functioning and Devereux-Parent score, for families at Level 2 (mild strain) of hypothesized deployment strain.

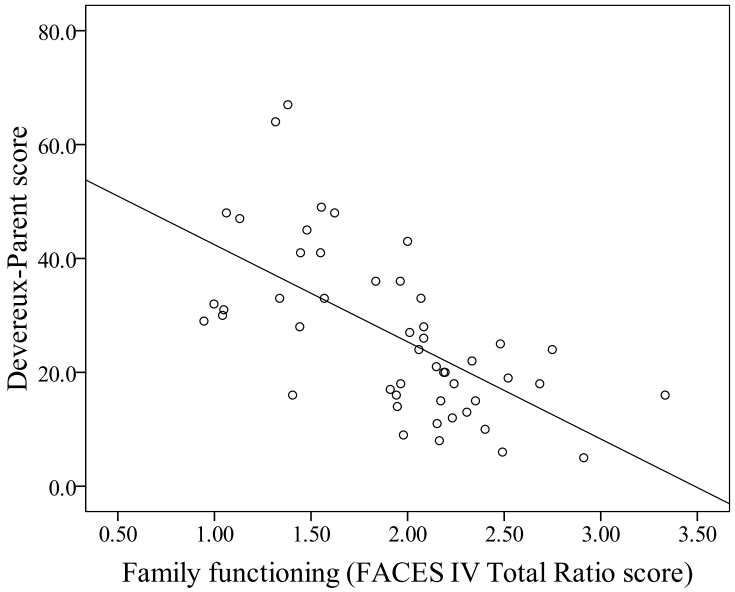


Figure 19. Relationship (r= -.63, N= 49, p< .001) between family functioning and Devereux-Parent score, for families at Level 3 (moderate strain) of hypothesized deployment strain.

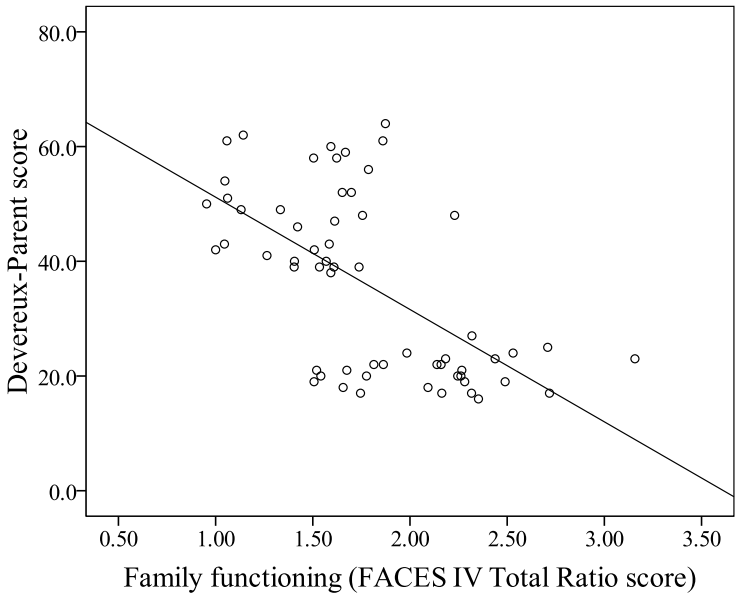


Figure 20. Relationship (r= -.61, N= 60, p< .001) between family functioning and Devereux-Parent score, for families at Level 4 (high strain) of hypothesized deployment strain.

Table 22
Results of Multiple Regression with 4 Levels of Deployment Strain and Family Functioning as Predictors, and Devereux-Parent Score as Outcome

	Weights and significance				
Predictor	*B*[a]	*SEB*[b]	β[c]	*t*	*p*
Deployment strain	9.30	2.78	.72	3.34	.001[d]
Family functioning	-6.67	3.81	-.22	-1.75	.082
Deploy strain × family functioning	-3.09	1.41	-.50	-2.19	.030

Note. Deployment strain: hypothesized level of strain due to deployment. Family functioning: FACES IV Total Ratio score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Rounded down to .001; not < .001.

Parallel analyses were conducted with Devereux-Teacher scores as the outcome measure. Figures 21 through 24 and Table 23 show the results. Results were very similar to those for Devereux-Parent scores. Again, although the interaction between the predictors was significant, and in essentially the direction hypothesized, families at Level 1 (presumed no strain) were an exception. Thus, with the 4-level measure of hypothesized deployment strain as a predictor, Hypothesis 3c was partially supported, in that the moderating effect of family functioning on behavioral disturbance was strongest at the two highest deployment strain levels, but was also strong at the lowest level.

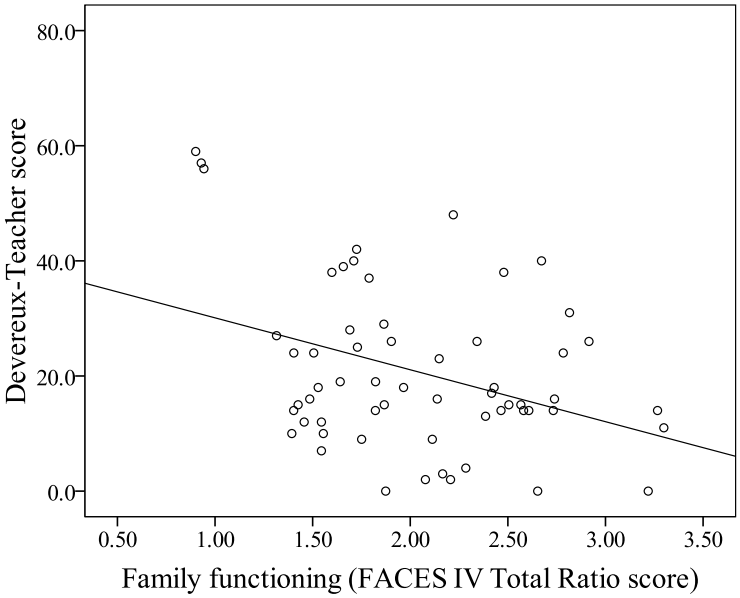


Figure 21. Relationship (*r*= -.37, *N*= 59, *p*< .01) between family functioning and Devereux-Teacher score, for families at Level 1 (no strain) of hypothesized deployment strain.

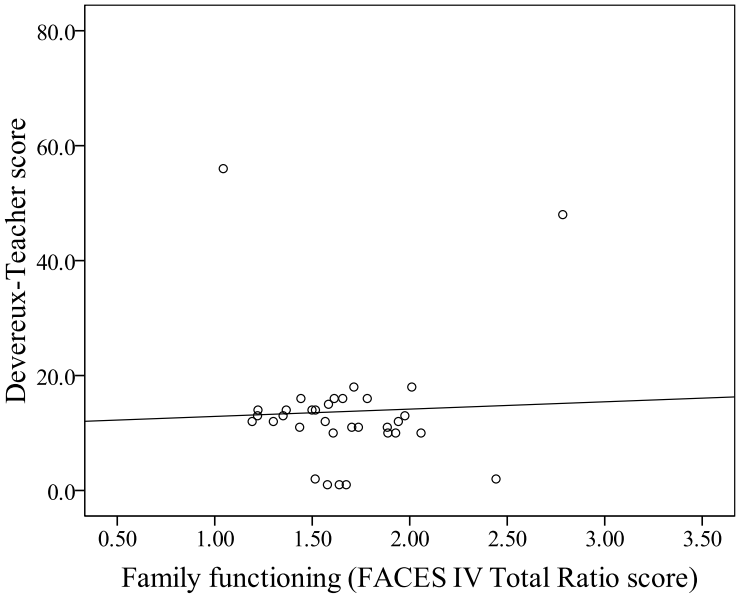


Figure 22. Relationship (*r*= .04, *N*= 33, *n.s.*) between family functioning and Devereux-Teacher score, for families at Level 2 (mild strain) of hypothesized deployment strain.

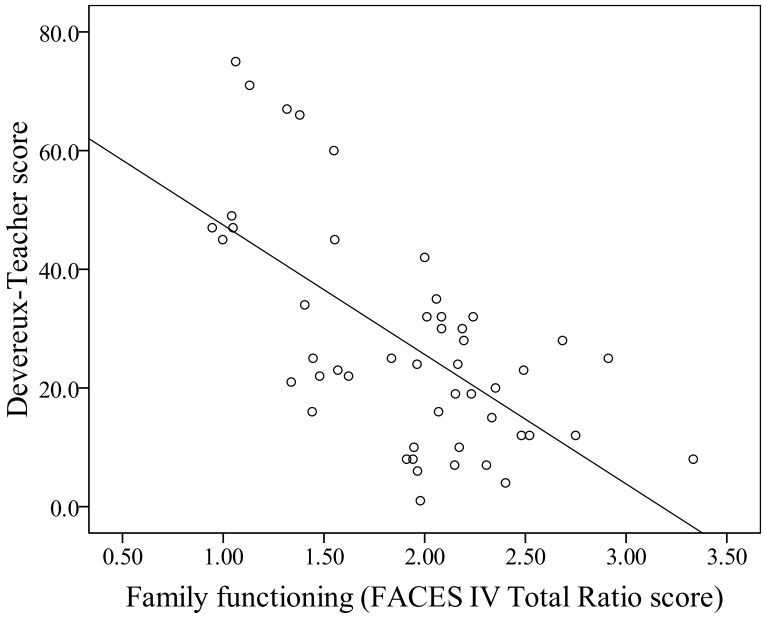


Figure 23. Relationship (r= -.63, N= 49, p< .001) between family functioning and Devereux-Teacher score, for families at Level 3 (moderate strain) of hypothesized deployment strain.

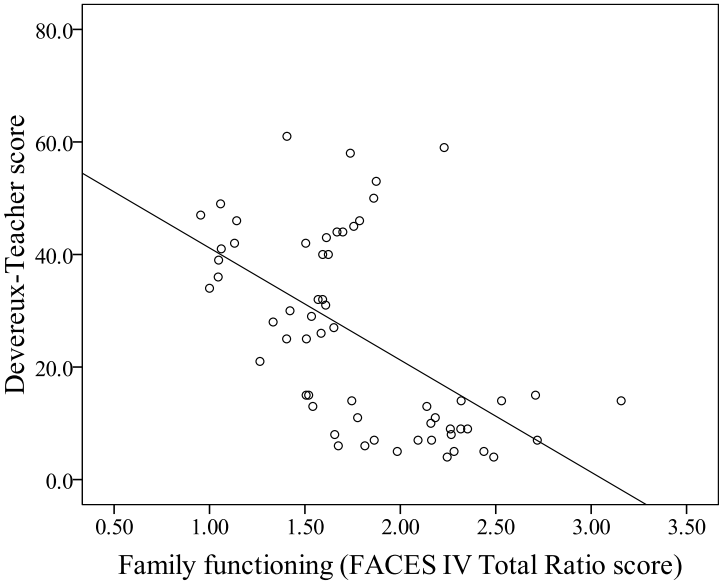


Figure 24. Relationship (r= -.56, N= 60, p< .001) between family functioning and Devereux-Teacher score, for families at Level 4 (high strain) of hypothesized deployment strain.

Table 23
Results of Multiple Regression with 4 Levels of Deployment Strain and Family Functioning as Predictors, and Devereux-Teacher Score as Outcome

	Weights and significance				
Predictor	*B*[a]	*SEB*[b]	β[c]	*t*	*p*
Deployment strain	11.20	3.18	.821	3.52	<.001
Family functioning	-0.29	4.35	-.009	-0.07	.947
Deploy strain × family functioning	-5.04	1.61	-.777	-3.13	.002

Note. Deployment strain: hypothesized level of stress due to deployment. Family functioning: FACES IV Total Ratio score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight.

Hypothesis 3d was that deployment strain would have less deleterious effects on children's grades when the family's functioning was healthier. With these outcome measures, it should be kept in mind that, unlike the Devereux scores, higher scores indicate better functioning. With math grade improvement, as Figures 25 and 26 show, at the lower levels of presumed deployment strain, better family functioning was associated with slightly poorer grade improvement (that is, some decline in grades), although the correlations were not significant. At the two higher levels of strain (Figures 27 & 28), there were positive relationships between functioning and grade improvement, although this was only significant at Level 3. Nonetheless, as Table 27 shows, the interaction between hypothesized strain level and family functioning was strongly significant. That is, the relationship between family functioning and the outcome measure differed at different levels of deployment. The source of this significance was clearly the reversal of

the relationship from negative to positive between the lower and higher levels of deployment strain.

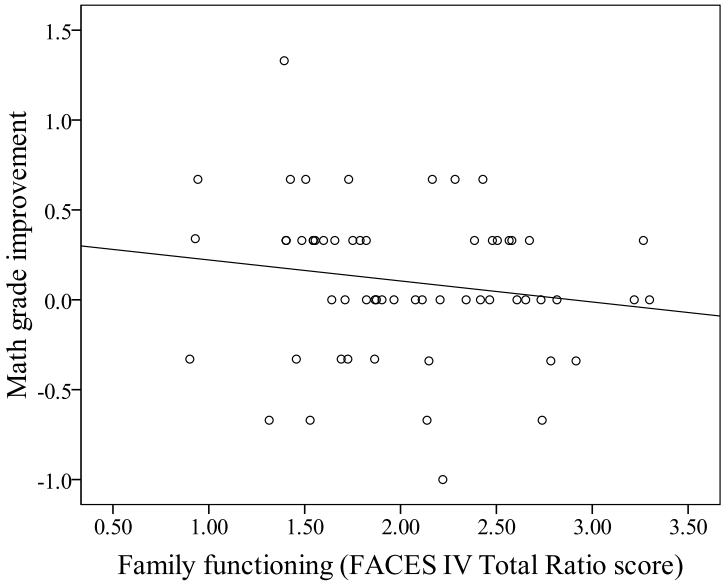


Figure 25. Relationship (*r*= -.16, *N*= 59, *n.s.*) between family functioning and child's math grade improvement, for families at Level 1 (no strain) of hypothesized deployment strain.

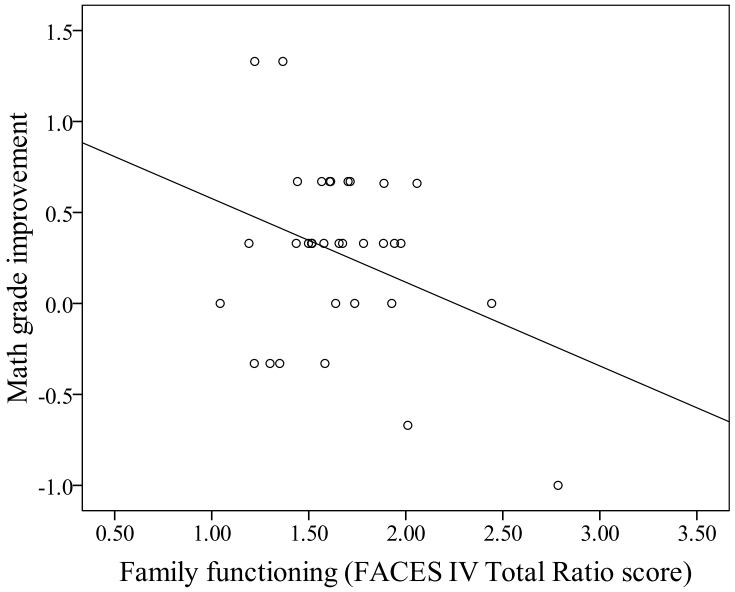


Figure 26. Relationship (*r*= -.33, *N*= 33, *n.s.*) between family functioning and child's math grade improvement, for families at Level 2 (mild strain) of hypothesized deployment strain.

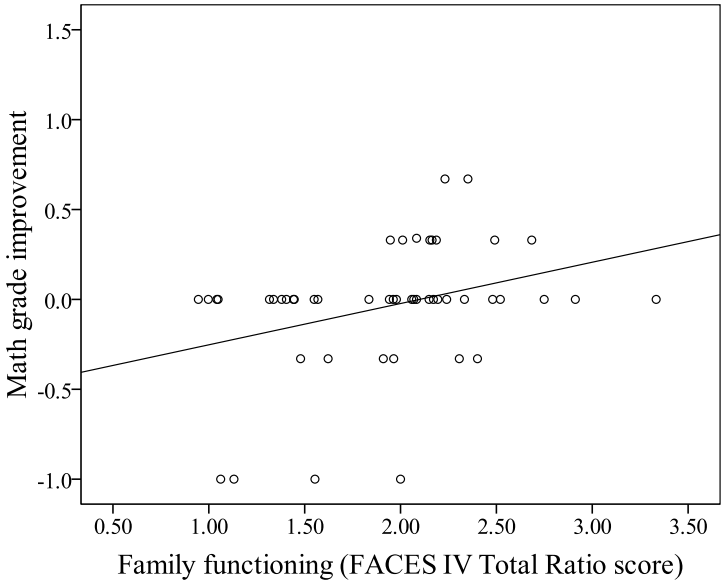


Figure 27. Relationship (r= .34, N= 49, p< .05) between family functioning and child's math grade improvement, for families at Level 3 (moderate strain) of hypothesized deployment strain.

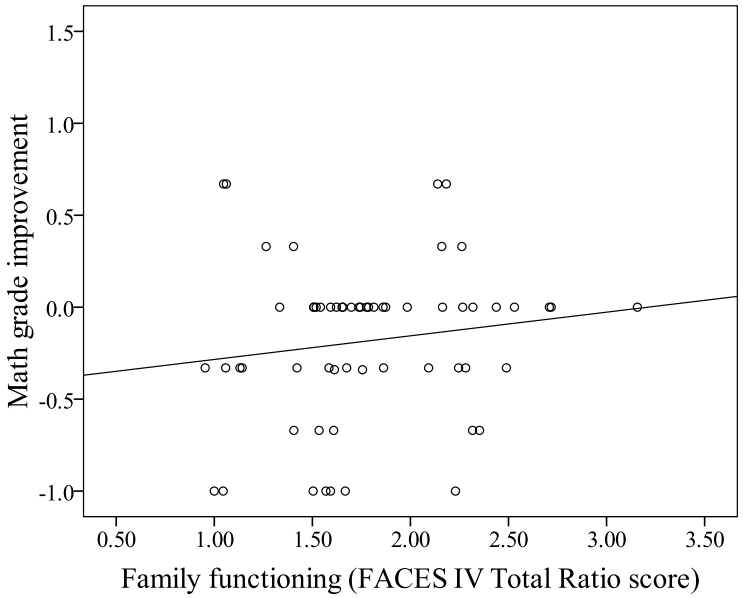


Figure 28. Relationship (r= .14, N= 60, *n.s.*) between family functioning and child's math grade improvement, for families at Level 4 (high strain) of hypothesized deployment strain.

Table 24
Results of Multiple Regression with 4 Levels of Deployment Strain and Family Functioning as Predictors, and Math Grade Improvement as Outcome

	Weights and significance				
Predictor	*B*[a]	*SEB*[b]	β[c]	*t*	*p*
Deployment strain	-.354	.093	-.944	-3.80	<.001
Family functioning	-.331	.127	-.384	-2.60	.010[d]
Deploy strain × family functioning	.129	.047	.725	2.74	.007

Note. Deployment strain: hypothesized level of stress due to deployment. Family functioning: FACES IV Total Ratio score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Rounded down to .01; not < .01.

Finally, analyses were repeated with reading grade improvement as the outcome variable. As Figures 29- 32 and Table 25 show, results were similar to those with math grades, but much stronger. At the lower levels of presumed deployment strain, what little (nonsignificant) relationship there was between family functioning and reading grades was negative; at the higher levels of strain, it was strongly positive. As hypothesized, then, healthy family functioning appears to insulate children against some of the harmful effects of deployment on academic performance. Thus, Hypothesis 3d was strongly supported for reading, and partially supported in the case of math grades.

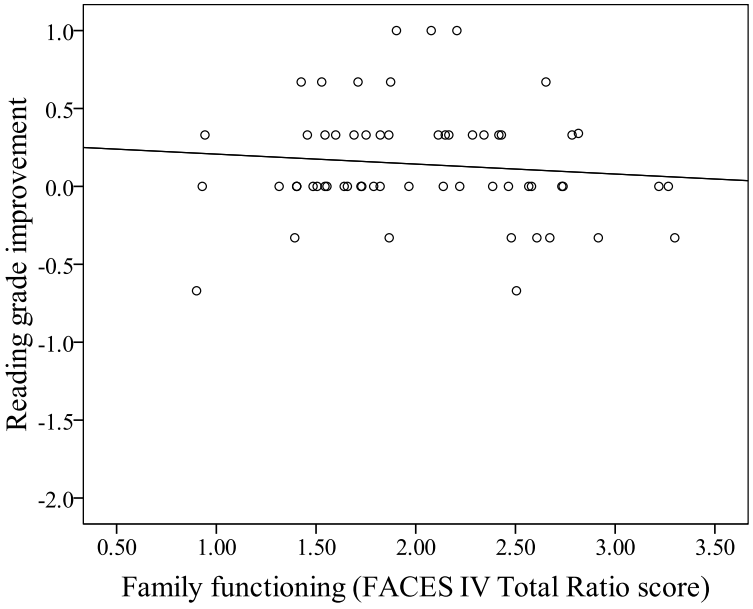


Figure 29. Relationship (*r*= -.10, *N*= 59, *n.s.*) between family functioning and child's reading grade improvement, for families at Level 1 (no strain) of hypothesized deployment strain.

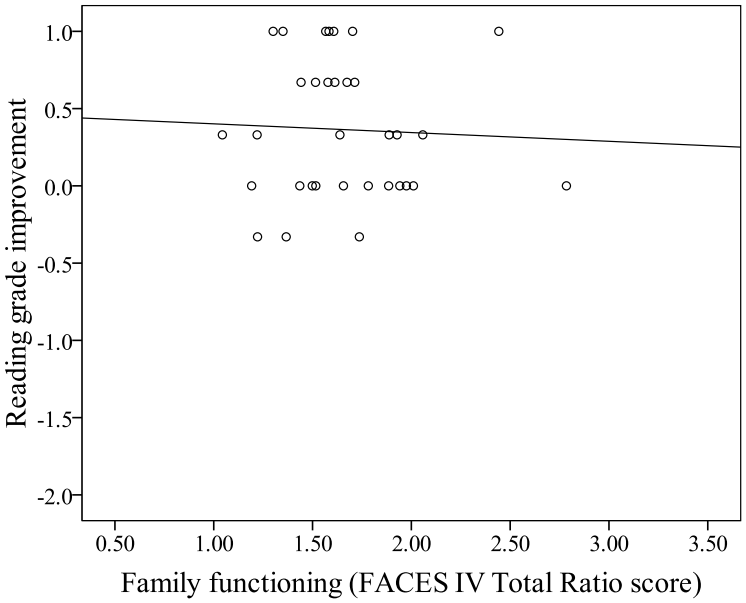


Figure 30. Relationship (*r*= -.05, *N*= 33, *n.s.*) between family functioning and child's reading grade improvement, for families at Level 2 (mild strain) of hypothesized deployment strain.

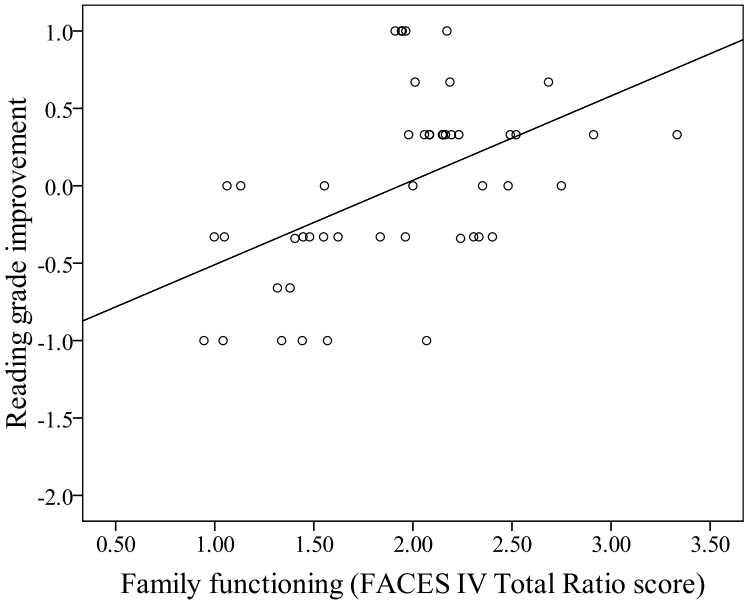


Figure 31. Relationship (r= .51, N= 49, p< .001) between family functioning and child's reading grade improvement, for families at Level 3 (moderate strain) of hypothesized deployment strain.

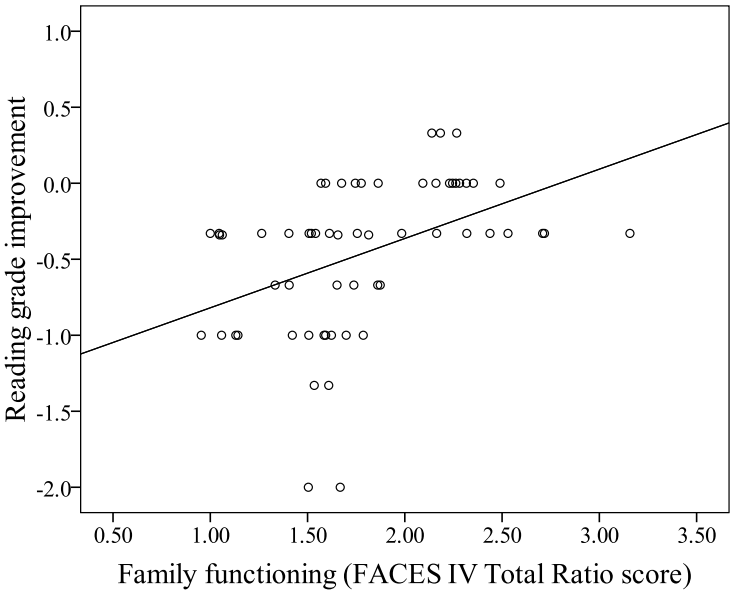


Figure 32. Relationship (r= .46, N= 60, p< .001) between family functioning and child's reading grade improvement, for families at Level 4 (high strain) of hypothesized deployment strain.

Table 25
Results of Multiple Regression with 4 Levels of Deployment Strain and Family Functioning as Predictors, and Reading Grade Improvement as Outcome

	Weights and significance				
Predictor	*B*[a]	*SEB*[b]	β[c]	*t*	*p*
Deployment strain	-.668	.103	-1.427	-6.48	<.001
Family functioning	-.411	.141	-.382	-2.91	.004
Deploy strain × family functioning	.248	.052	1.117	4.75	<.001

Note. Deployment strain: hypothesized level of stress due to deployment. Family functioning: FACES IV Total Ratio score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight.

Hypothesis 4. Hypothesis 4 was that in addition to its direct effect, deployment (considered both as dichotomous groups—deployed and not deployed—and in the deployment stage order described in Hypothesis 1) would have an indirect effect on behavioral and academic functioning of the child by affecting general family stress. That is, deployment would lead to stress, and stress itself would lead to negative effects on the child.

Hypothesis 4a: Deployment (deployed, compared to not deployed) would be indirectly associated with higher Devereux scores, indicating greater emotional disturbance, through its association with higher measured stress.

Hypothesis 4b: Deployment (deployed, compared to not deployed) would be indirectly associated with lower grades, through its association with higher measured stress.

Hypothesis 4c: Deployment stage (in 4 ordered groups) would be indirectly associated with higher Devereux scores, indicating greater emotional disturbance, through its association with higher measured stress.

Hypothesis 4d: Deployment stage (in 4 ordered groups) would be indirectly associated with lower grades, through its association with higher measured stress.

The most precise tests of these hypotheses can be obtained by using path analysis, in this case, using the software Amos 17.0 (Arbuckle, 2008). A path analysis assesses whether a hypothesized causal variable has a significant direct or indirect effect on an outcome variable. In path analysis, a diagram is produced indicating the relative influence (*B* or β weights, called *parameters* in path analysis) each predictor variable has on the outcome variable. In addition, it reports a critical ratio (*CR*) for each. The critical ratio "has a standard normal distribution under the null hypothesis that the parameter has a population value of zero" (Arbuckle, 2007, *Columns of the table of estimates*, para 4). As Biderman (2010) and others have pointed out, the *CR* is only approximately distributed as *z*; to be precise, it is so when the sample is very large, but a sample "in the 100's" (Biderman, 2010, p. 8) is generally regarded as a close enough approximation. Other statistics generated in a path analysis will be described below in the context of actual results. In addition, correlations between predictors and outcome measures for all path analyses reported below are included in Appendix S.

Deployment considered as either deployed or not. For comparison with previous research, analyses were conducted with deployment scored as either deployed (father absent from the home, scored as 0) or not deployed (father present, scored as 1).

Figure 33 shows the path diagram produced by analysis of the relationships among the three variables: Deployment, a dichotomous variable (father deployed or not deployed), hypothesized to be a causal or predictor variable; actual stress as measured by the Perceived Stress Scale, a presumed intervening variable; and behavioral functioning of the child as measured by the Devereux Behavior Rating Scale-Parent, the outcome measure.

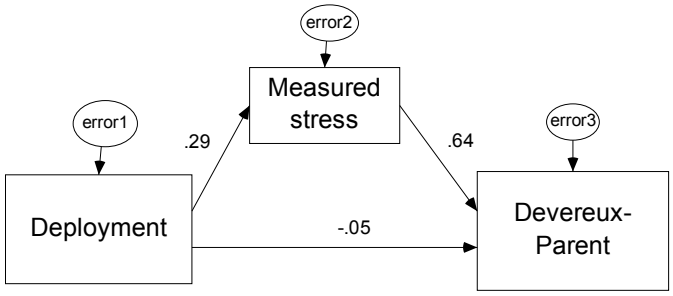


Figure 33 Diagram of path analysis of the effects of deployment (deployed or not) and measured stress on Devereux-Parent scores.

Table 26 shows the weights and statistical tests of significance of the predictors. In this case, deployment is tested to see whether it is a significant predictor of stress (first line of table), whether, in turn, stress predicts Devereux-Parent scores (second line), and whether deployment is a direct predictor of the Devereux-Parent variable (third line). As with multiple regression results described above, *B* represents the unstandardized regression weight for each predictor, *SEB* is its standard error, and β (beta) is the standardized regression weight. *CR* is $B \div SEB$, which is approximately distributed as *z* (the unit-normal distribution, or bell-shaped distribution of *z*-scores). The *CR* is then compared to the *z* distribution; as with most statistics, if its value is large enough to have occurred less than 5% of the time by chance (assuming the null hypothesis is true), it is considered to be statistically significant at $p < .05$.

Table 26
Results of Path Analysis with Deployment (Father Deployed or Not), Stress, and Devereux-Parent Scores

Predictor	Intervening variable	Outcome	Weights and significance			
			B[a]	*SEB*[b]	β[c]	*CR*[d]
Deployment	Stress		3.40	0.79	0.29	4.33***
	Stress	Dev-Parent	1.94	0.17	0.64	11.15***
Deployment		Dev-Parent	-1.63	2.02	-0.05	-0.81

Note. Deployment: whether or not father was deployed. Stress: Perceived Stress Scale score. Dev-Parent: Devereux-Parent score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution).
***$p < .001$.

The β weights have the advantage that they can be compared to each other directly, regardless of the scaling of the variable, and even across different analyses. Thus, it is clear that by far the strongest relationship among the three variables shown in Table 26 is that between stress and the Devereux-Parent. In this relatively simple analysis, β weights are equivalent to correlation coefficients and can be interpreted similarly. In particular, the effect of a predictor with an indirect effect through an intervening variable is the square of the product of the values of β weights along the path. In this case, then, deployment indirectly accounts for 3.4%, or $(.29 \times .64)^2$, of the variance in the Devereux-Parent scores. Since both paths are statistically significant, it is clear that deployment has an indirect effect. Similarly, deployment's direct effect can be determined by squaring the β weight along its path; in this case, it accounts for less than 1% of the variance, which is not significant.

B weights can also be interpreted directly in terms of one variable's effect on another. The weight of 3.40 means that a 1-unit increase in deployment (in this case, meaning that the father was deployed) increases (since the parameter is positive) stress by 3.40 units in the scale on which the PSS is scored. In turn, each increase of 1 unit of PSS score increases the Devereux-Parent score by 1.94. Therefore, having a deployed father indirectly increases the Devereux by 6.60 (3.40 × 1.94) points. However, deployment directly reduces the Devereux by 1.63 points, so the net effect of deployment is to increase the Devereux by 4.97 points. In Table 10 it was shown that this measure has a mean of 27.6 and *SD* of 15.6, so the father's deployment increases a child's score by .32 of a standard deviation. Referring back to the Devereux-Parent norms (taking into account the standardized scores), this is enough to change the child from the 50th to the 61st percentile, or from the 80th to the 86th.

Figure 34 and Table 27 show the results of the path analysis with the Devereux-Teacher as the outcome measure. The relationship between deployment and stress must be the same as in the previous analysis, as the same data on those measures were used in this analysis as in the previous one. That is, any given family had only one score for deployment and one score on the PSS, although they had both Parent and Teacher Devereux scores. Other results were similar to those reported in the previous analysis. That is, there was a strongly significant indirect relationship between deployment and Devereux scores, which occurred through the intervening variable of stress. Deployment, however, had essentially no direct effect at all on the outcome measures.

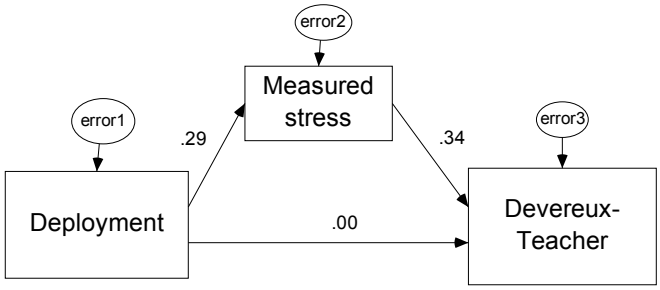


Figure 34. Diagram of path analysis of the effects of deployment (deployed or not) and measured stress on Devereux-Teacher scores.

Table 27
Results of Path Analysis with Deployment (Father Deployed or Not), Stress, and Devereux-Teacher Scores

			Weights and significance			
Predictor	Intervening variable	Outcome	*B*[a]	*SEB*[b]	β[c]	*CR*[d]
Deployment	Stress		3.40	0.79	0.29	4.33***
	Stress	Dev-Teacher	1.08	0.22	0.34	4.88***
Deployment		Dev-Teacher	-0.16	2.56	0.00	-0.06

Note. Deployment: whether or not father was deployed. Stress: Perceived Stress Scale score. Dev-Teacher: Devereux-Teacher score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution).
***$p < .001$.

Figure 35 and Table 28 show the relationships among deployment, stress, and improvement in math grades. Figure 36 and Table 29 show the same for improvement in reading grades. As with the previous analyses, there appears to be essentially no direct influence of deployment on grades. (Such a relationship might have been expected. It is entirely possible that having only one parent at home instead of two would hinder the parent's availability to help the child with homework and studying.) Instead, almost all of the influence is indirect, through stress. The negative parameters between stress and

grades indicate that increased stress is associated with decline in grades, as hypothesized. It may also be noted that the relationship is less strong for math than for reading, although still significant.

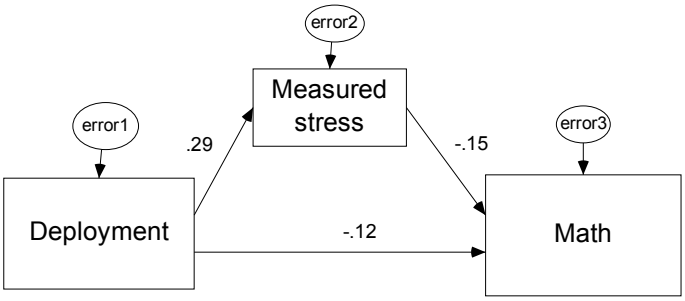


Figure 35. Diagram of path analysis of the effects of deployment (deployed or not) and measured stress on math improvement scores.

Table 28
Results of Path Analysis with Deployment (Father Deployed or Not), Stress, and Math Improvement Scores

			Weights and significance			
Predictor	Intervening variable	Outcome	*B*[a]	*SEB*[b]	β[c]	*CR*[d]
Deployment	Stress		3.40	0.79	0.29	4.33***
	Stress	Math-Improve	-0.01	0.01	-0.15	-2.06*
Deployment		Math-Improve	-0.12	0.07	-0.12	-1.66

Note. Deployment: whether or not father was deployed. Stress: Perceived Stress Scale score. Math-Improve: improvement in math grade.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution).
*$p < .05$. ***$p < .001$.

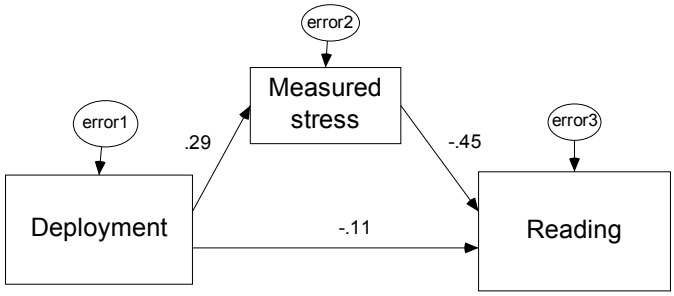


Figure 36. Diagram of path analysis of the effects of deployment (deployed or not) and measured stress on reading improvement scores.

Table 29
Results of Path Analysis with Deployment (Father Deployed or Not), Stress, and Reading Improvement Scores

			Weights and significance			
Predictor	Intervening variable	Outcome	B^a	SEB^b	β^c	CR^d
Deployment	Stress		3.40	0.79	0.29	4.33***
	Stress	Read-Improve	-0.05	0.01	-0.45	-6.95***
Deployment		Read-Improve	-0.15	0.08	-0.11	-1.78

Note. Deployment: whether or not father was deployed. Stress: Perceived Stress Scale score. Read-Improve: improvement in reading grade.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution).
***$p < .001$.

It might be informative to trace the specific effect of deployment on grades. Using the stronger relationship with reading to illustrate, it can be seen that a deployed father increases a family's stress by 3.40 PSS score units, and each such unit decreases the reading grade by .05 points, so indirectly deployment lowers a grade by .17. Furthermore, the direct effect of deployment here decreases the reading grade by .15 points. Therefore, having a deployed father reduces performance in reading by .32 of a grade point on average, or about the difference between, for example, a B and B+.

Deployment considered as four levels of hypothesized strain. A major thesis of this study is that using hypothesized levels of strain due to deployment would yield a more precise understanding of the effects of deployment than simply regarding deployment as father present vs. father absent. Figure 37 and Table 30 show results parallel to those of Figure 33 and Table 26, but using the 4-level presumed strain measure rather than deployed/not deployed as the predictor of effects on stress and the Devereux-Parent scores. Again, there is essentially no direct effect of deployment strain on the Devereux score. As might be expected, the effect of stress on the Devereux-Parent is similar. However, the 4-level measure is a much stronger predictor of stress (β weight of .60 compared to .29 for the dichotomous measure). Specifically, stress correlates at r= .293 with the dichotomous measure, but at r= .603 with the 4-level measure. Although both are strongly significant at p< .001, they differ significantly ($t_{(198)}$= 5.53, p< .001). (This test is performed on Fisher Z transformations of rs. This converts rs to a scale similar to that of z, the unit-normal distribution, so differences can be tested by t test.) That is, the 4-level measure of deployment strain is significantly more highly correlated with stress than is the dichotomous measure.

For a more specific comparison in terms of the actual scale values, using B weights, the indirect effect of 1 unit of increased deployment strain is 2.59 × 2.04 = 5.28, although the direct effect of deployment reduces that by 1.00 points. That is, a single unit of difference in deployment level changes the Devereux-Parent score by 4.28 points, or .27 of a *SD* on the Devereux-Parent scale (see Table 10). This is nearly as much as the difference between being deployed or not, in which the difference was .32 *SD* as described above. The 4-level measure allows for a difference of up to 3 units, that is,

between no hypothesized strain and high hypothesized strain. Therefore, the difference between a family's being in the not deployed phase (see Table 5) and the highest-strain phases (late predeployment or early deployment) would be 3 times as high, resulting in an average difference of .82 of a standard deviation on the Devereux-Parent scale.

Similarly, tracing the paths via β weights, it can be seen that hypothesized deployment strain has a moderately strong effect on the Devereux-Parent scores through measured stress (PSS scores). That is, $(.60 \times .67)^2 = .16$, meaning that it accounts for 16% of the variance in Devereux-Parent scores. In contrast, the direct effect of deployment strain, $-.08^2 = .01$, is negligible.

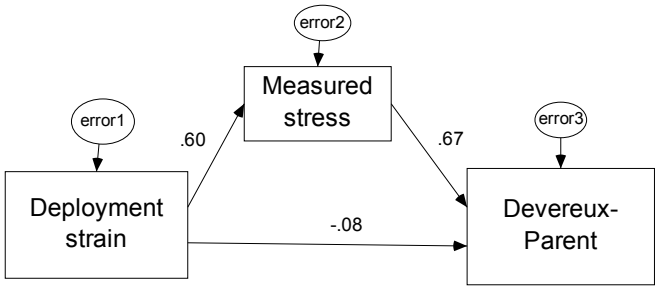


Figure 37. Diagram of path analysis of the effects of deployment strain and measured stress on Devereux-Parent scores.

Table 30
Results of Path Analysis with Deployment Strain, Stress, and Devereux-Parent Scores

Predictor	Intervening variable	Outcome	Weights and significance			
			B[a]	*SEB*[b]	β[c]	*CR*[d]
Deploy strain	Stress		2.59	0.24	0.60	10.68***
	Stress	Dev-Parent	2.04	0.21	0.67	9.80***
Deploy strain		Dev-Parent	-1.00	0.89	-0.08	-1.12

Note. Deploy strain: hypothesized stress due to deployment, in 4 levels. Stress: Perceived Stress Scale score. Dev-Parent: Devereux-Parent score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution).
***$p < .001$.

Results were similar, but considerably weaker, when using the Devereux-Teacher outcome measure, as shown in Figure 38 and Table 31. Here, deployment strain indirectly accounted for 4.9% of the variance in the outcome $(.60 \times .37)^2$, compared to less than 1% of its direct effects.

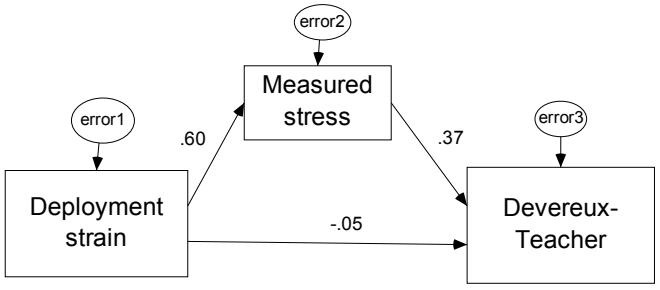


Figure 38. Diagram of path analysis of the effects of deployment strain and measured stress on Devereux-Teacher scores.

Table 31
Results of Path Analysis with Deployment Strain, Stress, and Devereux-Teacher Score

Predictor	Intervening variable	Outcome	Weights and significance			
			B[a]	*SEB*[b]	β[c]	*CR*[d]
Deploy strain	Stress		2.59	0.24	.603	10.68***
	Stress	Dev-Teacher	1.16	0.27	.366	4.39***
Deploy strain		Dev-Teacher	-0.63	1.14	-.046	-.56

Note. Deploy strain: hypothesized stress due to deployment, in 4 levels. Stress: Perceived Stress Scale score. Dev-Teacher: Devereux-Teacher score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution).
***$p < .001$.

In the case of improvement in math grades as an outcome measure, the picture is different (Figure 39 and Table 32). Although deployment strain, as seen above, is strongly related to measured stress, the latter is essentially unrelated to grade change (β= -0.02). However, a small amount of the variance ($-.28^2 = .08 = 8\%$) in the latter is directly due to stage of deployment, and this was statistically significant (*CR*= -3.27, $p < .01$). The negative sign of the parameter indicates that higher deployment strain was related to lower grades.

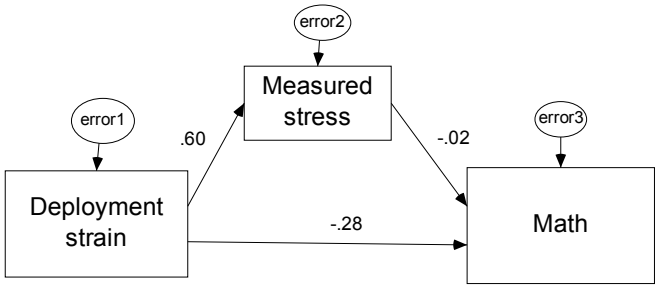


Figure 39. Diagram of path analysis of the effects of deployment strain and measured stress on math grade improvement.

Table 32
Results of Path Analysis with Deployment Strain, Stress, and Math Improvement Scores

			Weights and significance			
Predictor	Intervening variable	Outcome	*B*[a]	*SEB*[b]	β[c]	*CR*[d]
Deploy strain	Stress		2.59	0.24	0.60	10.68***
	Stress	Math-Improve	0.00	0.01	-0.02	-0.19
Deploy strain		Math-Improve	-0.10	0.03	-0.28	-3.27**

Note. Deploy strain: hypothesized stress due to deployment, in 4 levels. Stress: Perceived Stress Scale score. Math-Improve: improvement in math grade. [a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution). **$p < .01$. ***$p < .001$.

In the case of reading (Figure 40), deployment had both indirect (accounting for 3.9% of variance) and direct (5.8%) effects, as shown in Table 33. In a practical sense, the combined direct and indirect effects of the difference between a child's being in a family in a no-strain stage and one in a high strain deployment stage would be .62 grade points ((2.59 × -.04) + (-.11) × 3). That is the difference between a C and a B- or a B- and a B+.

Overall, then, there is support for the hypothesis that deployment's effect on these outcome variables is at least partly due to raising levels of stress. Furthermore, except for the math grade improvement, results were clearly stronger with the 4-group means of assessing presumed strain due to deployment.

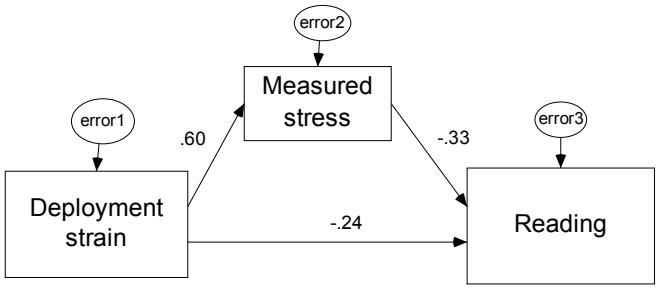


Figure 40. Diagram of path analysis of the effects of deployment strain and measured stress on reading grade improvement.

Table 33
Results of Path Analysis with Deployment Strain, Stress, and Reading Improvement Scores

			Weights and significance			
Predictor	Intervening variable	Outcome	*B*[a]	*SEB*[b]	β[c]	*CR*[d]
Deploy strain	Stress		2.59	.243	.603	10.68***
	Stress	Read-Improve	-0.04	.008	-.335	-4.41***
Deploy strain		Read-Improve	-0.11	.035	-.242	-3.19***

Note. Deploy strain: hypothesized stress due to deployment, in 4 levels. Stress: Perceived Stress Scale score. Read-Improve: improvement in reading grade. [a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution). ***$p < .001$.

Finally, as discussed previously, it is possible to compare change in grades not only to current deployment and presumed level of strain, but also to change in presumed

strain due to deployment from its level at the time of the prior grade. Figure 41 and Table 34 show the results of a path analysis using change in deployment strain as the predictor and change in math grades as the outcome. As before, since there is very little association between measured stress and change in math grade, it is clear that there is essentially no indirect effect of deployment strain on math. However, the direct effect (β= -.21) is significant.

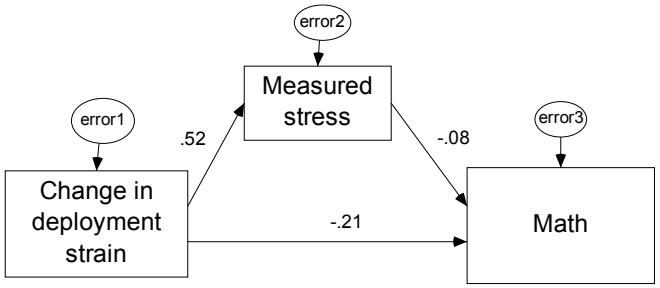


Figure 41. Diagram of path analysis of the effects of change in deployment strain and measured stress on math improvement scores.

Table 34
Results of Path Analysis with Change in Deployment Strain, Stress, and Math Improvement Scores

			Weights and significance			
Predictor	Intervening variable	Outcome	*B*[a]	*SEB*[b]	β[c]	*CR*[d]
Dep strain chng	Stress		1.62	0.19	0.52	8.54***
	Stress	Math-Improve	-0.01	0.01	-0.08	-0.95
Dep strain chng		Math-Improve	-0.06	0.02	-0.21	-2.61**

Note. Dep strain chng: hypothesized change in stress due to deployment, from the prior to the current grading period. Stress: Perceived Stress Scale score. Math-Improve: improvement in math grade.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution). **p< .01. ***p< .001.

With reading grade change as the outcome measure (Figure 42 and Table 35), both the indirect and direct effects of change in deployment strain are significant. Indirectly, tracing the path using *B* weights, it can be seen that each unit increase of deployment strain from the prior period to the current period results in a change of -0.068 (1.62 × -0.042) in grade. The direct effect is about the same, -0.06, as shown in Table 35. Therefore, a single unit of change in deployment strain makes a difference, on average, of 0.128 grade points. As shown in Table 13, 46 children went from a period of no strain to high strain (a change of +3). Therefore, on average, these children experienced a decline of 0.384 in reading grades between the two periods, or the difference between a C and a low C-, or a low B+ to a B-. In terms of variance accounted for, change in deployment strain directly and indirectly accounts for $(.52 \times -.39)^2 + (-.17^2) = .070$, or 7% of the variance in reading grade change.

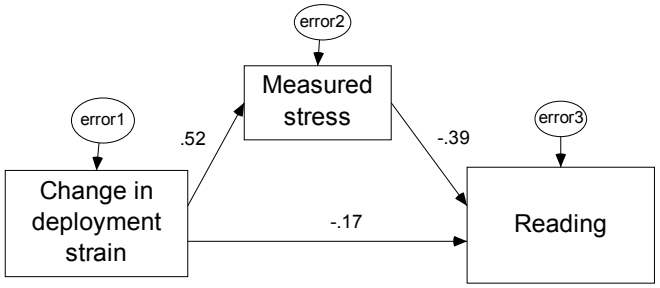


Figure 42. Diagram of path analysis of the effects of change in deployment strain and measured stress on reading improvement scores.

Table 35
Results of Path Analysis with Change in Deployment Strain, Stress, and Reading Improvement Scores

Predictor	Intervening variable	Outcome	Weights and significance			
			B[a]	*SEB*[b]	β[c]	*CR*[d]
Dep strain chng	Stress		1.62	0.19	0.52	8.54***
	Stress	Read-Improve	-0.04	0.01	-0.39	-5.46***
Dep strain chng		Read-Improve	-0.06	0.02	-0.18	-2.45**

Note. Dep strain chng: hypothesized change in stress due to deployment, from the prior to the current grading period. Stress: Perceived Stress Scale score. Read-Improve: improvement in reading grade.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution).
**$p < .01$. ***$p < .001$.

Hypothesis 5. Hypothesis 5 was that child gender would have an independent (main) effect on behavioral and academic functioning of the child, such that girls would display less behavior symptoms and reflect less of a decline academically than boys.

Hypothesis 5a: Girls would receive lower Devereux-Parent scores, indicating less emotional disturbance.

Hypothesis 5b: Girls would receive lower Devereux-Teacher scores, indicating less emotional disturbance.

Hypothesis 5c: Girls would receive higher grades and will show less decline in grades as a result of deployment than boys.

As Table 14 showed, Devereux total scores did not differ significantly between males and females, although boys did score higher on two of the subscales (interpersonal

problems and inappropriate behaviors and feelings) when evaluated by teachers. Thus, in the main, Hypotheses 5a and 5b were not supported. Also as can be seen in Table 14, girls improved more in reading overall than did boys, but this difference was not significant for math grades.

With regard to change in grades due to deployment, Table 36 shows means and standard deviations of math grade change scores broken down by gender and deployment (as a dichotomous variable), and Table 37 shows the results of an ANOVA to test for mean differences. As this shows, only the main effect of deployment was significant.

Table 36
Descriptive Statistics for Change in Math Grade, Broken Down by Child Gender and Deployment

	Deployment					
	Deployed			Not deployed		
Gender	*N*	Mean	*SD*	*N*	Mean	*SD*
Male	32	-.07	.35	73	.04	.47
Female	22	-.17	.46	74	.07	.45

Table 37
Results of 2-way ANOVA of the Effects of Deployment and Child Gender on Math Grade Change

Source	*SS*	*df*	*MS*	*F*	Sig.
Child gender	0.04	1	0.04	0.22	.643
Deployment	1.16	1	1.16	5.82	.017
Child gender × deployment	0.14	1	0.14	0.70	.403
Error	39.18	197	0.199		
Total	40.41	201			

Similarly, Tables 38 and 39 show descriptive statistics and results of ANOVA with reading improvement as the dependent variable. Again, only the main effect of deployment was significant. The main effect of gender was marginally significant at $p = .097$, so that it would be significant in a 1-tailed test, as predicted, and as noted in Table 14 such that girls in general improved more in reading than boys.

Table 38
Descriptive Statistics for Change in Reading Grade, Broken Down by Child Gender and Deployment

	Deployment					
	Deployed			Not deployed		
Gender	*N*	Mean	*SD*	*N*	Mean	*SD*
Male	32	-.32	.54	73	-.03	.48
Female	22	-.18	.66	74	.12	.57

Table 39
Results of 2-way ANOVA of the Effects of Deployment and Child Gender on Reading Grade Change

Source	*SS*	*df*	*MS*	*F*	Sig.
Child gender	0.82	1	0.82	2.77	.097
Deployment	3.39	1	3.39	11.48	<.001
Child gender × deployment	0.00	1	0.00	.01	.943
Error	58.17	197	.295		
Total	63.37	201			

Finally, the 4-level hypothesized strain due to deployment was used in multiple regressions. With math grade improvement as the dependent variable, none of the effects, deployment, gender, or the deployment × gender interaction, were significant. With reading grade improvement as the dependent variable, only the main effect of gender was significant (β= .306, $t_{(197)}$= 2.07, p= .040). Thus, Hypothesis 5c, that girls would receive higher grades and show less decline in grades as a result of deployment than boys, was supported only for overall gender difference, and only for reading.

Hypothesis 6. Hypothesis 6 was that age of the child would interact with other effects such that younger children would show stronger negative effects of deployment. That is, each of the Hypotheses 1a through 2c and 4a through 4b would be stronger if the child was younger.

The tests for Hypotheses 1a through 1c were repeated with age of child as an additional factor. Tables 40-43 show results of 2-way ANCOVAs. Contrary to expectations, neither the main effects of age nor the interactions of age with hypothesized deployment strain levels were significant. That is, the effect of phase of deployment (as

grouped into the four levels of presumed stressfulness) on the Devereux scores and grade improvement was essentially equivalent across all ages.

Table 40
Results of 2-way ANCOVA of the Effects of Hypothesized Deployment Strain and Child Age on Devereux-Parent Scores

Source	*SS*	*df*	*MS*	*F*	Sig.
Deployment strain level	5168	4	1292	5.94	.000
Age	14	1	14	.06	.803
Dep strain level × age	552	3	184	.85	.470
Error	41946	193	217		
Total	202230	201			

Table 41
Results of 2-way ANCOVA of the Effects of Hypothesized Deployment Strain and Child Age on Devereux-Teacher Scores

Source	*SS*	*df*	*MS*	*F*	Sig.
Deployment strain level	4097	4	1024	4.14	.003
Age	16	1	16	0.07	.799
Dep strain level × age	1458	3	486	1.97	.121
Error	47732	193	247		
Total	156534	201			

Table 42
Results of 2-way ANCOVA of the Effects of Hypothesized Deployment Strain and Child Age on Math Improvement Scores

Source	*SS*	*df*	*MS*	*F*	Sig.
Deployment strain level	0.61	4	0.15	0.86	.488
Age	0.00	1	0.00	0.02	.885
Dep strain level × age	0.83	3	0.28	1.55	.203
Error	34.36	193	0.18		
Total	40.41	201			

Table 43
Results of 2-way ANCOVA of the Effects of Hypothesized Deployment Strain and Child Age on Reading Improvement Scores

Source	*SS*	*df*	*MS*	*F*	Sig.
Deployment strain level	3.62	4	0.90	4.024	.004
Age	0.23	1	0.23	1.037	.310
Dep strain level × age	1.51	3	0.50	2.245	.084
Error	43.39	193	0.22		
Total	63.37	201			

For the re-test of Hypotheses 2a through 2c, all variables involved are continuous, so multiple regressions were used to test this aspect of Hypothesis 6. Furthermore, deviation from average age was also tested to identify any curvilinear effects; that is, if older and younger children were affected differently from children in the middle. This required 10 multiple regressions; the results are displayed in Appendix S. As with the previous analyses, age did not affect the relationship between family functioning and Devereux scores, grade improvement, or PSS scores.

The tests for Hypotheses 4c and 4d were repeated including age as an additional predictor. As with the above analyses, it added essentially nothing to the relationship.

Tables 44-47 show the results of the path analyses for, respectively, Devereux-Parent and -Teacher scores, and math and reading improvement. The effects of age are essentially zero.

Table 44
Results of Path Analysis with Deployment Strain, Age, Stress, and Devereux-Parent Scores

			Weights and significance			
Predictor	Intervening variable	Outcome	*B*[a]	*SEB*[b]	β[c]	*CR*[d]
Deploy strain	Stress		2.59	0.24	0.60	10.68***
Age	Stress		0.01	0.22	0.00	0.04
	Stress	Dev-Parent	2.04	0.21	0.67	9.80***
Deploy strain		Dev-Parent	-0.99	0.89	-0.08	-1.11
Age		Dev-Parent	0.05	0.64	0.00	0.08

Note. Deploy strain: hypothesized stress due to deployment, in 4 levels. Stress: Perceived Stress Scale score. Age: age of child. Dev-Parent: Devereux-Parent score. [a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution). ***$p < .001$.

Table 45
Results of Path Analysis with Deployment Strain, Age, Stress, and Devereux-Teacher Scores

Predictor	Intervening variable	Outcome	Weights and significance			
			B[a]	*SEB*[b]	β[c]	*CR*[d]
Deploy strain	Stress		2.59	0.24	0.60	10.68***
Age	Stress		0.01	0.22	0.00	0.04
	Stress	Dev-Teacher	1.16	0.26	0.37	4.40***
Deploy strain		Dev-Teacher	-0.53	1.14	-0.04	-0.46
Age		Dev-Teacher	0.58	0.81	0.05	0.72

Note. Deploy strain: hypothesized stress due to deployment, in 4 levels. Stress: Perceived Stress Scale score. Age: age of child. Dev-Teacher: Devereux-Teacher score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution).
****p*< .001.

Table 46
Results of Path Analysis with Deployment Strain, Age, Stress, and Math Improvement Scores

Predictor	Intervening variable	Outcome	Weights and significance			
			B[a]	*SEB*[b]	β[c]	*CR*[d]
Deploy strain	Stress		2.59	0.24	0.60	10.68***
Age	Stress		0.01	0.22	0.00	0.04
	Stress	Math-Improve	0.00	0.01	-0.02	-0.19
Deploy strain		Math-Improve	-0.11	0.03	-0.29	-3.42***
Age		Math-Improve	-0.02	0.02	-0.07	-1.05

Note. Deploy strain: hypothesized stress due to deployment, in 4 levels. Stress: Perceived Stress Scale score. Age: age of child. Math-Improve: improvement in math grade.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution).
****p*< .001.

Table 47
Results of Path Analysis with Deployment Strain, Age, Stress, and Reading Improvement Scores

Predictor	Intervening variable	Outcome	Weights and significance			
			B[a]	*SEB*[b]	β[c]	*CR*[d]
Deploy strain	Stress		2.59	0.24	0.60	10.68***
Age	Stress		0.01	0.22	0.00	0.04
	Stress	Read-Improve	-0.04	0.01	-0.33	-4.43***
Deploy strain		Read-Improve	-0.12	0.04	-0.25	-3.39***
Age		Read-Improve	-0.04	0.03	-0.08	-1.39

Note. Deploy strain: hypothesized stress due to deployment, in 4 levels. Stress: Perceived Stress Scale score. Age: age of child. Read-Improve: improvement in reading grade.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution). ***$p < .001$.

Hypothesis 7. Hypothesis 7 was that coping as measured by the Family Crisis Oriented Personal Evaluation Scales (F-COPES) would interact with other effects such that families with higher coping scores would show less strong negative effects of Deployment. That is, effects in tests of each of the Hypotheses 1a through 2c and 4a through 4d would be weaker for families in which the F-COPES score was stronger.

The analyses for Hypotheses 1a through 1c were repeated with total coping as a covariate. Those hypotheses predicted that deployment strain stages would be related to Devereux scores, grade improvement, and measured stress, such that greater levels of hypothesized strain would be associated with more deleterious effects. The present

analyses, then, were the same, but included direct and interaction effects with the F-COPES. The results are shown in Table 48.

For all outcome measures except for improvement in math grades, the interaction of deployment and coping was significant. In all cases, this was such that hypothesized deployment strain had a greater effect at lower levels of coping, as hypothesized. This was especially true at Level 4 of deployment strain. That is, when a parent was in a highly stressful stage of deployment, children from poorly-coping families did much more poorly on behavioral and academic measures, and the PSS scores for the family were especially high.

Hypotheses 2a through 2c predicted that family functioning would also be related to the outcome measures. Tests for these were repeated with total coping score as an additional predictor. For the re-test of Hypotheses 2a through 2c, all variables involved are continuous, so multiple regressions were used to test this aspect of Hypothesis 7. This required 5 multiple regressions; the results are displayed in Appendix T.

Table 48
Summary of 2-way Analyses of Covariance for Effects of Deployment Strain Levels and Coping (F-COPES Total) on Outcome Measures

Outcome measure Effect	*SS*	*df*	*MS*	*F*	*Sig.*
Devereux-Parent					
Deployment strain level	5203	3	1734	10.8	<.001
Total coping	7677	1	7677	47.8	<.001
Dep strain × coping	3767	3	1256	7.8	<.001
Error	30995	193	161		
Total	202230	201			
Devereux-Teacher					
Deployment strain level	7310	3	2437	12.4	<.001
Total coping	4159	1	4159	21.1	<.001
Dep strain × coping	6636	3	2212	11.2	<.001
Error	37963	193	197		
Total	156534	201			
Math improvement					
Deployment strain level	1.685	3	.562	3.169	.026
Total coping	.080	1	.080	.453	.502
Dep strain × coping	1.074	3	.358	2.021	.112
Error	34.200	193	.177		
Total	40.410	201			
Reading improvement					
Deployment strain level	4.75	3	1.58	7.84	<.001
Total coping	4.05	1	4.05	20.05	<.001
Dep strain × coping	2.68	3	0.89	4.42	.005
Error	39.02	193	0.20		
Total	63.37	201			
Perceived Stress					
Deployment strain level	251.6	3	83.9	7.7	<.001
Total coping	1063.0	1	1063.0	97.2	<.001
Dep strain × coping	106.9	3	35.6	3.3	.023
Error	2110.3	193	10.9		
Total	83931.0	201			

Hypotheses 4c and 4d predicted that effects of deployment strain would be mediated by measured family stress. Tests of these hypotheses were repeated with the addition of F-COPES score as a predictor. Figures 43 through 46 and Tables 49-52 show the results of adding coping scores to the results of Hypotheses 4c and 4d. They can be compared to Figures 37-40 and Tables 31-32. In each case, coping skills had indirect effects on the outcome measure (except in math, in which stress itself had virtually no effect on grades), and also a much smaller and non-significant direct effect. Higher coping skills reduced stress, in addition to the influence of deployment, and moderated the negative effects of deployment on disturbance and reading grades. Thus, Hypothesis 7 was clearly supported, except for the repeated analyses for Hypotheses 2a-2c, involving the effects of both family coping skills and family functioning.

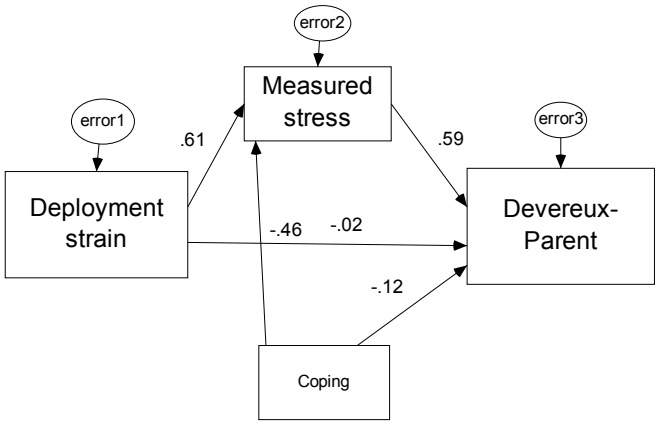


Figure 43. Results of path analysis of the effects of deployment strain, family coping skills, and measured stress on Devereux-Parent scores.

Table 49
Results of Path Analysis with Deployment Strain, FCOPES*, Stress, and Devereux-Parent Scores*

			Weights and significance			
Predictor	Intervening variable	Dependent variable	*B*[a]	*SEB*[b]	β[c]	*CR*[d]
Deploy strain	Stress		2.62	.199	.607	13.17***
FCOPES	Stress		-0.16	.016	-.456	-9.90***
	Stress	Dev-Parent	1.78	.252	.590	7.07***
Deploy strain		Dev-Parent	-0.32	.968	-.024	-0.33
FCOPES		Dev-Parent	-0.13	.071	-.118	-1.78

Note. Deploy strain: hypothesized stress due to deployment, in 4 levels. Stress: Perceived Stress Scale score. FCOPES: Family Crisis Oriented Personal Evaluation Scales scores. Dev-Parent: Devereux-Parent score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution).
***$p < .001$.

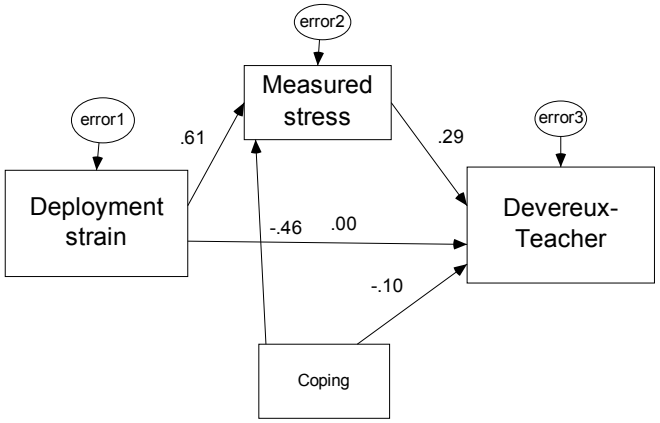


Figure 44. Results of path analysis of the effects of deployment strain, family coping skills, and measured stress on Devereux-Teacher scores.

Table 50
Results of Path Analysis with Deployment Strain, FCOPES*, Stress, and Devereux-Teacher Scores*

			Weights and significance			
Predictor	Intervening variable	Dependent variable	*B*[a]	*SEB*[b]	β[c]	*CR*[d]
Deploy strain	Stress		2.62	0.20	0.61	13.17***
FCOPES	Stress		-0.16	0.02	-0.46	-9.90***
	Stress	Dev-Teacher	0.93	0.32	0.29	2.90**
Deploy strain		Dev-Teacher	-0.02	1.24	0.00	-0.01
FCOPES		Dev-Teacher	-0.11	0.09	-0.10	-1.25

Note. Deploy strain: hypothesized stress due to deployment, in 4 levels. Stress: Perceived Stress Scale score. FCOPES: Family Crisis Oriented Personal Evaluation Scales scores. Dev- Teacher: Devereux- Teacher score.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution).
**$p < .01$. ***$p < .001$.

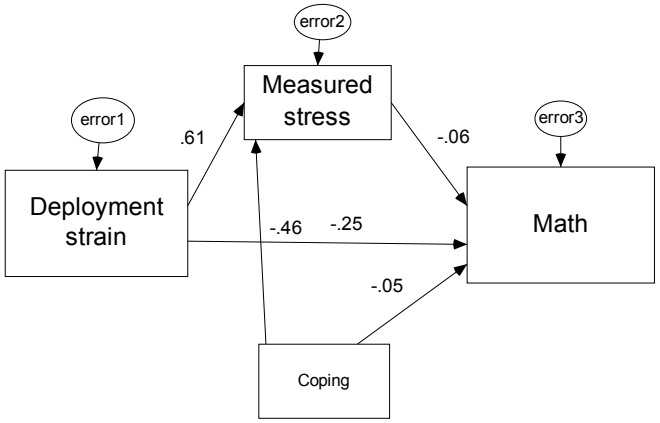


Figure 45. Results of path analysis of the effects of deployment strain, family coping skills, and measured stress on math grade improvement.

Table 51
Results of Path Analysis with Deployment Strain, FCOPES, Stress, and Math Improvement Scores

			Weights and significance			
Predictor	Intervening variable	Dependent variable	*B*[a]	*SEB*[b]	β[c]	*CR*[d]
Deploy strain	Stress		2.62	0.20	0.61	13.17***
FCOPES	Stress		-0.16	0.02	-0.46	-9.90***
	Stress	Math-Improve	-0.01	0.01	-0.06	-0.53
Deploy strain		Math-Improve	-0.10	0.04	-0.25	-2.74**
FCOPES		Math-Improve	0.00	0.00	-0.05	-0.66

Note. Deploy strain: hypothesized stress due to deployment, in 4 levels. Stress: Perceived Stress Scale score. FCOPES: Family Crisis Oriented Personal Evaluation Scales scores. Math-Improve: improvement in math grade.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution).
**$p < .01$. ***$p < .001$.

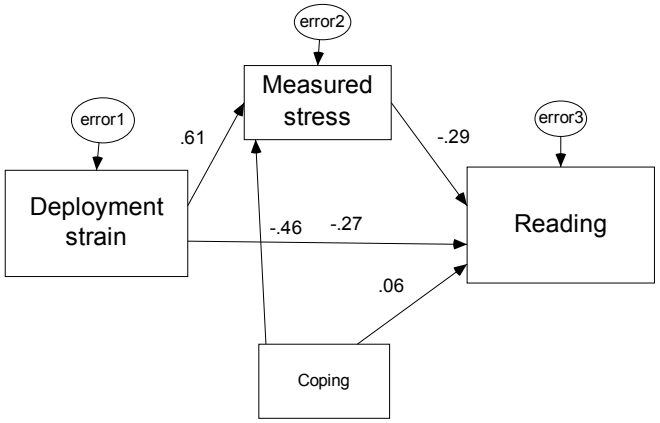


Figure 46. Results of path analysis of the effects of deployment strain, family coping skills, and measured stress on reading grade improvement.

Table 52
Results of Path Analysis with Deployment Strain, FCOPES, Stress, and Reading Improvement Scores

			Weights and significance			
Predictor	Intervening variable	Dependent variable	*B*[a]	*SEB*[b]	β[c]	*CR*[d]
Deploy strain	Stress		2.62	0.20	0.61	13.17***
FCOPES	Stress		-0.16	0.02	-0.46	-9.90***
	Stress	Read-Improve	-0.03	0.01	-0.29	-3.16**
Deploy strain		Read-Improve	-0.13	0.04	-0.27	-3.26**
FCOPES		Read-Improve	0.00	0.00	0.06	0.81

Note. Deploy strain: hypothesized stress due to deployment, in 4 levels. Stress: Perceived Stress Scale score. FCOPES: Family Crisis Oriented Personal Evaluation Scales scores. Read-Improve: improvement in reading grade.
[a]Unstandardized regression weight. [b]Standard error of *B*. [c]Standardized regression weight. [d]Critical ratio, distributed approximately as *z* (the standard normal distribution).
**$p < .01$. ***$p < .001$.

Hypothesis 8. Hypothesis 8 was that deployment stages (considered as dichotomous groups) would have an independent effect on functioning of the child and

family stress. That is, stages in which the military parent was absent due to a deployment, combined (referred to as *parent absent*), compared to deployment stages in which the parent was not deployed, combined (referred to as *parent present*), would have an independent (main) negative effect on behavioral and academic functioning of the child and family stress. These hypotheses were parallel to Hypotheses 1a-1c, but with the simple dichotomous definition of deployment, rather than the 4-level measure of presumed strain due to deployment.

Hypothesis 8a: Parent absence, compared to parent presence, would have an independent (main) positive effect on Devereux Behavior Rating Scale ratings of the child by the parent. (That is, children of absent parents would have higher mean Devereux scores, indicating greater emotional disturbance.)

Hypothesis 8b: Parent absence, compared to parent presence, would have an independent (main) negative effect on grades. (That is, children whose parents were absent would be more likely to show a drop in grades than children whose parents were present.)

Hypothesis 8c: Parent absence, compared to parent presence, would have an independent (main) positive effect on stress levels as measured by the Perceived Stress Scale (PSS). (That is, parental absence would be associated with higher stress scores.)

As Table 53 shows, parent absence was associated with significantly higher levels of Devereux scores as rated by the parent and PSS scores, and a significant decline in grades in both math and reading. Only the Devereux as rated by the teacher showed no

difference. Therefore, Hypothesis 8a was only partially supported, and Hypotheses 8b and 8c were fully supported.

Table 53
Comparisons of Means on Outcome Variables by Deployed/Not deployed

	Deployed	Mean	*SD*	*t* of difference
Devereux-Parent	No	26.3	15.7	2.01*
	Yes	31.3	15.0	
Devereux-Teacher	No	21.7	15.9	1.35
	Yes	25.2	17.6	
Math Improvement	No	.054	.462	2.33*
	Yes	-.110	.399	
Reading Improvement	No	.045	.530	3.57***
	Yes	-.265	.587	
PSS	No	18.9	5.0	4.32***
	Yes	22.3	4.8	

Note. N of deployed: 137, *N* of not deployed: 54.
*$p < .05$. ***$p < .001$.

Exploratory Analyses

It had been thought, on the basis of some prior research, that socioeconomic status (SES) might affect the family's reactions to stressors. In the present case, the differences within enlisted rates and officer ranks were minimal, so SES was simply dichotomized between enlisted men and officers. The five analyses for Hypotheses 1a through 1c were re-run with this variable as an additional factor. The main effect of rank was significant only with math grades ($p < .01$), such that the children of enlisted personnel improved

more overall. The interaction of rank and level of strain was significant with Devereux scores as rated by parent at $p < .01$ and PSS scores (also, it might be noted, as rated by the parent) also at $p < .01$, but these results were complex. The interaction with the Devereux-Parent was such that the children of enlisted men were rated as somewhat more disturbed at the "No strain" and "High strain" Levels, but somewhat less disturbed at the "Low" and "Moderate" Levels. With PSS, the enlisted men's families rated themselves as somewhat more stressed then would have been expected at "No" and "Low"-strain levels of deployment, and somewhat less stressed at the "Moderate" and "High" Levels.

It was also thought that the number of deployments in the family's history might affect the outcome measures. This was analyzed by ANCOVA with deployment strain level as the independent variable, and number of deployments as the covariate. With the five principal outcome measures as dependent variables, no effects involving number of deployments were significant.

CHAPTER V

DISCUSSION

Review of Aims, Method, and Results

This study was designed to examine the relationships among military deployment, family functioning, and family stress, and their effects on children's behavior and academic performance. There were three broad aims of the study: gathering current data under present conditions, use of a family systems approach to measure family functioning, and an empirical test of a new model derived from the Emotional Stages of Deployment concept. All of these aims were accomplished.

Previous studies on the effects of deployment have been uncoordinated and lacking a clear goal or underlying theoretical structure. Results have been mixed, with some studies showing negative effects on children, others no effects, and a few positive effects. There has been no consistent definition of stages of deployment. There is a developing consensus that periods immediately around the parent's departure and following his/her return are the most stressful. However, there appears not to have been any previous rigorous test of these observations. On the basis of a review of the literature, the present researcher proposed a set of stages reflecting the expected levels of strain due to deployment; that is, strain on the family arising from the anticipation or occurrence of major disruptions in the family system due to deployment. This model was tested in the present research.

The APA's Presidential Task Force on Military Deployment Services for Youth, Families and Service Members (APA Task Force, 2007) reported that there are

significant gaps in our understanding of the psychological and social effects of deployment on military personnel and their families, especially since there have been significant changes in who makes up the U.S. military personnel and little recent research. Thus, the present study adds to the recognized need for more research in this area.

Summary of Method

Addresses were obtained with the cooperation of the school district for 620 families of children in kindergarten through fifth grade with a parent in military service. Each family was sent a packet including an explanation of the research, an informed consent form, questions on demographic information, the military member's deployment history and future schedule, and the following measures. The fourth edition of the Family Adaptability and Cohesion Scales (FACES IV) assessed the health of family functioning, and the Devereux Behavior Rating Scale, Parent version (Devereux-Parent) assessed the child's level of behavioral disturbance. The Family Crisis Oriented Personal Evaluation Scales (F-COPES) evaluated family coping skills, and the Perceived Stress Scale (PSS) measured family stress. Following the return of these materials by 201 families (a return rate of 32%), all with fathers in the Navy, the Devereux-Teacher scale was completed by the teachers of each of the children. The FACES IV, F-COPES, and Devereux scales included subscales, but they did not differ much in their relationships with deployment, so for most analyses overall scores were used.

Grades in math and reading from the child's current quarter and the grade period approximately 7 months prior were obtained, and the improvement or decline in grades between these two periods were used along with the Devereux scores as outcome

measures of the hypothesized deleterious effects of deployment on children. The phase of deployment cycle each family was in was determined according to criteria from Logan (1987) and Pincus et al. (2001). For most analyses, deployment was considered as either deployed or not (equivalent to parent absent or present), as many prior studies have done, and in one of four stages hypothesized to differ in level of family strain due to deployment phase, referred to as *strain*. The four stages included roughly equal numbers of families (*n*= 33 to 60), so that small *n*s would not affect the interpretation of results. The dichotomous definition of deployment and the four-level definition of deployment strain only partially overlapped, in that families with a deployed member were divided between the two levels presumed most disruptive, in which about half the families had members not yet deployed or recently returned from deployment (see Table 7). Thus they reflected similar but distinct conditions under which the families were functioning.

Sample

At the time of the survey, 27% of military parents were deployed. Because 32% of those invited to participate in the study did so, the results are probably reasonably representative of Navy families. Although 35% of families included a step-parent, no parent reported being divorced as their current marital status. This presumably reflects the fact that in 93.3% of military families, the military members are men (ICF International, 2008). When a couple divorces, the children usually stay with the mother, particularly if the father is expected to be out of the country for long periods; in this situation the mother and children would no longer be defined as a military family. Therefore, the very small proportion of single-parent households (2.5%) does not mean

the sample was unrepresentative of military families, although it does raise questions about the sample's comparability to the general population of American families.

Mean scores on the F-COPES and the Devereux scales were revealing in describing the sample. Compared to national norms, these families were low on seeking spiritual support and mobilizing the family to acquire and accept help, and extremely high (99th percentile on average) on passive appraisal, defined as the family's ability to accept a difficult situation by minimizing their reaction. These characteristics combine to fit an almost stereotypical image of military culture, valuing self-reliance and toughness. Overall, however, they were shown to be well above average in coping skills. The children, as assessed by the two forms of the Devereux, tended to be low on interpersonal problems and did not evidence many inappropriate behaviors or feelings, suggesting that they were relatively mature and self-controlled, again fitting common beliefs about military families, and consistent with the findings of Watanabe (1985), who concluded that self-images of adolescents from military families were at least as high as those from civilian families. In the present study, the children tended to be a bit high on depression and physical symptoms and fears, although closely matching national norms overall.

Summary of Results

Twenty-one hypotheses were proposed, arranged under 8 general subjects. They were listed in order of perceived importance. Table 54 summarizes the hypotheses and the results. In all, 13 were clearly supported, 4 were partially supported (that is, supported using one dependent variable but not another), and 4 were not supported. Most of those not supported were low priority. The general conclusions were quite clear: Stress on a family due to the father's deployment has significant and sometimes strong

deleterious effects on the children, and the source of the stress is not simply parent absence, but varies according to phases of deployment. Implications of specific results will be discussed below.

Discussion of Results

This section will begin with a broad review of the goals of the study, followed by a review of the main hypotheses and how they were intended to address the goals. Next, the results and their support or lack of support for the main hypotheses and how they converge with or diverge from previous findings will be discussed. This will be followed by a description of how the results are a continuation and extension of previous work in the field, and what they have added to it. The section will conclude with a review of the secondary hypotheses and exploratory analyses.

Table 54
Summary of Results of Hypothesis Tests

Hypothesis	Outcome measure	Results
1. Greater deployment strain associated with adverse effects:		
	a. Higher Devereux	Overall, clearly supported, except Level 2 not more stressful than Level 1 in teacher reports.
	b. Decline in grades	Overall, clearly supported, except that Level 2 not more stressful than Level 1.
	c. Higher family stress	Clearly supported.
2. Healthier family functioning associated w/ positive effects:		
	a. Lower Devereux	Strongly supported.
	b. Less decline grades	Supported for reading, but not math.
	c. Lower family stress	Strongly supported.
3. More deploy strain combined w/ poorer fam functioning associated w/ more adverse:		
a. & b. Deployment (Yes/No) × family functioning:		
	a. Higher Devereux	Not supported.
	b. Decline in grades	Supported for reading, but not math.
c. & d. Deployment (4 levels of strain) × family functioning:		
	c. Higher Devereux	Overall supported, although pattern complex.
	d. Decline in grades	Supported.
4. Effects of deployment mediated by general stress:		
a. & b. Deployment (Yes/No) –> stress –>:		
	a. Higher Devereux	Not supported.
	b. Decline in grades	Supported.
c. & d. Deployment (4 levels) –> stress –>:		
	c. Higher Devereux	Supported).
	d. Decline in grades	Supported for reading, but not math.
5. Gender main effect: girls better functioning:		
	a. Lower Devereux	Not supported.
	b. Less decline grades	Supported for reading, but not math.
6. Age effects: younger associated with poorer functioning:		
	all of above	Not supported.
7. Coping effects: families w/ better coping show better functioning.		
	all of above	Clearly supported.
8. Deployment (Yes/No) independent effect on stress and functioning.		
	a. Higher Devereux	Supported for Dev-Parent, not for Dev-Teacher.
	b. Decline in grades	Supported.
	c. Higher family stress	Supported.

It should be acknowledged that some of the following discussion is phrased in terms of causal effects. Without conducting a true experiment, it is impossible to fully establish causality. In the present case, the assignment of families to different phases of deployment was, for all practical purposes, random, although not under the control of the researcher. Therefore, it seems justifiable to assume that relationships between deployment and other variables are not merely correlational, but causal. Furthermore, it seems reasonable to assume that much, if not most, of the relationship between measured stress, family functioning, or coping and behavioral disturbance is directional. Although it is possible that a child's behavior disorders from some other cause could increase family stress or reduce the health of family functioning or coping, the family situation seems at least as likely to affect children as the reverse. Comments below suggesting a causal role for family functioning and coping do not necessarily rule out other possible causes of the relationships found.

Specific Goals of the Study

The focus of the present study was to determine if the military deployment of a parent has deleterious effects on a child's behavior or academic performance. In contrast to more simplistic models of deployment that assumed it was principally the absence of the parent that caused family distress (e.g., Kelley, 2002), the model proposed here suggests that family strain follows a progression such that stress due to deployment would rise from none, when the parent was not deployed and more than 91 days away from a deployment (Stage 1), to mild, in the early predeployment phase (Stage 2), to high, in the immediate predeployment and early deployment phases (Stage 4). Stress due to deployment was then expected to taper off gradually to moderate, in the late

deployment and early reunion phases (Stage 3), and to mild, in the late reunion phase (Stage 2).

Thus, the main goals of the study were to establish whether a child's behavior and/or academic performance are adversely affected by higher levels of family strain, presumed to be caused by the stage of deployment, and by poorer family functioning, and whether these two predictors interact such that strain due to deployment has an especially adverse effect in families with poorer functioning. A second important goal was to determine whether the predicted ill effects of deployment were mediated by general family stress. Finally, a third main goal was to determine whether the revised model of deployment strain levels was a more precise predictor of presumed consequences than the parental presence/absence model.

Preliminary Test of Deployment Phase and Tests of Main Hypotheses

The main hypotheses, 1a–4d, supplemented by 8a–8c, addressed the main goals of the study, to determine if deployment and family functioning are related to children's behavior and academic performance through the intervening variable of family stress. To determine this, five steps were necessary.

First, it was expected that deployment defined as parent absent vs. parent present (Hypotheses 8a & 8b) and as the four levels of deployment strain (Hypotheses 1a & 1b) would be associated with higher levels of dysfunctional behavior as measured by the two Devereux scales and by decline in math and reading grades. (It might have been preferable to have included the tests of the dichotomous deployment definition in Hypothesis 1, as they were in Hypotheses 3 and 4. They were relegated to Hypothesis 8

to indicate that this was of less interest, but logically the simpler tests perhaps should have preceded the more complex ones.)

As the second step in establishing the connection among the variables studied, it was expected that poorer family functioning, assessed by the FACES IV, would also be related to dysfunctional children's behavior and poorer academic performance (Hypotheses 2a & 2b). Third, it was hypothesized that the two predictors would interact in their effects on children's behavior and academic performance (Hypotheses 3a–3d). Fourth, it was expected that both deployment (Hypotheses 8c & 1c) and family functioning (Hypothesis 2c) would be related to family stress, as measured by the Perceived Stress Scale. Fifth, it was expected that deployment's effects on the outcome measures would be mediated by stress (Hypotheses 4a–4d).

Deployment's effect on children. Hypotheses 8a, 8b, 1a, and 1b tested whether deployment, either as parent present/parent absent, or as defined by the hypothesized four strain levels, affected children's behavior or grade improvement. Much of the research in the field has suggested that deployment is a major stressor in military families, and that it has negative effects on children's behavior (e.g., Huebner et al., 2007; Pierce, 1978). It has also been suggested that children in a family with a deployed member may also do more poorly academically. Yeatman (1981) noted that wives of deployed military members reported decreased academic performance of their children. Chandra et al. (2010) found that teenagers with a deployed parent were said to have more difficulties with school, and Lyle (2006) found that parental deployment adversely affected scores on the Texas Assessment of Academic Skills. Interestingly, the only study found in the review of literature on deployment that used actual grades as a measure of academic

performance was that of Oldaker (1969), who found that second graders with a deployed father actually did better in math and language arts than those with a father at home. Therefore, the present study appears to be one of the few to examine grades as a reflection of possible deployment strain.

Logically, discussion of tests of Hypotheses 8a (parental absence due to deployment would result in higher Devereux scores, indicating behavioral dysfunction), and 8b (deployment's effect on grades) should precede others, as being the simplest and most straightforward. The results (Table 54) showed that deployment was associated with poorer behavior as evaluated by the parent, but the difference between the deployed and not-deployed groups did not reach significance when behavior was evaluated by the teacher. Here it might be noted that parents tended to rate their children more negatively (approximately 1/3 *SD*) than did the teachers, perhaps because they observed the children in a wider variety of circumstances and when the children were less inhibited, or possibly because they held the children to higher standards. The Devereux-Parents differences between the two groups were fairly substantial, again about 1/3 *SD*. Thus, Hypothesis 8a was only partially supported.

In regard to grades, over the approximately 7-month time span between grading periods, both math and reading grades declined in the deployed group, but improved for children in the not-deployed families. The difference was significant in the case of math, and strongly significant in the case of reading, supporting Hypothesis 8b. In reading, the average child with a deployed father was 0.31 grade points below the average child with a non-deployed father, or about the difference between a B and B-.

Using the presumably more sophisticated method of defining family strain brought on by the deployment cycle, Hypotheses 1a and 1b were tested. Results (Table 16) were strongly supportive of the hypotheses. Not only did the four groups of children in families at different stages of deployment differ significantly from one another, but the linear effects were strongly significant also. This indicated that for the most part, as hypothesized, as family strain due to deployment increased, the child's behavior and academic performance declined. These differences were substantial in terms of real impact on the children. Devereux-Parents ratings were 13 points, or nearly a full *SD*, higher for children in the presumed high strain conditions than for children in the no-strain condition. For reading grades, the difference between these two groups of children was approximately a half a grade point. Thus, Hypotheses 1a and 1b were strongly supported, confirming the assumption that the parental deployment cycle has negative effects on children. With some outcome measures, however, it appeared that Level 1 was not, as expected, less stressful than Level 2.

In summary, the deleterious effects of deployment suggested by many previous researchers and clinicians have been confirmed. More than most prior studies, the present research has demonstrated that the effects are not trivial in terms of actual impact on the child.

Family functioning's effect on children. In the second step of determining the effects among predictor and outcome variables, Hypotheses 2a and 2b tested whether higher scores on the FACES IV, indicating healthier family functioning, would be related to children's behavior, regardless of deployment. Lucia and Breslau (2005) assessed familial cohesion (one of the principal components of the Circumplex Model) and found

that children at ages 6 and 11 from highly cohesive families were reported to have fewer internalizing and attention problems than those from less cohesive families. Annunziata et al. (2006) found that in a sample of at-risk adolescents, those with more cohesive families were more engaged with academic achievement. The present research sought to confirm these findings.

Overall (Table 17), results were as expected, in that for most FACES IV dimensions and for most outcome measures, healthier family functioning was associated with less dysfunction in the children. There were some exceptions. Rigid scores, presumed to indicate unhealthy functioning, were positively related to children's behavior. Perhaps some degree of rigidity helps structure a child's behavior. Also, improvement in math grade was only very weakly related to FACES IV scores. This exception and similar ones regarding differences in results for math and reading will be discussed below. For the most part, however, the FACES IV Total Ratio score seemed to capture the construct of family functioning well, so it was used in later analyses. Thus, with the exception of math improvement, it appears that family functioning, as expected, was related to a child's behavior and academic performance.

Deployment combined with family functioning. It was further hypothesized that the two general categories of predictors, deployment effects and family functioning, would not only have significant main effects, but would interact in their effects on children's behavior and academic performance. This interaction would be such that children from families both experiencing deployment strain and functioning poorly would do more poorly than would have been expected from the combined main effects of the predictors (Hypotheses 3a–3d). Healthy family functioning, according to Eastman et al.

(1990), may help "immunize" families against stress. Kliewer and Kung (1998) confirmed in a study of 99 families of children age 8 to 12 that family cohesion and adaptability, as measured by the FACES III (Olson et al. (1985) moderated the effects of hassles and major family stressors.

As Tables 18 through 20 showed, when deployment was considered simply as parent absent/parent present, and with the Devereux scores or math grade as the outcome measures, the interactions were not significant. However, the interaction was strongly significant for improvement in reading grades (Table 21), and the effect was in the direction predicted. A comparison between Figures 15 and 16 shows that in families without a deployed parent, family functioning was irrelevant to grade improvement, but in families with a deployed father, lower functioning was associated with a decline in grades. Thus it appears that the overall poorer grades associated with low family functioning (Hypothesis 2b) was due almost entirely to students with deployed fathers.

When deployment strain defined by the four stages in the deployment cycle was used along with family functioning as predictors of child behavior (Hypothesis 3c), in general results were as expected, in that at higher presumed levels of strain, there was a strong relationship between functioning and Devereux scores. An exception to the expected pattern of results occurred in that, at the presumed no-strain Level 1, this relationship was also found (Figures 17 & 21). With grade changes as the dependent variables, in general the predicted effect was found, although with math improvement, again there was an exception to the expected pattern, in that the relationship between functioning and grade was somewhat weaker at Level 4 than it was at Level 3. With reading grade improvement, it was clear that at the lower strain stages student

performance was not affected by family functioning, but at the two higher stages, reading skills declined for most children only when family functioning was below average (Figures 31 & 32).

Overall, then, it may be concluded that the expected interactions were not found for deployment defined as parent present/parent absent, except for reading, but that deployment strain did interact with family functioning as expected, with some variations from the expected pattern of increasing strain levels being associated with declining behavior and academic performance on the part of the child. It was also found that in families with no presumed strain due to deployment, family functioning was only minimally associated with children's behavior, if at all. This suggests that previous research showing a general effect (e.g., Annunziata et al., 2006; Lucia & Breslau, 2005) may actually have been the result of those families in their samples that were experiencing above-average stress.

Deployment and family functioning's effects on stress. As stated above, the main goals of the study were to determine if deployment and family functioning were related to children's behavior and academic performance through the intervening variable of family stress. The hypotheses discussed above established that for the most part, deployment and family functioning, both separately and in combination, did affect children adversely. The fourth step in establishing the relationships among the variables was to determine if deployment and/or family functioning affected general family stress levels. Eastman et al. (1990), in their survey of Navy families, had found that families with a member assigned to shore duty reported lower levels of overall life stress than those in a pre-deployment, deployment, or post-deployment stage. The same study found an inverse association

between family cohesiveness and stress. Flake et al. (2009) confirmed the Eastman et al. finding concerning deployment's direct effect on stress.

The test of Hypothesis 8c, that families with a deployed father would report greater stress, was strongly supported (Table 53). Similarly, Hypothesis 1c, that as level of deployment strain increased, so would stress, was also strongly supported (Table 16). Finally, Hypothesis 2c, that poor family functioning would be associated with stress, also received strong support (Table 17). Thus it is clear that stress is related to the predictor variables. Although it might be regarded as obvious that deployment and unhealthy family functioning would be related to elevated family stress levels, demonstrating this was a logical precondition to the next step in establishing the relationships among the predictor and outcome variables through the mediating variable of stress.

Deployment and family functioning effects mediated through stress. As has been argued above, it appears reasonable to conclude that deployment and deployment strain, being essentially randomly assigned to families in the sample, is the cause of family stress. Unhealthy family functioning can also be presumed to cause stress, although it is possible that at least some causation goes the other way: that stresses unrelated to functioning, such as illness, might cause a disruption in family functioning, or that both may be caused by a third variable, such as marital infidelity. Hypotheses 4a–4d focused on the more tenable assumption that deployment was the causal agent among the variables. They predicted that, regardless of direct effects of deployment or deployment strain, a significant degree of the deleterious effects on the child would be as a result of its increasing family stress.

Many studies have referred to stress as an effect of deployment, but failed to measure stress directly to confirm the assumption that deleterious effects were in fact caused by stress. The present study appears to be the first to explicitly test the hypothesis that negative effects of deployment on children are mediated by family stress.

Deployment (father absent) was a strong predictor of stress, which in turn was a strong predictor of Devereux-Parent and Devereux-Teacher scores (Tables 26 & 27) and decline in math and reading grades (Tables 28 & 29). Interestingly, there was essentially no direct effect of deployment on any of the outcome measures; that is, virtually all the deleterious effects were due to the increase in stress. As noted previously, the results with grades were somewhat counter-intuitive, as it might have been expected that a child's academic performance could suffer when all family duties were carried by one parent, even in families that were not particularly stressed by the deployment. Also as described previously, the combined direct and indirect effects of deployment had significant practical effects, including approximately 1/3 *SD* of difference on the Devereux-Parent, and 1/3 of a grade point in reading.

With the four-level stage definition of deployment strain (which effectively presumed a linear increase in harmful effect as the levels increased), both Devereux outcome measures showed strong indirect effects of hypothesized deployment strain and virtually no direct effects (Tables 30 & 31). A one-level difference on this measure was nearly as strong as the difference between the father being deployed or not.

With the math grade outcome measure, contrary to prediction, stress was unrelated to grade change, although there was a significant direct effect of deployment strain (Table 32). Thus, stress, whether from deployment or other causes, did not seem to

matter to a child's change in math performance. However, being in a higher-strain family did make a direct difference, such that a 1-level difference in presumed deployment strain was matched by a decline of 1/10 grade point.

With the reading grade measure, both the indirect and direct effects of deployment strain were highly significant, and roughly equal in their effects (Table 33). Together, they had a strong effect such that the difference between a child's being in a no-strain family and a high-strain one was equivalent to 0.62 grade points, as between a B and C+. Similar results were found using change in deployment strain between the two grading periods as the predictor (Tables 34 & 35). With math, there was virtually no indirect effect through stress, but a significant direct effect. With reading, again, both the indirect and direct effects were strongly significant, and a single unit of change on the 7-point scale made a difference, on average, of 0.13 grade points.

Observations on math and reading grade change. Clearly, reading grades were a more sensitive outcome measure than math grades in almost all tests. In retrospect, this should not have been surprising. Lyle (2006) had found only a tenth of a standard deviation of difference in math scores between children with deployed and non-deployed parents. Engle et al. (2008) did find a negative effect of deployment on math and science achievement scores, but this was less than a half a percent. Finally, Hillenbrand (1976) had found a slight improvement in math and analytical abilities in older sons with parental deployment. It is possible that math achievement is simply more a function of aptitude than studying or paying attention in class, which might have affected reading grades more. Future researchers should note that grades in different subjects may not be equal reflections of family stress or changes to the family structure.

Summary. Deployment defined as father's presence versus absence appears to have some deleterious effects on children's behavior and academic performance. Overall, parental absence due to a deployment had significant negative effects on Devereux-Parent scores and grades, but not on Devereux-Teacher scores, and the negative effect was strong only for reading grades and at lower levels of family functioning. Effects of deployment were mediated by general family stress for Devereux scores, but not for either of the grade change measures.

For the model of deployment strain as varying over specific phases of deployment, largely independent of parental absence, most hypotheses were strongly supported. Deployment strain was strongly associated with behavioral disturbance and declining grades, and the effect was present primarily in families with poorer functioning. These ill effects were shown to have been mediated partly or entirely by increasing general family stress. Specifically, with the Devereux measures, the effect was virtually all a result of the increase in stress, whereas with the grade measures, there were significant direct effects. There was no indirect effect of stress on math, but there was with reading grades. Overall, then, the main hypotheses were supported; deployment and deployment strain have negative effects on a child's functioning, largely mediated by stress.

Implications of Findings

This section discusses the main goals and results of the study in the context of the past literature and future directions in the field.

Multi-level Model of Deployment Strain. Much of the prior literature on the effects of deployment has been anecdotal, primarily based on the experience of clinicians

in military mental health centers. In addition, research on the topic has used widely varying definitions of deployment or focused only on a narrow time frame. The study by Decker (1978), for example, was concerned only with the third to fourth month after deployment began. Gabower (1960) studied children of deployed parents only, and compared those in counseling with a matched control group also with deployed parents. Similarly, Wong and Gerras (2010) restricted their study to children in deployed families and searched for correlates of stress in adolescents. Parry (1986) studied the reunion period only.

Several recent studies compared measures taken at two time points. Kelley (2002) compared a nondeployed group of military mothers to a group that anticipated deployment within the next 60 days. Barker and Berry (2009) surveyed families at least 3-4 months into a deployment and then approximately 4-6 weeks after the military member returned home. A few other researchers (e.g., Chartrand et al., 2008) have directly compared families with a deployed or non-deployed parent. Jensen et al. (1996) studied children both cross-sectionally and longitudinally, comparing deployed and non-deployed periods.

A number of studies have divided their sample into three groups. Hiew (1992), Bey and Lange (1974), and Kelley et al. (2001) categorized families as predeployment, deployment, and reunion or postdeployment. Kelley (1994b) assessed mothers at three distinct points: 3 to 4 months prior to deployment, 12 to 16 weeks after deployment, and 3 to 4 weeks after return.

Eastman et al. (1990) used a four-group definition, based on military members who: (a) had not returned from, or were not scheduled to leave for, a deployment within

90 days; (b) were scheduled to leave for a deployment within 90 days; (c) returned from a deployment within 90 days; and (d) were on shore duty. Thus, deployed parents were grouped with non-deployed in this study, unless they were within 90 days of a change in their status. Finally, a few researchers have declined to distinguish among chronological divisions. Crumley and Blumenthal (1973), for example, concluded that the entire deployment cycle is a disturbance to the development of the child.

It is clear that deployment phases have largely been defined for convenience or to suit the particular focus of a study (e.g., anticipation of change). As Logan (1987) recognized, this practice hindered an understanding of how a family changes over the course of the cycle of military deployments. She proposed a model called the Emotional Cycle of Deployment with seven "emotional" stages which occur during the three phases of deployment: (a) the period before deployment, (b) the time during deployment, and (c) reunion. Her distinction between the objectively measurable *phases* and the inferred emotional *stages* has been retained in the model proposed in the present study. Logan defined her stages imprecisely, however. Stage 1 was described as occurring about four to six weeks before the military member leaves, Stage 2 as the days preceding the military member's departure, Stage 3 as encompassing the first 4-6 weeks of deployment, Stage 4 the middle period of deployment, Stage 5 as "usually" about the last 4-6 weeks, Stage 6 upon the military member's return, and Stage 7 extending 4-6 weeks after return.

Pincus et al. (2001) proposed a revision of Logan's (1987) pioneering taxonomy. They suggested five periods of deployment rather than Logan's three phases. These periods were (a) predeployment, from the time of notification of deployment to when the military member leaves; (b) deployment, the first month of deployment; (c) sustainment,

months two to five of deployment; (d) re-deployment, the month before the military member is to return home, typically month six; and (e) post-deployment, three to six months after deployment. However, these chronological divisions do not seem to fully reflect the periods of concern to many other researchers. In particular, as described above, many in the field have assumed and/or demonstrated that the periods immediately prior to the departure and immediately following the return of the military member are especially crucial to the family. Furthermore, the Logan and Pincus et al. models appear never to have been tested empirically. Therefore, the present researcher has proposed a refinement of the Logan-Pincus model to more precisely define periods of special interest. This has also been the first test of this family of models.

The new model proposes seven phases that can be exactly defined, in the hopes that this specificity will encourage researchers in the field to adopt a common terminology and more precise definitions of their periods of interest. These phases are: (a) early predeployment phase, 36-91 days before a deployment; (b) late predeployment phase, 1-35 days before a deployment; (c) early deployment phase, the day of deployment up to 35 days after the deployment begins; (d) late deployment phase, greater than 35 days after the deployment begins and ending at the return date; (e) early reunion phase, up to 35 days after the military member returns from deployment; (f) late reunion, 36–91 days after the military member returns from deployment; and (g) not deployed, not scheduled to leave for a deployment within 91 days. The choice of 35 days (5 weeks) to define certain phases reflects Logan's (1987) reference to "four to six weeks" for these periods. The use of 91 days before deployment and after return to define the period of

non-deployment reflects many references in the literature to a period of about 3 months; 91 days is one-quarter of a year.

In addition to proposing the above systematic objective system for defining deployment phases, the present researcher put forward a formal hierarchy of presumed stress due to phases of deployment. Most previous research has contrasted two or three different periods and proposed specific differences among their effects. Adoption of a common definition of expected periods of deleterious effects would allow for more consistent and precise communication among researchers and clinicians. On the basis of the extensive review of the literature reported in this work, it was expected that the potentially harmful effects would vary as follows from approximately least to most adverse effect: (a) the not deployed group (Level 1), (b) the late reunion and early predeployment groups (Level 2), (c) the late deployment and early reunion groups (Level 3), and (d) the late predeployment and early deployment groups (Level 4).

Unlike the objective phases, it must be established that these stages of deployment stress do correspond with the expected disruption of the emotional cycle of deployment. Therefore, in the present study, ill effects were hypothesized to fall into approximately the order of the stages, or levels of stress. Boss (2002) defined family stress as pressure or strain on the family system, so to help distinguish the hypothesized stress due to deployment from other sources of stress, the term *strain* was adopted to indicate the levels.

A principal goal of the present study was to investigate whether this new system of defining deployment strain was in fact related to deleterious effects on the children, and to establish whether it was a more precise and valid measure of stress on the family

than the deployed/not deployed distinction that has been the main definition of differences among families in different phases of the deployment cycle. In this, the study has largely succeeded. Overall there were strongly significant linear effects in approximately the order predicted.

In this regard, it should be noted that there was no reason to expect the strain levels to be truly an equal-interval scale. That is, it could not be assumed that the difference between Level 2 and Level 3, for example, was the same as that between Level 3 and Level 4. Nonetheless, the results suggested that the scale was in fact fairly close to linear, with many outcome measures declining roughly equally from level to level. The main exception to this was between Level 1 (no strain) and Level 2 (mild strain). Overall, it appeared that the two levels were approximately equivalent (see Figures 6 & 7). In Figure 6, two of the three measures (Devereux-Parents and PSS) did show the expected pattern. Figure 7, on grade improvements, show the strongest examples of Level 2 apparently being less stressful than Level 1 (although the difference between the two levels was not quite significant for math). Here, however, the measure itself may be producing an anomaly. Recall that the grade improvements (or declines) were computed by subtracting the previous grade in each subject from the current one. Therefore, many of the children in Level 2 were post-deployment, meaning that their previous semester's grades had been earned while under greater strain. In other words, at least some of this effect could represent a rebound from an earlier, more stressful stage of deployment. To test this, grade improvement was compared to change in deployment strain. As Figure 8 shows, the effect became non-significant when the prior deployment stage was taken into account.

In summary, then, the main goal of the study was accomplished. It was demonstrated that stage of deployment strain, along with family functioning, were associated with general family stress, which in turn was associated with deleterious effects on the children. These effects were significant both statistically and in terms of clinical and academic impact. It appears that the new model of deployment strain is a useful one for understanding the disruptions in young children's behavior and academic performance. It has not yet been established, however, that the model holds equally well for effects on the wife or other family members.

Superiority of the 4-level model. An additional major goal of the study was to determine whether, as predicted, the presumably more sophisticated model of the effects of deployment modeled on the work of Logan (1987) and Pincus et al. (2001) was a better predictor of deleterious effects than the simple deployed/not deployed model. As indicated above, on the basis of the number of hypotheses confirmed or disconfirmed, this appears to be the case. The one direct comparison, of their correlations with measured stress, suggested that the new model is significantly better at predicting family stress. Since stress, in turn, has negative effects on the child, it is clear that the new model is a more precise means of determining harm done to the child by deployment.

As noted previously, however, the new model is not simply a more precise measure of deployment's effects. The models reflect somewhat different, although partially overlapping, phenomena. It is likely that stress due to the anticipation of a father's absence and the shifting of family systems after he leaves and after he returns is combined with the practical impact of his absence on the mother and the other family members.

Deployment phases vs. stages. The preliminary analyses (Table 15 and Figures 3 & 4) in which phase of deployment was used as the predictor in place of the deployment strain levels were quite revealing. They suggest that not only is a simple deployed/not deployed distinction unnecessarily coarse, but that the four-group distinction might have been less than ideal also. A principal reason for using the four stages rather than the seven phases had been concern that numbers in some phase groups would be too small to support complex analyses, and this was true. However, for the simple analyses of the effects of deployment phase on the outcome measures, this seemed to make little difference. It appears that with some adjustment for early pre-deployment and non-deployment, stress over the cycle of deployment is a near-linear function of time. That is, there is little to be gained by setting cutoff points—the cycle does not lend itself to being viewed as a series of phases.

Finally, on the basis of some observations (e.g., by Bey & Lange, 1974; Jensen et al., 1996; Parry, 1986) that different periods in the deployment cycle might have different effects on children, the four subscales of the Devereux-Parent were analyzed separately across the seven phases. The pattern of results (Figure 5) indicated that for this set of measures, in any case, there were few differences, except that in the late predeployment and early deployment phases, the children showed especially elevated scores on physical symptoms and fears. Since these were the phases with the highest levels of dysfunctional behavior overall (and were included in the high-strain Level 4 stage), this suggests simply that these symptoms of dysfunction are more likely at high levels of stress.

Utility of the family systems approach. It had been argued (APA Task Force, 2007) that research on military deployment's effects on the family has been hindered by

the lack of a consistent theoretical foundation. For this reason, the present research was built on family systems theory, and in particular, the Circumplex Model of Marital and Family Systems (Olson et al., 1979). The changes to a family brought on by military deployment provide an excellent test of family systems theory, in that the theory emphasizes systemic changes brought on by major shifts in the family structure. Because deployment is predictable and usually reversible, in contrast to most major family disruptions, it should be easy and revealing to study. The present study did not fully exploit these opportunities, however, as details of changed relationships and roles were not obtained. Although the results of the present study were quite consistent with predictions of family systems theory, they did not rule out other explanations. In particular, Pederson (1966) argued that a child's reaction to a father's absence may be principally a response to the mother's behavior, although Jensen et al. (1996), in their review of the literature on deployment, noted that they saw no evidence of this.

Secondary Hypotheses

It was not possible to examine some variables thought to be relevant to the main goals. First, since no mothers in the sample were military personnel, the effects of father deployment and mother deployment could not be compared. The mother is the military member of the family in only 6.7% of military families (ICF International, 2008). Therefore, studies focusing specifically on them are uncommon anddifficult to conduct. Applewhite and Mays (1996), in one of the few studies to compare maternal and paternal deployment, found no significant differences, although this topic remains to be studied more thoroughly.

Second, fortunately for the U.S., there were no Naval combat deployments during the period studied, so the possible heightened stress of concern for the safety of the husband or father could not be tested. It had been expected that deployment to a combat zone would add substantially to the family's stress, as found by Kelley (1994b) and Jensen et al. (1996), although Oldaker (1969) did not find a relationship between hazardous duty assignment and student academic achievement.

Finally, although Barker and Berry (2009) had found that total time of deployments had an adverse effect on children, in this study, the number of deployments had no effects. This tends to confirm findings by Wong and Gerras (2010) with adolescents that showed no effect of number of deployments in the child's lifetime.

Statistical tests of Hypotheses 5, 6, and 7 were of secondary interest. Several of these minor hypotheses were not well supported. There proved to be only minimal differences between boys and girls, contrary to Hypothesis 5 (Tables 14, 36–39). Findings on gender differences on the effects of deployment on children have been complex and inconsistent (e.g., Annunziata et al., 2006; Chandra et al., 2010; Hillenbrand, 1976). It is possible that some of the measures used in this study were insensitive to gender differences, either by design, or because of the preconceptions of the raters. For example, it is possible that parents, in evaluating a child on inappropriate behaviors, may have implicitly used different standards for boys and girls.

Age of child (Hypothesis 6) was not found to be relevant (Tables 40-47 & Appendix S), despite considerable prior research suggesting that it can be. For example, Gabower (1960) found that paternal absence before the age of five was more disruptive than at later ages. Oldaker (1969) had concluded that fourth-graders from lower socio-

economic status households were more affected by their father's deployment than younger or older children, suggesting that any effects might not be a linear effect of age. This was tested in the present study by examining age also for curvilinear effects, but those analyses were also non-significant. Thus, the expectations of writers that age would be an important factor in adjustment to deployment have not been supported, although they remain to be tested in a wider variety of settings.

Regarding both these characteristics of children, it is possible that this may be an example of the inapplicability of older research and less well controlled research to current customs and standards. That is, it may well be the case that age and gender do not matter much.

Hypothesis 7 was that coping would interact with other effects such that family coping skills, like healthy family functioning, would moderate the harmful effects of deployment, as Gabower (1960) had found with maternal coping skills. However, Jensen et al. (1996) had not found significant effects of coping in their study of deployment.

Hypothesis 7 was evaluated first by repeating the analyses testing Hypotheses 1a–1c with coping added as a covariate (Table 48). It was seen that coping had strongly significant main effects on Devereux scores, family stress, and reading improvement, although not on math improvement. More to the point, coping interacted significantly with deployment strain such that, as hypothesized, the impact of deployment on these four outcome measures was greater in families with poorer coping skills. However, when coping and family functioning were both included as predictors of the outcomes, only measured stress showed significant main or interactive effects (Appendix T). Thus, it

appears that coping and family functioning were similar; when family functioning was included, coping had little to add to predicting the outcome variables.

When coping scores were added to the path analyses of the effects of deployment strain on the outcomes (Figures 43–46 & Tables 49-52), coping was found to have strong negative effects on family stress, but no direct effects on Devereux scores or grade change. Thus, it is clear that the significant main effects and interactions found for coping in the repeated analyses of Hypotheses 1a–1c were due solely to coping's ability to moderate stress. This suggests that knowledge of family coping skills might be even more useful for predicting the effects of strain than knowledge of family functioning.

Exploratory Analyses

A number of writers in the field (e.g., Jensen, Lewis, & Xenakis, 1986; Morrison, 1981) have noted that socio-economic status (SES) might have significant interactive or direct effects on the outcomes of interest to this study. However, SES appeared to differ little across the families. The sole effective relevant indicator, enlisted vs. officer status of the military member, was used as a weak substitute for SES. Results were complex, but generally did not seem to make a difference in the impact of deployment strain on outcome measures. Because of the social and economic similarity of personnel within enlisted rates and within officer ranks, it is likely that effects of SES could not be adequately tested in this sample.

Limitations, Contributions to Practice, and Recommendations for Future Research

Limitations. As with any study that relies on voluntary participation, there may be some concern that those families that responded to the survey were different from the target population of military families. Although the high response rate of 32% tends to

argue against this, it is possible that parents (mostly mothers) with a particular interest in the subject were more likely to respond than others. For example, these parents might have been especially unhappy with the military lifestyle, or, on the other hand, might have been proud of their family's ability to cope. It can also be argues that the self-report nature of the questionnaires may not be completely accurate. Overall, it appears that the sample was probably reasonably representative of Navy families. Generalizability to other military branches may be limited. These Navy families experienced deployments that were approximately 6-months long. Other branches of the military may have varying lengths of deployments. At the same time, generalizability to the civilian population may also be limited. The families in the sample were unusual, as indicated by their scores on the FACES IV and F-COPES compared to norms. Other characteristics of being in a military family are quite different from the experience of typical American families. The type of disruption brought on by deployment is common in military families but unusual for others. Major ruptures in the family system in civilian families probably occur with little warning and accompanied by other stressors, such as illness, a deteriorating marital relationship, etc.

Contributions to practice. Theoretical research is often oriented towards uncovering obscure relationships among variables that may or may not be important to practice. In this case, however, it can be argued that there is much to interest the practitioner. Not only were the effects of deployment strain substantial, and obviously disruptive to the children, but the important variables are such that they could be taken into account by a therapist. While administering the FACES IV and F-COPES to families might be intrusive, the concepts behind them are clear, and a practitioner who is

aware of the constructs of family functioning and coping should have no difficulty making rough estimates of their applicability to a given family. Knowing that research has clearly supported the principle that an external stressor will have a stronger effect on some families than others should help not only in judging the need for an intervention, but could allow a therapist to anticipate harm in certain circumstances with certain families. Furthermore, although strain due to deployment may be greater than that commonly found in civilian families, it may have some characteristics in common with other major disruptive events, such as moving or divorce. An understanding of the interrelationships among family structure, coping mechanisms, stressors, and deleterious effects on children should be helpful in general practice.

Recommendations for future research. While the present study is not the definitive one in the field, it does attempt to better establish certain broad outlines of the effects of deployment. Some specific issues were noted in the course of this study that might be worthwhile to pursue separately. Although it was clear that deployment has deleterious effects on children, these appear to occur largely or almost entirely in families with poor functioning or coping skills. Therefore, rather than bemoaning the supposed general harm done by the military lifestyle, it is important to emphasize that deployment does not affect all children equally, and to further identify protective factors. Future research might concentrate on interventions that could mitigate the effects of family strain. Even encouraging coping skills in advance of a deployment might be helpful. It is clear from the strength of the deleterious effects seen in this study that a great deal of good could be done by mitigating strain due to deployment. It may also be of interest to

examine the different types and quality of stress that is experienced at the different strain levels.

Conclusions

The U.S. military has become increasingly aware of the influence of the family on the performance of military personnel, and in turn, of the effects of military duties on the family. The U.S. Army named 1984 "The Year of the Military Child" and 1985 "The Year of the Military Family," and concern for the welfare of military dependents has remained high in the last 30 years. Families are a fundamental unit of social behavior, and as family systems theory emphasizes, anything that affects one member affects all. Thus, the holistic family approach that the present study took was not only in line with current theory, it appears to have been productive in terms of identifying the effects of deployment stressors.

The design of the study also seems to have contributed to its success. Although a longitudinal design following the same families over years of deployment cycles might have been ideal, it would have been both time-consuming and impractical, given that over such a period families have usually relocated. The seven-month span of the present study was adequate to encompass a wide range of stages. The fact that deployment is essentially random in such a population means that for all practical purposes, this was a natural experiment, so it is safe to conclude that deployment was the cause of the differences found in the outcome measures. Finally, it was one of the few large-scale studies to examine the complex interrelationships among a number of different presumed causal, mediating, and moderating variables and their effect on several different outcomes.

Appendix A

Permission letter to use and reprint Circumplex Model and FACES IV

LIFE INNOVATIONS, Inc.®
P.O. Box 190 ● Minneapolis, MN ● 55440-0190
800-331-1661 ● 651-635-0511 ● FAX: 651-

Permission to Use FACES IV Package

I am pleased to give you permission to use the **FACES IV Package** in your research project, teaching or clinical work with couples or families. In order to use FACES IV, you must use the entire FACES IV Package which contains 62 items.

You may either duplicate the materials directly or have them retyped for use in a new format. If they are retyped, acknowledgement should be given regarding the name of the instrument, the developers' names, and Life Innovations.

In exchange for providing this permission, we would appreciate a copy of any papers, theses or reports that you complete using the **FACES IV Package.** This will help us to stay abreast of the most recent developments and research regarding this scale. We thank you for your cooperation in this effort.

Also, we are requesting that you provide us with a *set of your data* so that we can build a large and diverse norm base. We will acknowledge your contribution to the master data base. We will not use your data for individual studies on your topic or any topic. We would appreciate it if you used the format we have provided in an Excel spreadsheet (Microsoft).

In closing, I hope you find the **FACES IV Package** of value in your work with families. I would appreciate hearing from you as you make use of this package.

Sincerely,

David H. Olson

David H. Olson, Ph.D.

APPENDIX B

FAMILY ADAPTABILITY AND COHESION SCALE IV

FACES IV: Questionnaire

D.H. Olson D.M.Gorall

Directions to Family Members:

1. All family members over the age of 12 can complete the FACES IV.
2. Family members should complete the instrument independently, not consulting or discussing their responses until they have been complete.
3. Circle the response that best fits each statement.

1. Family members are involved in each others lives.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
2. Our family tries new ways of dealing with problems.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
3. We get along better with people outside our family than inside.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
4. We spend too much time together.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
5. There are strict consequences for breaking rules in our family.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
6. We never seem to get organized in our family.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
7. Family members feel very close to each other.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
8. Parents equally share leadership in our family.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
9. Family members seem to avoid contact with each other when at home.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
10. Family members feel pressured to spend most of their free time together.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
11. There are clear consequence when a family member does something wrong.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
12. It is hard to know who the leader is in our family.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
13. Family members are supportive of each other during difficult times.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
14. Discipline is fair in our family.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
15. Family members know very little about the friends of other family members.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
16. Family members are too dependent on each other.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
17. Our family has a rule for almost every possible situation.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
18. Things do not get done in our family.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree
19. Family members consult other family members on important decisions.
Strongly Disagree Generally Disagree Undecided Generally Agree Strongly Agree

20. My family is able to adjust to change when necessary.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
21. Family members are on their own when there is a problem to be solved.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
22. Family members have little need for friends outside the family.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
23. Our family is highly organized.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
24. It is unclear who is responsible for things (chores, activities) in our family.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
25. Family members like to spend some of their free time with each other.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
26. We shift household responsibilities from person to person.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
27. Our family seldom does things together.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
28. We feel too connected to each other.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
29. Our family becomes frustrated when there is a change in our plans or routines.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
30. There is no leadership in our family.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
31. Although family members have individual interests, they still participate in family activities.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
32. We have clear rules and roles in our family.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
33. Family members seldom depend on each other.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
34. We resent family members doing things outside the family.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
35. It is important to follow the rules in our family.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
36. Our family has a hard time keeping track of who does various household tasks.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
37. Our family has a good balance of separateness and closeness.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
38. When problems arise, we compromise.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
39. Family members mainly operate independently.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
40. Family members feel guilty if they want to spend time away from the family.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
41. Once a decision is made, it is very difficult to modify that decision.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
42. Our family feels hectic and disorganized.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
43. Family members are satisfied with how they communicate with each other.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
44. Family members are very good listeners.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
45. Family members express affection to each other.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
46. Family members are able to ask each other for what they want.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**

47. Family members can calmly discuss problems with each other.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
48. Family members discuss their ideas and beliefs with each other.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
49. When family members ask questions of each other, they get honest answers.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
50. Family members try to understand each other's feelings.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
51. When angry, family members seldom say negative things about each other.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**
52. Family members express their true feelings to each other.
Strongly Disagree **Generally Disagree** **Undecided** **Generally Agree** **Strongly Agree**

How Satisfied are you with:

53. The degree of closeness between family members.
Very Dissatisfied **Somewhat Dissatisfied** **Generally Satisfied** **Very Satisfied** **Extremely Satisfied**
54. Your family's ability to cope with stress.
Very Dissatisfied **Somewhat Dissatisfied** **Generally Satisfied** **Very Satisfied** **Extremely Satisfied**
55. Your family's ability to be flexible.
Very Dissatisfied **Somewhat Dissatisfied** **Generally Satisfied** **Very Satisfied** **Extremely Satisfied**
56. Your family's ability to share positive experience.
Very Dissatisfied **Somewhat Dissatisfied** **Generally Satisfied** **Very Satisfied** **Extremely Satisfied**
57. The quality of communication between family members.
Very Dissatisfied **Somewhat Dissatisfied** **Generally Satisfied** **Very Satisfied** **Extremely Satisfied**
58. Your family's ability to resolve conflicts.
Very Dissatisfied **Somewhat Dissatisfied** **Generally Satisfied** **Very Satisfied** **Extremely Satisfied**
59. The amount of time you spend together as a family.
Very Dissatisfied **Somewhat Dissatisfied** **Generally Satisfied** **Very Satisfied** **Extremely Satisfied**
60. The way problems are discussed.
Very Dissatisfied **Somewhat Dissatisfied** **Generally Satisfied** **Very Satisfied** **Extremely Satisfied**
61. The fairness of criticism in your family.
Very Dissatisfied **Somewhat Dissatisfied** **Generally Satisfied** **Very Satisfied** **Extremely Satisfied**
62. Family members concern for each other.
Very Dissatisfied **Somewhat Dissatisfied** **Generally Satisfied** **Very Satisfied** **Extremely Satisfied**

APPENDIX C

DEVEREUX BEHAVIOR RATING SCALE

Copyrighted Scale

APPENDIX D

PERCEIVED STRESS SCALE

Perceived Stress Scale

S. Cohen T. Kamarck R. Meremlstein

Instructions: The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please circle the appropriate response to indicate how often you felt or though a certain way.

IN THE LAST MONTH,

1. How often have you been upset because of something that happened unexpectedly?
   Never Almost Never Sometimes Fairly Often Very Often
2. How often have you felt that you were unable to control the important things in your life?
   Never Almost Never Sometimes Fairly Often Very Often
3. How often have you felt nervous and 'stressed'?
   Never Almost Never Sometimes Fairly Often Very Often
4. How often have you felt confident about your ability to handle your personal problems?
   Never Almost Never Sometimes Fairly Often Very Often
5. How often have you felt that things were going your way?
   Never Almost Never Sometimes Fairly Often Very Often
6. How often have you found that you could not cope with all the things that you had to do?
   Never Almost Never Sometimes Fairly Often Very Often
7. How often have you been able to control irritation in your life?
   Never Almost Never Sometimes Fairly Often Very Often
8. How often have you felt that you were on top of things?
   Never Almost Never Sometimes Fairly Often Very Often
9. How often have you been angered because of things that were outside your control?
   Never Almost Never Sometimes Fairly Often Very Often
10. How often have you felt difficulties were piling up so high that you could not overcome them?
    Never Almost Never Sometimes Fairly Often Very Often

*(Permission for use of scale not necessary when used for academic research purposes)

APPENDIX E

PERMISSION LETTER TO USE FCOPES

MYRON B THOMPSON SCHOOL OF SOCIAL WORK
University of Hawaii at Manoa

Alice Loo

Dear Ms. Loo

RE: Permissions for FCOPES, FTRI AND FCELEBI

This correspondence confirms that permissions for the use of FCOPES have been granted. Be certain to cite the source, authors and copyrights for this measure in your report/publications

Mahalo nui loa,

Hamilton McCubbin, PhD
Professor and Director of Research

APPENDIX F

FAMILY CRISIS ORIENTED PERSONAL EVALUATION SCALES

F- COPES: FAMILY CRISIS ORIENTED PERSONAL EVALUATION SCALES

H. I. McCubbin D. H. Olson A.S. Larsen

Directions:
1. Decide how well each statement describes your attitude and behavior in response to problems or difficulties in your family.
2. Circle the response that indicates how much you agree or disagree with the statement about your response.

*Mod .= Moderately

When we face problems of difficulties in our family, we respond by:

1. Sharing our difficulties with relatives
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
2. Seeking encouragement and support from friends
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
3. Knowing we have the power to solve major problems
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
4. Seeking info and advice from persons in other families who have faced the same or similar problems
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
5. Seeking advice from relatives (grandparents, etc.)
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
6. Seeking assistance from community agencies and programs designed to help families in our situation
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
7. Knowing that we have the strength with our own family to solve our problem
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
8. Receiving gifts and favors from neighbors (e.g. food, taking in mail, etc.)
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
9. Seeking information and advice from the family doctor
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
10. Asking neighbors for favors and assistance
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
11. Facing the problems 'head-on' and trying to get to the solution right away
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
12. Watching television
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
13. Showing that we are strong
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
14. Attending church services
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
15. Accepting stressful events as a fact of life
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
16. Sharing concerns with close friends
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
17. Knowing luck plays a big part in how well we are able to solve family problems
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
18. Exercising with friends to stay fit and reduce tension
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree

19. Accepting that difficulties occur unexpectedly
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
20. Doing things with relatives (get togethers, dinner, etc.)
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
21. Seeking Professional counseling and help for family difficulties
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
22. Believing we can handle our own problems
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
23. Participating in church activities
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
24. Defining the family problem in a more positive way so that we do not become too discouraged
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
25. Asking relatives how they feel about problems we face
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
26. Feeling that no matter what we do to prepare, we will have difficulties handling problems
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
27. Seeking advice from a minister
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
28. Believing if we wait long enough, the problem will go away
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
29. Sharing problems with neighbors
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree
30. Having faith in God.
Strongly Disagree Mod. Disagree Neither Agree or Disagree Mod. Agree Strongly Agree

APPENDIX G

BACKGROUND QUESTIONNAIRE

Date: _____

Please answer each question. If exact information (dates) is not known, please provide an estimate. All responses will be kept confidential. Thank you.

(1) Date of Birth of Child Participant: _____

(2) Age: _____

(3) Grade: _____

(4) Ethnicity: W B A H AI M

(5) Gender? Please circle: Male Female

(6a) How many brothers? _____ (6b) Age of brothers: _____

(7a) How many sisters? _____ (7b) Age of sisters: _____

(8) Gender of military parent? Please Circle: Male Female

(9) Rank of military parent: _____

(10) Military Assignment: _____

(11) Number of years in military service: _____

(12) Is the military parent currently deployed? Please Circle: Yes No

(13a) If yes, date of departure? _____

(13b) Expected date of return? _____

(14) Where is the military parent deployed? _____

(15) If the military parent is not currently deployed, what is the date of departure for the next deployment, if any? _____

(16) What date did the military parent last return from a deployment?

_____

(17) In this child's lifetime, how many deployments has your family experienced?

_____

(18) Is your child or family participating in any type of supportive (counseling) services?

Please Circle: Yes No

If yes, please describe: _____

(19) Occupation of non-military parent: _____

(20) Do you currently reside ON or OFF the military base. Please circle one.

APPENDIX H

PARENT CONSENT FORM

Dear Parents:

My name is Alice Loo and I am a doctoral student in Educational Psychology at the Graduate School and University Center at the City University of New York. I would like to invite your family to participate in a research project about children in military families. Military families with children aged 6-12 from Duval County are being invited to take part in this study.

The purpose of my study is to investigate the effects of a military deployment on a child's behavior and academic functioning. The results of this study may assist educators in gaining important insight concerning the effects of a parent's military deployment on a child's behavior and academics. This information may also enable education professionals to work more effectively with military children and their families that are experiencing a deployment.

Your participation in this study involves completing a background questionnaire and some rating scales that provide information about your family and your child's behaviors at home. These forms should take approximately 40 minutes to complete. Additionally, your child's teacher will be asked to complete a rating scale of your child's behavior in class, and your child's English and Math grades will be obtained from school records. No information from this study will become a part of your child's school records, or affect your child's grades or standing at the school in any way.

Participation in this study is completely voluntary; withdrawal is possible at any time. There are no foreseeable risks for participation in the study. All information gathered will be strictly confidential. All respondents' names will be removed from the questionnaires after the information has been gathered.

Thank you for taking the time to read and respond to this request. Your participation is greatly appreciated. If you agree to participate, please return this consent form, background questionnaire and rating scales in the addressed, stamped envelope within one week. Feel free to contact me if you have any questions regarding this research at the following phone number: (917)309-7516, or by email at atseng@gc.cuny.edu, or my advisor Dr. Mary Kopala at (212) 817-8303 or by email at mkopala@gc.cuny.edu. If you have any questions regarding your rights as a participant in this study, you can contact Kay Powell, IRB Administrator at the Graduate School and University Center/City University of New York at (212) 817-7525.

I will be happy to share the results of this study with you upon its completion. If you would like to be sent a copy of the results, please fill out the attached index card with your name, address or email address and return it with your questionnaires.

Sincerely,
Alice Loo
Dr. Mary Kopala
Faculty Advisor (212) 817-8303

I have read all the information that appears on this consent form. I understand my rights and I voluntarily consent to participate in this study.

_____ _____
Parent's signature Date

_____
Child's name

APPENDIX I

TEACHER CONSENT FORM

Dear Teacher:

Hello. My name is Alice Loo and I am a doctoral student in Educational Psychology at the Graduate School and University Center at the City University of New York. I am conducting a research project about children in military families in which one (or more) of your student's families has agreed to participate.

The purpose of my study is to investigate the effects of a military deployment on a child's behavior and academic functioning. The results of this study may assist educators in gaining important insight concerning the effects of a parent's military deployment on a child's behavior and academics. This information may also enable education professionals to work more effectively with military children and their families that are experiencing a deployment.

Your participation involves completing the attached behavior rating scale for each participating student(s). It is estimated that between one to five students will be participating from your class. Additionally, each child's parent will be asked to complete a background questionnaire and some rating scales that provide information about their family and the child's behaviors at home. Each child's English and Math grades will also be obtained from school records. No information from this study will become a part of the student's school records, or affect the student's grades or standing at the school in any way.

Your participation in this study is completely voluntary; withdrawal is possible at any time. There are no foreseeable risks for participation in the study. All information gathered will be strictly confidential.

Thank you for taking the time to read and respond to this request. Your participation is greatly appreciated. Please return this consent form to the researcher in the addressed, stamped envelope within one week. Feel free to contact me if you have any questions regarding this research at the following phone number: (917)309-7516, or by email at atseng@gc.cuny.edu., or my advisor Dr. Mary Kopala at (212) 817-8303 or by email at mkopala@gc.cuny.edu. If you have any questions regarding your rights as a participant in this study, you can contact Kay Powell, IRB Administrator at the Graduate School and University Center/City University of New York at (212) 817-7525.

Sincerely,

Alice T. Loo
Dr. Mary Kopala
Faculty Advisor (212) 817-8303

I have read all the information that appears on this assent form. I understand my rights and I voluntarily agree to participate in this study.

_____ _____

Teacher's signature Date

_____

Teacher's name

APPENDIX J

REGION WHERE PARENT DEPLOYED (IF DEPLOYED)

Region	Frequency	Percent of those deployed
Africa	10	18.5
Africa, East	4	7.4
Africa, Horn	1	1.9
Africa, West	2	3.7
Baltic Sea	2	3.7
Caribbean Sea	1	1.9
Caribbean Sea, East	3	5.6
Caribbean Sea, West	1	1.9
Indian Ocean	10	18.5
Korea	1	1.9
Mediterranean Sea	7	13.0
Middle-East	9	16.7
Pacific Ocean	2	3.7
Not reported	1	1.9
Total Deployed	54	100.0
Not deployed	147	
Total	201	

APPENDIX K

OCCUPATIONS OF NON-MILITARY PARENTS (ALL MOTHERS) WHO REPORTED OCCUPATION

	Frequency	Percent
accountant	1	1.9
artist	1	1.9
bookkeeper	1	1.9
cashier	1	1.9
chef	1	1.9
computer spec	1	1.9
cust serv	2	3.7
dance instructor	1	1.9
hair stylist	2	3.7
home*	22	40.7
homemaker*	2	3.7
lawyer	1	1.9
LPN	1	1.9
med Assist	1	1.9
none*	1	1.9
paraprof	1	1.9
phone sales	1	1.9
realtor	1	1.9
RN	2	3.7
sales	1	1.9
social work	1	1.9
student*	1	1.9
teacher	3	5.6
teacher	3	5.6
web design	1	1.9
Total	54	100.0

*Assumed to have no income-producing occupation.

APPENDIX L INTERCORRELATIONS AMONG PREDICTOR MEASURES

F-COPES	**F-COPES** Acq Soc Sup	Reframing	Seek Spirit Sup	Mobil Fam Sup	Passive Apprais	Total Coping	**Perceived Stress Scale**	**Devereux-Parent** Int Pers Probs	Inapp Beh Feel	Depress	Phys Symp Fears	Total Raw	**Devereux-Teacher** Int Pers Probs	Inapp Beh Feel	Depress	Phys Symp Fears	Total Raw
Acquiring Social Support	1	.510**	.368**	.549**	-.105	.905**	-.509**	-.332**	-.279**	-.262**	-.389**	-.355**	-.221**	-.216**	-.220**	-.067	-.202**
Reframing	.510**	1	.192**	.082	.178*	.693**	-.394**	-.382**	-.388**	-.313**	-.313**	-.391**	-.271**	-.207**	-.219**	-.120	-.226**
Seeking Spiritual Support	.368**	.192**	1	.175*	.112	.587**	-.010	-.244**	-.113	-.197**	-.176*	-.205**	-.209**	-.244**	-.279**	-.222**	-.260**
Mobilizing Fam to Acquire and Accept Help	.549**	.082	.175*	1	-.275**	.546**	-.266**	-.003	.023	.054	-.109	-.012	.080	.108	.084	.222**	.131
Passive Appraisal	-.105	.178*	.112	-.275**	1	.101	.082	-.132	-.039	-.122	.099	-.052	-.163*	-.062	.038	-.006	-.058
TotalCoping	.905**	.693**	.587**	.546**	.101	1	-.449**	-.387**	-.307**	-.300**	-.369**	-.383**	-.268**	-.235**	-.243**	-.090	-.233**
Perceived Stress Scale	-.509**	-.394**	-.010	-.266**	.082	-.449**	1	.448**	.575**	.553**	.663**	.627**	.241**	.284**	.397**	.333**	.338**
Devereux-Parent Interpersonal Problems	-.332**	-.382**	-.244**	-.003	-.132	-.387**	.448**	1	.717**	.745**	.666**	.876**	.803**	.677**	.713**	.633**	.773**
Inapprop Behaviors/Feelings	-.279**	-.388**	-.113	.023	-.039	-.307**	.575**	.717**	1	.759**	.718**	.892**	.572**	.627**	.651**	.606**	.669**
Depression	-.262**	-.313**	-.197**	.054	-.122	-.300**	.553**	.745**	.759**	1	.785**	.918**	.580**	.587**	.785**	.722**	.721**
Physical Symptoms/Fears	-.389**	-.313**	-.176*	-.109	.099	-.369**	.663**	.666**	.718**	.785**	1	.890**	.472**	.492**	.698**	.597**	.609**
Tota lRaw	-.355**	-.391**	-.205**	-.012	-.052	-.383**	.627**	.876**	.892**	.918**	.890**	1	.679**	.666**	.796**	.714**	.775**
Devereux-Teacher Interpersonal Problems	-.221**	-.271**	-.209**	.080	-.163*	-.268**	.241**	.803**	.572**	.580**	.472**	.679**	1	.858**	.751**	.710**	.914**
Inapprop Behaviors/Feelings	-.216**	-.207**	-.244**	.108	-.062	-.235**	.284**	.677**	.627**	.587**	.492**	.666**	.858**	1	.801**	.755**	.941**
Depression	-.220**	-.219**	-.279**	.084	.038	-.243**	.397**	.713**	.651**	.785**	.698**	.796**	.751**	.801**	1	.833**	.918**
Physical Symptoms/Fears	-.067	-.120	-.222**	.222**	-.006	-.090	.333**	.633**	.606**	.722**	.597**	.714**	.710**	.755**	.833**	1	.889**
Total Raw	-.202**	-.226**	-.260**	.131	-.058	-.233**	.338**	.773**	.669**	.721**	.609**	.775**	.914**	.941**	.918**	.889**	1

*p< .05 **p< .01.

APPENDIX M

PRIOR READING GRADES

Grade on 4-pt. scale	Frequency	Percent	Cumulative Percent
0.00	4	2.0	2.0
0.67	1	.5	2.5
1.00	2	1.0	3.5
1.33	5	2.5	6.0
1.67	3	1.5	7.5
2.00	49	24.4	31.8
2.33	8	4.0	35.8
2.67	9	4.5	40.3
3.00	76	37.8	78.1
3.33	12	6.0	84.1
3.67	15	7.5	91.5
4.00	17	8.5	100.0
Total	201	100.0	

Note. Cumulative percent may include rounding error.

APPENDIX N

CURRENT READING GRADES

Grade on 4-pt. scale	Frequency	Percent	Cumulative Percent
1.00	20	10.0	10.0
1.33	5	2.5	12.4
1.67	14	7.0	19.4
2.00	29	14.4	33.8
2.33	13	6.5	40.3
2.67	14	7.0	47.3
3.00	45	22.4	69.7
3.33	18	9.0	78.6
3.67	13	6.5	85.1
4.00	30	14.9	100.0
Total	201	100.0	

Note. Cumulative percent may include rounding error.

APPENDIX O

PRIOR MATH GRADES

Grade on 4-pt. scale	Frequency	Percent	Cumulative Percent
0.00	2	1.0	1.0
0.67	1	.5	1.5
1.00	16	8.0	9.5
1.67	3	1.5	10.9
2.00	31	15.4	26.4
2.33	11	5.5	31.8
2.67	21	10.4	42.3
3.00	73	36.3	78.6
3.33	10	5.0	83.6
3.67	17	8.5	92.0
4.00	16	8.0	100.0
Total	201	100.0	

Note. Cumulative percent may include rounding error.

APPENDIX P

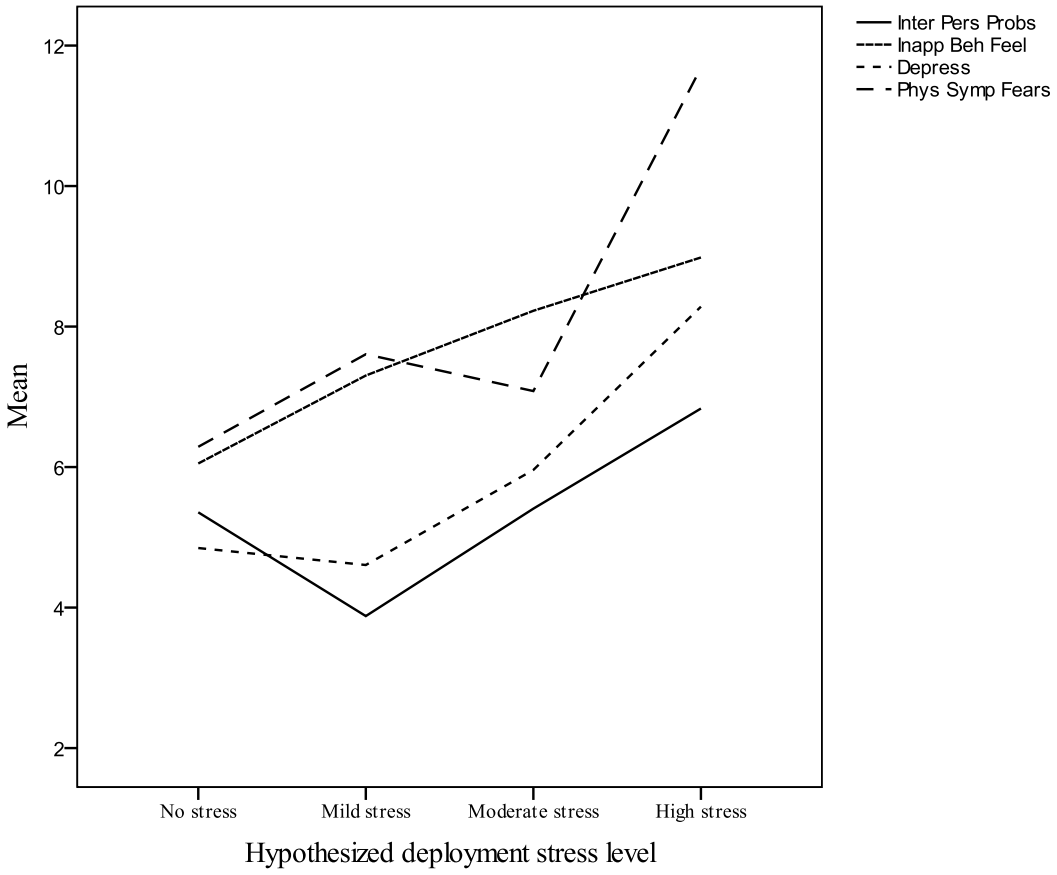
CURRENT MATH GRADES

Grade on 4-pt. scale	Frequency	Percent	Cumulative Percent
0.00	1	.5	.5
0.67	9	4.5	5.0
1.00	10	5.0	10.0
1.67	4	2.0	11.9
2.00	27	13.4	25.4
2.33	17	8.5	33.8
2.67	16	8.0	41.8
3.00	60	29.9	71.6
3.33	24	11.9	83.6
3.67	15	7.5	91.0
4.00	18	9.0	100.0
Total	201	100.0	

Note. Cumulative percent may include rounding error.

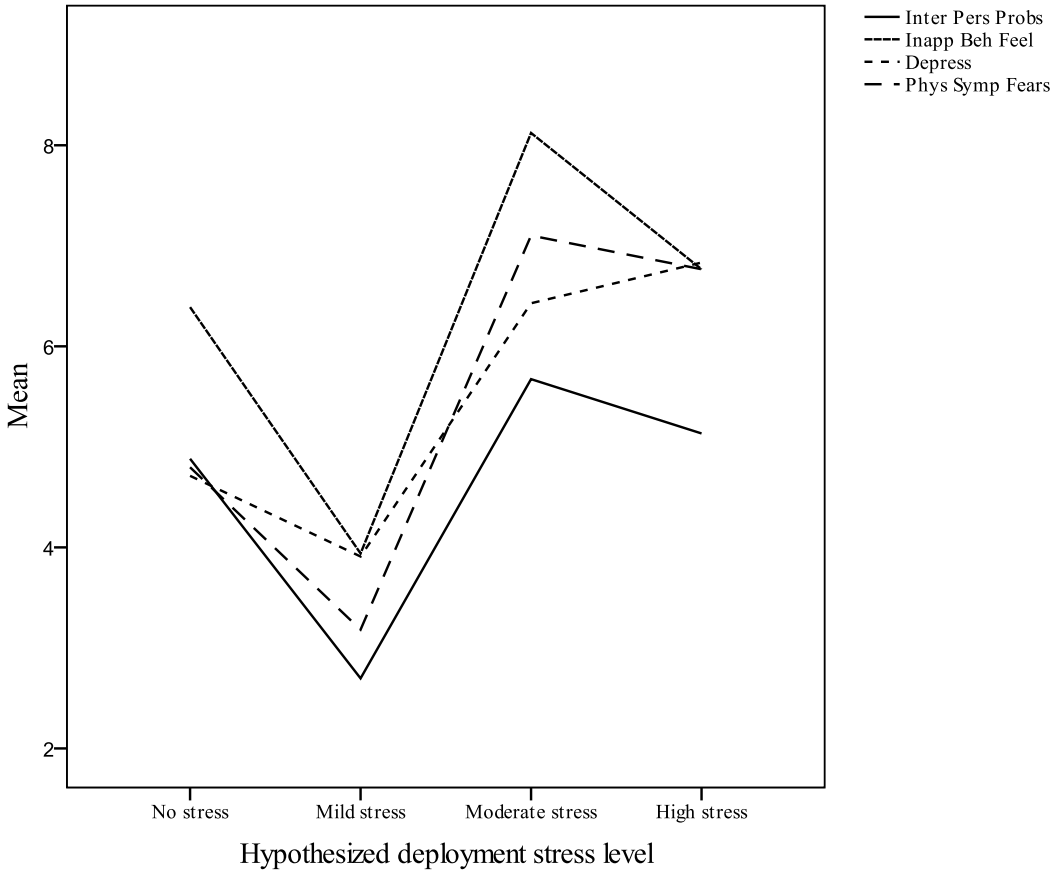
APPENDIX Q

DEVEREUX- PARENT SUBSCALES BY HYPOTHESIZED STRAIN LEVEL GROUPS



APPENDIX R

DEVEREUX- TEACHER SUBSCALES BY HYPOTHESIZED STRAIN LEVEL GROUPS



APPENDIX S

CORRELATIONS BETWEEN PREDICTORS AND OUTCOME VARIABLES FOR PATH ANALYSES

Predictor Variables	Outcome Variables				
	Measured stress	Devereux-Parent	Devereux-Teacher	Math Improvement	Reading Improvement
Deployment (yes/no)					
r=	.293	.141	.095	-.163	-.245
p=	<.001	.046	.180	.021	<.001
Deployment Strain					
r=	.603	.329	.174	-.287	-.444
p=	<.001	<.001	.013	<.001	<.001
Deployment Strain Change					
r=	.517	.226	.107	-.247	-.376
p=	<.001	.001	.132	<.001	<.001
Age					
r=	-.095	-.047	.019	-.023	-.011
p=	.182	.505	.784	.745	.877
Total Coping					
r=	-.449	-.383	-.233	-.033	.187
p=	<.001	<.001	.001	.641	.008
Measured Stress					
r=	—	.627	.338	-.183	-.480
p=	—	<.001	<.001	.009	<.001

Note. N=201 for all. Measured stress was used both as a predictor and outcome variable. All *p* values 2-tailed.

APPENDIX T

RESULTS OF MULTIPLE REGRESSIONS TESTING EFFECTS OF CHILD'S AGE ON ACADEMIC AND BEHAVIORAL FUNCTIONING AND PERCEIVED STRESS SCALE SCORES

Dependent Variable: Devereux-Parent

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	39.948	22.170		1.802	.073
	Age	1.978	2.689	.171	.735	.463
	FACES Total Ratio	-7.331	11.039	-.245	-.664	.507
	Age x FACES Total Ratio	-.957	1.322	-.327	-.724	.470

Dependent Variable: Devereux-Teacher

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	35.569	24.599		1.446	.150
	Age	1.437	2.983	.118	.482	.631
	FACES Total Ratio	-10.438	12.248	-.333	-.852	.395
	Age x FACES Total Ratio	-.328	1.467	-.107	-.223	.823

Dependent Variable: Math Improvement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-1.108	.737		-1.503	.134
	Age	.133	.089	.398	1.485	.139
	FACES Total Ratio	.609	.367	.707	1.658	.099
	Age x FACES Total Ratio	-.072	.044	-.854	-1.637	.103

Dependent Variable: Reading Improvement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-1.899	.895		-2.121	.035
	Age	.169	.109	.406	1.560	.120
	FACES Total Ratio	1.028	.446	.955	2.306	.022
	Age x FACES Total Ratio	-.094	.053	-.895	-1.765	.079

Dependent Variable: PSS Total

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	26.694	7.755		3.442	.001
	Age	.070	.941	.018	.074	.941
	FACES Total Ratio	-2.919	3.861	-.295	-.756	.451
	Age x FACES Total Ratio	-.133	.462	-.138	-.288	.774

Dependent Variable: Devereux-Parent

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	53.025	5.326		9.957	.000
	AgeDeviation	2.186	2.942	.163	.743	.458
	FACES Total Ratio	-13.579	2.757	-.454	-4.925	.000
	AgeDev x FACES Total Ratio	-1.119	1.431	-.186	-.782	.435

Dependent Variable: Devereux-Teacher

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	47.182	5.919		7.972	.000
	AgeDeviation	-.019	3.270	-.001	-.006	.995
	FACES Total Ratio	-13.537	3.064	-.431	-4.418	.000
	AgeDev x FACES Total Ratio	.316	1.591	.050	.199	.843

Dependent Variable: Math Improvement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-.302	.176		-1.713	.088
	AgeDeviation	.207	.097	.535	2.125	.035
	FACES Total Ratio	.163	.091	.189	1.785	.076
	AgeDev x FACES Total Ratio	-.105	.047	-.602	-2.206	.029

Dependent Variable: Reading Improvement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-.737	.216		-3.418	.001
	AgeDeviation	.166	.119	.343	1.392	.166
	FACES Total Ratio	.377	.112	.350	3.377	.001
	AgeDev x FACES Total Ratio	-.089	.058	-.408	-1.528	.128

Dependent Variable: PSS Total

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	27.008	1.862		14.507	.000
	AgeDeviation	.166	1.029	.037	.162	.872
	FACES Total Ratio	-3.689	.964	-.373	-3.828	.000
	AgeDev x FACES Total Ratio	-.214	.500	-.107	-.428	.669

APPENDIX U

RESULTS OF MULTIPLE REGRESSIONS TESTING EFFECTS OF FAMILY COPING AND FAMILY FUNCTIONING ON ACADEMIC AND BEHAVIORAL FUNCTIONING AND PERCEIVED STRESS SCALE SCORES

Dependent Variable: Devereux-Parent

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	87.569	26.319		3.327	.001
	FACES Total Ratio	-22.825	14.048	-.764	-1.625	.106
	Total Coping	-.364	.265	-.343	-1.376	.171
	FACES x Coping	.099	.135	.459	.734	.464

Dependent Variable: Devereux-Teacher

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	49.462	29.686		1.666	.097
	FACES Total Ratio	-12.491	15.846	-.398	-.788	.431
	Total Coping	-.037	.299	-.033	-.122	.903
	FACES x Coping	.001	.153	.004	.005	.996

Dependent Variable: Math Improvement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.037	.891		1.165	.245
	FACES Total Ratio	-.469	.475	-.544	-.986	.325
	Total Coping	-.011	.009	-.359	-1.224	.222
	FACES x Coping	.005	.005	.791	1.078	.282

Dependent Variable: Reading Improvement

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-.835	1.084		-.771	.442
	FACES Total Ratio	.238	.578	.221	.411	.681
	Total Coping	.004	.011	.114	.398	.691
	FACES x Coping	.000	.006	-.052	-.072	.942

Dependent Variable: PSS Total

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	61.943	8.694		7.125	.000
	FACES Total Ratio	-16.807	4.640	-1.700	-3.622	.000
	Total Coping	-.376	.087	-1.073	-4.301	.000
	FACES x Coping	.140	.045	1.955	3.131	.002

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