CAREGIVER PHYSICAL HEALTH AND

PROTECTIVE FACTORS AGAINST CHILD ABUSE AND NEGLECT

BY

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and the Graduate Faculty of the University of Kansas
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Abstract

Child abuse and neglect are influential negative experiences with long-lasting effects. A trend in child maltreatment prevention focuses on investigation of protective factors rather than risk factors. The present study examined relationships among caregiver physical health, protective factors, stress, and depression at two time points in a national sample of caregivers receiving parenting-related services. Results included predictive effects from aspects of reduced health to increases in stress and depression and evidence that depression mediated the relationships between aspects of health (Role Limitations and General Health) and family functioning. Consistent predictive relationships from depression (negative effect) and stress (positive effect) to family functioning were also found. Implications for considering caregiver physical health in the context of child maltreatment prevention are discussed.

Introduction

The Problem of Child Abuse and Neglect

Child maltreatment, a general term for both child abuse and neglect, is one of the most devastating and influential problems in the United States; its effects are far-reaching and long-lasting. The Centers for Disease Control and Prevention (CDC) defines child maltreatment as any act of commission or omission by a parent or other caregiver that results in harm, potential for harm, or threat of harm to a child; it is not necessary for harm to be intended (Leeb, Paulozzi, Melanson, Simon, & Arias, 2008). Similarly, the federal government defined child abuse and neglect in the Child Abuse Prevention and Treatment Act (CAPTA) as "the physical and mental injury, sexual abuse, negligent treatment, or maltreatment of a child under the age of 18 by a person who is responsible for the child's welfare under circumstances which indicate that the child's health or welfare is harmed or threatened" (ACF, 2003). Child maltreatment encompasses physical abuse, sexual abuse, psychological or emotional abuse, neglect (e.g., failure to provide, failure to supervise), and intimate partner violence.

Child maltreatment is not a new phenomenon and it is not unique to any nation or culture. For example, evidence of infanticide (intentional killing of an infant or child) exists throughout much of ancient history. In the United States, the current focus and systems related to the prevention and treatment of child maltreatment arose from two influential sources. In 1962, Kempe, Silverman, Steele, Droegemuller, and Silver (1962) published the pivotal article *The Battered Child Syndrome* in the Journal of the American Medical Association, marking the development of child

abuse as a distinct academic subject. This article exposed the reality that significant

numbers of parents and caretakers batter their children, some even to death. In

addition, it demonstrated that many incidents thought to be childhood accidents or

conditions were the results of child abuse. In 1974, Congress passed landmark

legislation in the federal Child Abuse Prevention and Treatment Act (CAPTA; Public

Law 93-273). The act's many impacts included providing states with funding for the

investigation and prevention of child maltreatment and creating the National Center

on Child Abuse and Neglect (NCCAN) and an information clearinghouse. CAPTA

was reauthorized and amended in 1978, 1984, 1988, 1992, 1996, and 2003.

Despite the growing support for the prevention and treatment of child abuse

and neglect in the 20th century, these continue to be major problems with far-reaching

consequences in the United States. In 2004, nearly 1 million children were victims of

child abuse and neglect in the U.S. (DHHS, 2006). The consequences of child

maltreatment are clear. Children who experience maltreatment are at increased risk

for immediate adverse health effects and chronic disease, severe obesity, depression,

and risky behaviors (e.g., smoking, alcoholism, drug abuse, eating disorders, suicide,

and sexual promiscuity) as adolescents and adults (Felitti, Anda, Nordenberg,

Williamson, Spitz, et al., 1998; Runyan, Wattam, Ikeda, Hassan, & Ramiro, 2002).

Maltreatment during infancy and childhood can interrupt healthy brain development,

leading to physical, mental, and emotional problems such as sleep disturbances and

attention-deficit/hyperactivity disorder (DHHS, 2001; Perry, 2001, 2002). In addition,

compared to children who are not abused, children who are physically maltreated are

twice as likely to experience domestic violence as adults (Tjaden & Thoennes, 2000) and more likely to eventually abuse their own children (Prevent Child Abuse America, 2003). Child maltreatment increases the likelihood of criminal behavior during both adolescence and adulthood (Widom & Maxfield, 2001). Direct costs (e.g., judicial, law enforcement, health care) of child maltreatment are estimated at $24 billion each year; indirect costs (e.g., long-term economic consequences) exceed $69 billion each year (Fromm, 2001).

Protective Factors against Child Abuse and Neglect

Prevention of child maltreatment is frequently thought of in terms of reducing risk factors such as social isolation, lack of family cohesion, and poverty. Protective factors are the opposite of risk factors and may lesson the risk of child abuse and neglect. These factors exist on the individual, family, community, and societal levels. Due to these broad levels, there are many independent lists of protective factors. These lists, while generally overlapping, suggest a varying array of protective factors. Protective factors can include: a supportive family environment, nurturing parenting skills, stable family relationships, household rules and monitoring of the child, parental employment, adequate housing, access to health care and social services, caring adults outside the family who can serve as role models or mentors, and communities that support parents and take responsibility for preventing abuse (Child Welfare Information Gateway, 2006; DHHS, 2003).

In recent years, a systematic approach to studying protective factors with broad application and impact has emerged. In 2001, the Center for the Study of Social

Policy (CSSP) set out to develop an approach for child maltreatment prevention that utilized early care and education programs and a strengths-based perspective. The shift to a strengths-based perspective was in response to the idea that identifying deficits and labeling families as "at risk" is often a barrier to engaging families in intervention (Horton, 2003). The CSSP identified five protective factors through a literature review, consultation with experts in the field of child maltreatment prevention, and examination of strategies currently used by exemplary early care and education programs. These five factors are: 1) parental resilience, 2) social connections, 3) knowledge of parenting and child development, 4) concrete support, and 5) children's healthy social and emotional development (Horton, 2003). CSSP elected to exclude specific risk factors such as mental illness, substance abuse, and domestic violence which are beyond the intervention reach of early care and education programs.

The CSSP protective factors capture well-understood and researched phenomena. *Resilience* refers to the ability to survive in times of stress through the use of adaptive coping skills (Block & Kremen, 1996). In resilient parents and families, these coping skills include the ability to form caring relationships, open emotional expression, collaborative problem solving, making use of available resources, an orientation toward the positive, and making meaning out of experiences (Higgins, 1994; Walsh, 1998). *Social connections* is defined as being integrated into a social network, adequate levels of contact and communication with others, and the presence of positive intimate ties to other individuals (Horton, 2003). Social

connections must be positive, as parents may be connected to others but in

relationships that are dysfunctional as a result of dependence or conflict (Beeman,

1997). *Concrete support* refers to the ability to fulfill basic needs, including

provisions such as clothing or housing and access to services such as mental health

care. Social connections and concrete support reflect three types of support found in

the literature: *instrumental* (Cohen, Mermelstein, Kamarck, & Hoberman, 1985);

informational (Carver, Scheier, & Weintraub, 1989); and *emotional* (Cohen & Wills,

1985). Social connections align with emotional support, and concrete support aligns

with instrumental and informational support. Each of these types of support exists as

both actual or received and perceived by an individual; numerous studies (e.g.,

Barrera, 1986) have reported that perceived levels of support are more important than

received support in terms of beneficial impact. *Knowledge of parenting and child*

development is defined as a basic understanding of age-appropriate expectations for

children and child rearing strategies; lack of this knowledge often results in parents

assessing children's behavior in excessively negative ways. The importance of

knowledge of parenting and child development was emphasized by Lundahl and

colleagues (1996) who reported that parent education is a crucial component of

programs aimed at reducing child maltreatment. *Children's healthy social and*

emotional development refers to a child's development of social skills, establishment

of healthy relationships, and ability to appropriately express and regulate their

emotions. A child's positive social and emotional development can serve as a

protective factor through impact on the quality of the parent-child interaction (Shonkoff & Phillips, 2000).

To date, prevention programs, specifically Community-Based Child Abuse Prevention (CBCAP) programs which focus on primary and secondary prevention, have not established effectiveness according to federal standards. Primary prevention activities focus on the population at large and secondary prevention activities focus on families identified as "at risk" for child maltreatment before it occurs. Measuring effectiveness for prevention programs is difficult, as reductions in reported and substantiated cases of child maltreatment do not necessarily equate to successful impact. As a result, there has been a growing focus on measuring protective factors against child maltreatment as an outcome. There are numerous measures that assess a single protective factor such as social support or knowledge of child development. However, there is no instrument which systematically assesses multiple, distinct protective factors. The Protective Factors Survey (PFS) is currently being developed to fill this gap (Counts, Buffington, Chang-Rios, Rasmussen, & Preacher, 2009). The PFS was initiated in response to a need for valid and reliable outcome and evaluation measures for child maltreatment prevention programs. It was designed to measure protective factors based on the CSSP model.

The protective factors measured by the PFS have been modified based on reliability and validity analyses. The current version of the PFS examines five protective factors: 1) family functioning/communication, 2) social emotional support, 3) concrete support, 4) nurturing and attachment, and 5) knowledge of parenting/child

development. Table 1 presents operational definitions for these five factors (Counts et al., 2009). The PFS addresses caregiver or family-level protective factors and does not include child-level factors, such as children's healthy social and emotional development.

Table 1

Operational Definitions of Relevant Protective Factors

Protective Factor	Operational Definition
Family Functioning/ Communication	Having adaptive skills and strategies to persevere in times of crisis. Family's ability to openly share positive and negative experiences and mobilize to accept, solve, and manage problems.
Social Emotional Support	Perceived informal support (from family, friends, and neighbors) that helps provide for emotional needs.
Concrete Support	Perceived access to tangible goods and services to help families cope with stress, particularly in times of crisis or intensified need.
Nurturing and Attachment	The emotional tie along with a pattern of positive interaction between the parent and child that develops over time.
Knowledge of Parenting/ Child Development	Understanding and utilizing effective child management techniques and having age-appropriate expectations for children's abilities.

Protective Factors, Stress, and Depression

Protective factors are influenced by a variety of internal and external forces. The experiences of stress and depression have been related to a number of general protective factors. The relationship between stress and mental illness, such as depression, has been reviewed extensively (Andrews, 1978; Dohrenwend &

Dohrenwend, 1974; Levi, 1971; Steptoe & Ayers, 2004). One model posits that when experiences are appraised as threatening or challenging, this stress results in an emotional response such as anxiety or depression (Lazarus, 1971; Steptoe & Ayers, 2004). It is difficult to fully review the literature relating stress to protective factors given that the construct of stress is broadly defined and measured in a variety of ways. Thus, this review focuses on the mechanisms through which depression, a more narrowly defined construct, influences protective factors. Given the strong correlation between stress and depression, it is reasonable to assume they have similar relationships to protective factors and are discussed together.

Perhaps most importantly, the presence of depression interferes with the development of the caregiver-child bond and impacts the caregiver's experience of parenting. Depressed mothers report more stress, negative perceptions of their children's behavior, and more feelings of hostility toward their children (Cornish, McMahon, Ungerer, Barnett, Kowalenko, et al., 2006; Edborg, Seimyr, Lundh, & Widstrom, 2000; Graham, Lobel, & DeLuca; 2002; Renk, Roddenberry, Oliveros, & Sieger, 2007). Whereas primary attention has been on mothers, similar results have been found in fathers. Depression in fathers decreases father-child activities, increases paternal aggravation and stress, and negatively impacts the mother-father relationship (Bronte-Tinkew, Moore, Matthews, & Carrano, 2007). In addition, parental perceived stress has been related to both parenting efficacy and satisfaction (Belchic, 1996). Caregiver depression also affects healthy child attachment and development, another protective factor. Infants of depressed mothers have a significantly reduced likelihood

of secure attachment and an increased likelihood of avoidant or disorganized

attachment (Martins & Gaffan, 2000). In addition, children of depressed mothers

demonstrate less curiosity and positive affect and more negative affect (Hart, Field,

del Valle, & Pelaez-Nogueras, 1998). Importantly, research suggests that mothers

with depression may have several barriers to seeking help, including an inability to

disclose feelings, a lack of knowledge about depression and treatment options, and

family and health professionals' failure to respond to the depressed mother's

emotional needs (Dennis & Chung-Lee, 2006).

Stress and depression interfere with caregivers' ability to get the social,

emotional, and concrete support they need. Social isolation may stem from

psychological and behavioral barriers that prevent positive connections from

developing (Seagull, 1987). It has been well-established that non-depressed

individuals respond differently to depressed persons and that this differential response

may serve to maintain depression (Coyne, 1976); differential responses include more

silence, decreased verbal responding, direct negative statements and anger, and

rejection (Howes & Hokansan, 1979; Sacco, Milana, & Dunn, 1988). Depression can

serve to deteriorate existing sources of social and emotional support both in terms of

perceived and actual support (Dew & Bromet, 1991; Knoll, Rieckmann, & Kienle,

2007). One mechanism for this deterioration may be poor interpersonal problem-

solving in individuals with depression (Gotlib & Asarnow, 1979). Demonstrating the

direct relationship between protective factors and child maltreatment, one study

reported that caregivers who engaged in neglect (e.g., failure to provide adequate

food, clothing, housing, or other types of care) were more likely to report loneliness, inadequate support from their social network, and depression (Gaudin, Polansky, Kilpatrick, & Shilton, 1993).

Stress and depression may interfere with the ability to utilize concrete support through mechanisms of learned helplessness and a lack of goal-directed behavior. Learned helplessness, a well-established principle related to depression, is a condition in which an individual believes that a situation is hopeless, s/he has no control, and that any attempts at change will be futile. It describes a state in which the individual remains passive in a negative situation. Depressed individuals frequently display learned helplessness and poor problem-solving (Miller & Seligman, 1975). Learned helplessness and lack of problem-solving skills may impact depressed caregivers' ability to identify and seek appropriate resources to meet needs such as food, housing, or employment. Another mechanism of interference may be the use of self-handicapping by caregivers with depression; self-handicapping serves to reduce expectations, avoid potential losses, and externalize failures (Weary & Williams, 1990). In several studies, mothers who were depressed were less likely to be employed or in school or transition out of receiving federal assistance (Coiro, 2001; Jayakody & Stauffer, 2000). Depression may prevent caregivers from undertaking the tasks necessary to find employment (Jayakody & Stauffer, 2000). For employed caregivers, the presence of depression increases absenteeism and turnover, which may threaten employment security (Pelled & Xin, 1999). Stress also relates to employment, such that higher stress is reported by individuals who are unemployed,

too disabled to be employed, or employed part-time (Cohen & Williamson, 1988).

Depression can also interfere with necessary self-care behaviors, such as compliance

with medical care or failure to receive preventative medical services (e.g., cancer

screenings) which could negatively impact caregiver health (DiMatteo, Lepper, &

Croghan, 2000; Pirraglia, Sanyal, Singer, & Ferris, 2004).

Stress, Depression, and Health

The relationships among stress, depression, and health have been well-

established in the literature. These relationships are reciprocal and overlap, making it

difficult to draw lines of cause and effect. For example, depression likely increases

the experience of physical symptoms, and the presence of physical symptoms will

likely increase depression. Assessments of health-related quality of life (HRQOL)

demonstrate both the large impact of health on overall well-being and the inter-

relationships of health, stress, and depression. Health-related quality of life refers to

an individual's perceived physical and mental health over time. It is frequently used

to measure the effects of both short- and long-term illness and disability on an

individual's day-to-day life (CDC, 2000).

After surveying the U.S. population, the Centers for Disease Control and

Prevention (CDC) report that Americans feel unhealthy, either physically or mentally,

six days per month, on average. In addition, individuals with the lowest income and

education reported more unhealthy days per month than those with higher income or

education. Individuals with chronic illness, such as arthritis, cancer, cardiovascular

disease, and diabetes, report up to twice as many unhealthy days per month compared

to those without chronic illness. Since 1993, the percentage of adults who self-report fair or poor health has steadily increased, reaching 16.5% in 2005. Additionally, 10.7% of individuals reported being physically unhealthy, 10.0% reported being mentally unhealthy, and 6.6% reported activity limitations on fourteen or more days per month. Approximately 19% of adults reported some type of activity limitation due to health concerns. Individuals with a health-related limitation reported more days of poor physical and mental health, fewer healthy days, more days with activity limitations, more days with pain, and more days with depression and anxiety than individuals with no reported health-related limitation (CDC, 2000).

Similarly, in a large survey of primary care patients, the presence of any physical symptoms increased the likelihood of a mood or anxiety disorder diagnosis; the likelihood of a psychiatric disorder increased sharply with the increasing number of physical symptoms. In addition, the number of physical symptoms was strongly related to the level of functional impairment with each physical symptom resulting in significantly increased impairment (Kroenke, Spitzer, Williams, Linzer, Hahn, et al., 1994).

In the validation of a measure of stress, scores on the Perceived Stress Scale (PSS; Cohen & Williamson, 1988) were related to both depressive and physical symptomatology. Stress and depression were highly correlated but were shown to be distinct constructs which independently predicted physical symptoms and health services utilization (Cohen, Kamarck, & Mermelstein, 1983; Cohen & Williamson, 1988). Stress was also related to health behaviors such as sleep, diet, and alcohol and

drug usage (Cohen & Williamson, 1988). Examination of the relationship between stress and health has focused largely on the negative impact of stress on health (see Martin & Brantley, 2004 for a review); a much smaller literature has explored the impact of health on stress, despite the fact that it is universally accepted that chronic illness is a major life stressor (Martin & Brantley, 2004).

For patients with serious or chronic medical illness, depression is frequently experienced co-morbidly, with the rate of depression increasing as the medical condition or symptoms worsen (Cassem, 1995; Hu, Amoako, Gruber, & Rossen, 2007; Lowe, Grafe, Ufer, Kroenke, Grunig, et al., 2004; Schmitt & Ford, 2007; Shah, 2006; Vincent, 1997). Regardless of symptom or diagnosis, overall physical burden, including physical impairment or limitation, appears to be most powerfully associated with depression (Lyness, Niculescu, Tu, Reynolds, & Caine, 2006; Norton, Manne, Rubin, Hernandez, Carlson, et al., 2005). Similar results have been found for the experience of stress during and following serious or chronic illness (Gruber, Fegg, Buchmann, Kolb, & Hiddemann, 2003; Hudson, 2000; Melanson & Downe-Wamboldt, 1995; van Lankveld, Naring, van der Staak, van't Pad Bosch, & van de Putte, 2003). Depression can then adversely affect health through diminishing self-care behaviors (Hu et al., 2007). A common finding across studies is the low rate of treatment for depression or other psychiatric disorders in medical populations (Gruber et al., 2003; Lowe et al., 2004).

Caregiver Health, Parenting, and Protective Factors

Poor physical health or illness is a life stressor which can independently increase the risk for child maltreatment and increase the likelihood for maltreatment in the context of other risk factors such as caregiver history of abuse, domestic violence, alcohol or drug abuse, or psychiatric illness (Wilson, Reid, Midmer, Biringer, Carroll, et al., 1996). Risk factors for child maltreatment related to health include social isolation, poverty or socioeconomic disadvantage, family disorganization, lack of family cohesion, poor parent-child relationships and negative interactions, and parent stress and distress (CDC, 2007).

Physical health has been shown to relate to psychological distress in caregivers. Several studies have shown that providing kinship care, particularly as an older adult (e.g., grandmothers raising grandchildren), results in poorer physical health, which in turn increases psychological distress. As a result, kinship caregivers may not be able to physically care for the children and may be at a higher risk for inflicting maltreatment due to distress (Kelley, Whitley, Sipe, & Yorker, 2000; Whitley & Kelley, 2001). The relationship between social isolation or loneliness and poor health has been well-established in the literature (Mullins, Smith, Colquitt, & Mushel, 1996; Steptoe, Owen, Kunz-Ebrecht, & Brydon, 2004). While researchers are generally interested in the adverse effects of loneliness on health, these relationships are often correlational and cause and effect has not been established.

The relationships between caregiver health and parenting have received attention in a small literature. Specifically, parent limitations in daily functioning due

to illness have been related to child behavior problems, such that increased limitations relate to poorer child adjustment (Chun, Turner, & Romano, 1993). Poor adjustment includes increased child depression, increased child anxiety, poor child psychosocial adjustment, and an impoverished family environment (Dura & Beck, 1988; Forehand, Jones, Kotchick, Armistead, Morse, et al., 2002; Forehand, Steele, Armistead, Morse, Simon, et al., 1998; Mikail & von Baeyer, 1990; Rickard, 1988; Steele, Forehand, & Armistead, 1997). The level of caregiver disability appears to matter more than the specific illness (Dura & Beck, 1988). Similarly, mothers with human immunodeficiency virus (HIV) or chronic pain report poorer mother-child relationships, over-reactive parenting styles, dysfunctional parenting strategies, and less monitoring of their children's activities (Evans, Shipton, & Keenan, 2006; Forehand et al., 2002; Kotchick, Forehand, Brody, Armistead, Simon, et al., 1997). The father-child relationship has also been shown to be of lower quality when the father has a chronic illness, such as HIV (Steele et al., 1997). Mothers with chronic pain report physical, psychological, and social difficulties and problems completing day-to-day parenting tasks (Evans, Shipton, & Keenan, 2005). These results indicate that parent health status interferes with children's healthy social and emotional development, one of the protective factors, and specifically, that caregiver level of health-related functionality relates to poor adjustment for both caregiver and child.

Additionally, children who have caregivers with health problems demonstrate increased somatic focus and complaints (Jones, O'Connell, Sarah, & Forehand, 2006; Mikail & von Baeyer, 1990; Rickard, 1988). Children of chronic pain patients report

pain more frequently, report more abdominal pain, and use more medication (Jamison & Walker, 1992). Increased illness behavior and complaints in children may increase caregiver stress, particularly if the caregiver is experiencing health-related problems or limitations, and negatively impact children's healthy development.

The importance of caregiver health has been acknowledged by LONGSCAN, a federally-funded collaboration of research studies coordinated through the University of North Carolina examining the etiology and impact of child abuse and neglect (Hunter, Cox, Teagle, Johnson, Mathew, et al., 2003). LONGSCAN was initiated through grants from the National Center on Child Abuse and Neglect (NCCAN) in 1990 and uses an ecological-developmental framework to examine risk and protective factors identified through previous literature at the child, parent, family, neighborhood, and cultural levels (LONGSCAN, n.d.).

Limitations of the Previous Literature and Current Frameworks

Limitations exist in the literature connecting protective factors, stress, depression, and caregiver health. As noted above, there is minimal literature relating stress, independent of depression, to specific protective factors. In addition, the literature which does link stress and/or depression to individual or family characteristics which serve as protective factors generally does so outside the context of child maltreatment prevention. For example, whereas the literature may relate depression to social isolation or poor caregiver-child bond, it does not address these outcomes as being related to potential for child maltreatment (e.g., Cornish et al., 2006). The relationship between caregiver health and parenting has received little

attention in the literature. Similarly, those studies which do connect caregiver health to issues which serve as protective factors, such as parenting strategies and the caregiver-child bond, do so outside the context of child maltreatment prevention. In addition, this literature has focused on only two primary groups – mothers with HIV or chronic pain – which serves as a major limitation in terms of generalizability. Finally, whereas a large literature exists linking adverse health outcomes to the experience of stress and depression, these studies are largely either correlational or causal from stress and/or depression to poor health; the reverse relationship from health to stress and depression has not received extensive study. Current studies establishing causality from health to stress and/or depression are disease-specific, frequently examine serious or chronic illnesses, and often use older adults as a study population. Significantly, these studies also are limited by their focus on illness-related stress as opposed to general experienced stress.

The overarching limitation in the literatures as noted previously is a general failure to make connections for a more comprehensive view of the established relationships. The connections among protective factors and stress and depression and among physical health and stress and depression have not been clearly drawn in the context of child maltreatment prevention. In addition, the connection from physical health to protective factors has not been clearly demonstrated by the existing literature. Despite the supporting evidence, caregiver physical health is not listed as a risk or protective factor related to child maltreatment in any of the current major

frameworks for preventing child maltreatment (Child Welfare Information Gateway, 2007; Horton, 2003).

The Present Study

The present study examined the relationships among caregiver physical health, stress, depression, and protective factors in the context of child maltreatment prevention. The influence of physical health on stress, depression, and protective factors was explored, as well as whether stress and depression would serve as mediators for the physical health-protective factors relationships. The present study assessed all variables of interest (physical health, stress, depression, and protective factors, as measured by the Protective Factors Survey) at two time points. The repeated measures allowed for predictive analyses linking physical health to stress, depression, and the protective factors. A primary goal of the study was to establish causal relationships among these variables; the methods and analyses were designed to allow for these inferences. The second goal of the study was to replicate existing relationships from the literature in the context of identified protective factors against child abuse and neglect.

The present study addressed several limitations in the current literature and will extend the existing literature on physical health, stress, depression, and protective factors. It explored causal relationships among physical health to stress and depression individually, relationships which have received less attention in the literature than the predictive relationships among stress or depression to physical health. Due to the health measure selected, health status was measured generally and

was not diagnosis or symptom-specific, which adds to the generalizability of the findings through applicability to the general population as opposed to specific patient groups. Also, the study population was young to middle-aged adults rather than older adults. The stress measure assessed general levels of experienced stress as opposed to illness-related stress, expanding on the current literature on the relationship between health and stress. Most importantly, it investigated the relationship between health and protective factors in the context of child maltreatment prevention, initiating exploration of caregiver health as a factor related to child maltreatment in current prevention frameworks.

Hypotheses

The present study examined the following hypotheses. Figure 1 provides a conceptual model of the variables of interest and hypotheses.

1) Better caregiver health will result in higher levels of protective factors as assessed by the Protective Factors Survey.

2a) Better caregiver health will result in lower levels of caregiver stress.

2b) Better caregiver health will result in lower levels of caregiver depression.

3a) Higher levels of caregiver stress will result in lower levels of protective factors.

3b) Higher levels of caregiver depression will result in lower levels of protective factors.

4a) Caregiver stress will partially mediate the relationship between caregiver health and protective factors.

4b) Caregiver depression will partially mediate the relationship between caregiver

health and protective factors.

Figure 1

Conceptual Model of Hypotheses

Method
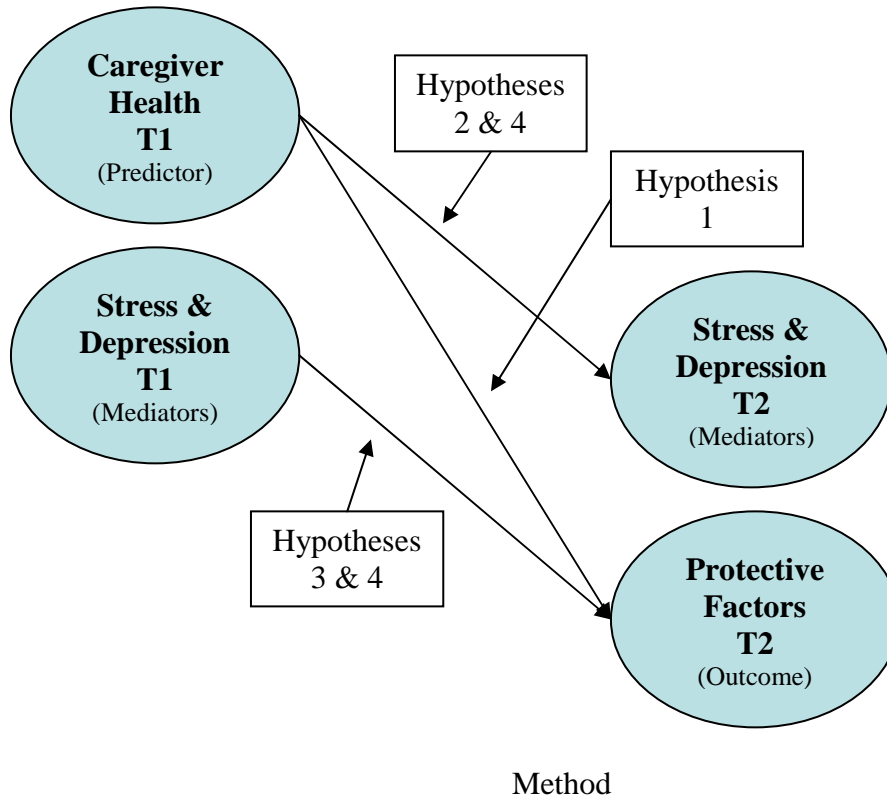
Participants

Participant Agencies. Agencies that provide child abuse and neglect

prevention services were recruited through the distribution of a recruitment flyer. The

recruitment flyer was distributed on numerous national electronic-mail based listservs

including Early Childhood Comprehensive Systems (ECCS), Community-Based

Child Abuse Prevention (CBCAP), Child Abuse Prevention Partners, Child Welfare

League of America Southern Region, Circle of Parents, National Alliance of

Children's Trust and Prevention Funds, and FRIENDS (Family Resource Information, Education and Network Development Services), the national resource center for CBCAP and at the national 2007 CBCAP grantees' conference. Interested agencies completed a web-based registration survey available at an Internet address provided on the recruitment flyer. Agencies may have been motivated to participate based on an interest in having outcome data to demonstrate need for services and effectiveness to executive committees and funding sources.

Seventy-one agencies completed the registration survey. Agencies eligible for participation included any agency that provided child abuse and neglect prevention services (e.g., parenting education, home visitation, parenting support groups, child care resource and referral) and interacted with clients more than one time. Twenty-four agencies were removed, either at their request or because they did not meet the eligibility criteria. At the beginning of survey administration, 57 agencies remained as active participants. One agency requested to be removed after the beginning of administration, leaving 56 participating agencies from 23 states. After Time 1 data collection, surveys were received from 19 of the 56 agencies (33.9%). Time 2 surveys were received from 15 of these 19 agencies (78.9%). Nine states had agencies that completed both time points: Georgia, Illinois, Kansas, Kentucky, Maine, New York, South Carolina, Virginia, and Washington.

Participant Individuals. Participants were recruited by agencies that registered for participation. Eligible participants included any individual receiving parenting-related services from a participating agency who would be available for survey

administration at two time points approximately one month apart. At Time 1, surveys were received for 691 individuals from the 19 agencies. At Time 2, surveys were received for 291 (42.1%) of these same individuals at 15 agencies.

Table 2 reports the demographic characteristics for the participants at Time 1 who completed survey administration at both Time 1 and 2.

Table 2

Participant Demographic Characteristics

Demographic Characteristic	Descriptive Statistic
Age:	
	$M = 30.49$
	$SD = 8.63$
Missing	$n = 32$ (11.0%)
Sex:	
Female	$n = 253$ (86.9%)
Male	$n = 25$ (8.6%)
Missing	$n = 13$ (4.5%)
Race/Ethnicity:	
White	$n = 181$ (62.2%)
African American	$n = 46$ (15.8%)
Black	$n = 26$ (8.9%)
Hispanic or Latino	$n = 24$ (8.2%)
Multi-racial	$n = 7$ (2.4%)
Native American	$n = 4$ (1.4%)
Asian	$n = 1$ (0.3%)
Missing	$n = 2$ (0.7%)
Marital Status:	
Married	$n = 115$ (39.5%)
Single	$n = 101$ (34.7%)
Partnered	$n = 28$ (9.6%)
Divorced	$n = 21$ (7.2%)
Separated	$n = 20$ (6.9%)
Widowed	$n = 2$ (0.7%)
Missing	$n = 4$ (1.4%)

Family Housing:

Rent	$n = 153$	(52.6%)
Own	$n = 93$	(32.0%)
Shared housing with relatives/friends	$n = 36$	(12.4%)
Temporary	$n = 6$	(2.1%)
Missing	$n = 3$	(1.0%)

Family Income:

$0-10,000	$n = 93$	(32.0%)
$10,001-20,000	$n = 57$	(19.6%)
$20,001-30,000	$n = 43$	(14.8%)
$30,001-40,000	$n = 27$	(9.3%)
$40,001-50,000	$n = 25$	(8.6%)
More than $50,001	$n = 39$	(13.4%)
Missing	$n = 7$	(2.4%)

Highest Level of Education:

Elementary or junior high school	$n = 12$	(4.1%)
Some high school	$n = 50$	(17.2%)
High school diploma or GED	$n = 86$	(29.6%)
Trade/Vocational Training	$n = 20$	(6.9%)
Some college	$n = 64$	(22.0%)
2-year college degree (Associate's)	$n = 22$	(7.6%)
4-year college degree (Bachelor's)	$n = 22$	(7.6%)
Master's degree	$n = 9$	(3.1%)
PhD or other advanced professional degree (law, medicine, etc.)	$n = 3$	(1.0%)
Missing	$n = 3$	(1.0%)

Administration Format:

Face-to-face	$n = 65$	(22.3%)
Participant with staff present	$n = 162$	(55.7%)
Participant only	$n = 49$	(16.8%)
Missing	$n = 15$	(5.2%)

Administration Language:

English	$n = 284$	(97.6%)
Spanish	$n = 1$	(0.3%)
Missing	$n = 6$	(2.1%)

Participant Involvement in Child Protective Services:

No	$n = 183$	(62.9%)
Yes	$n = 71$	(24.4%)
Not sure	$n = 24$	(8.2%)
Missing	$n = 13$	(4.5%)

Length of Program Involvement (in days):

$M = 256.93$
$SD = 396.71$
$Mdn = 47.00$

Participant Attendance:		
75-100%	$n = 211$	(72.5%)
50-74%	$n = 31$	(10.7%)
25-49%	$n = 14$	(4.8%)
Less than 25%	$n = 11$	(3.8%)
Missing	$n = 24$	(8.2%)

The majority of participants (73.4%) were involved with a program less than

one year. The most common services received included parent education (67.4%),

parent-child interaction (47.1%), home visitation (34.4%), and resource and referral

(29.6%). At Time 2, administration format was significantly different from Time 1, χ^2

(4, N=264) = 278.16, p<.001, such that more participants completed the survey packet

alone and fewer completed it with staff present. Additionally, at Time 2, significantly

fewer participants were reported to have involvement with child protective services

(CPS) compared to Time 1, χ^2 (4, N=266) = 253.49, p<.001.

Participants were asked to report the age of the child they felt would benefit

most from their participation in the program (PFS, Item 18). The average age of the

identified child at Time 1 ($n = 272$) was 4.3 years ($SD = 3.6$). Participants were also

asked to report all children living in their household and their relationship to each of

those children. The 291 participants reported 547 children (e.g., relationships) and

identified themselves as "birth parent" in 92.5% ($n = 506$) of these relationships; the

remaining reported relationships were diverse including grandparent, adoptive parent,

foster parent, or sibling.

Procedure

Participant Agency Technical Assistance. Following the registration period

and prior to the beginning of survey administration, technical assistance related to

data collection was provided to participant agencies. Technical assistance was provided through two voluntary conference calls provided by staff from the Institute for Educational Research and Public Service at the University of Kansas (Institute). During the conference calls, the PFS Administration Training PowerPoint presentation and frequently-asked-questions were reviewed. A minimum of 23 agencies participated in the technical assistance; agencies were not required to identify themselves during the call so it is not known precisely how many agencies participated in the calls.

In addition, all registered agencies were mailed both electronic and hard copies of the frequently-asked-questions, Administration Training PowerPoint presentation, Phase III Manual, and complete PFS survey packet (Survey packet provided in Appendix A). A staff member at the Institute was available for technical assistance questions throughout the data collection process. (See the FRIENDS National Resource Center website at http://www.friendsnrc.org/outcome/pfs.htm for technical assistance documents.)

Survey Administration. Program staff (e.g., case worker, family support worker) from the participating agencies administered the PFS survey packet to participating individuals. Surveys were completed through a face-to-face interview by program staff or by participating individuals with program staff either present or not present. Participant agencies were instructed to use their agency-approved informed consent process for survey administration and were provided with an example of an informed consent document in the Phase III Manual to use if needed.

Participants completed the PFS survey packet in two timeframes with a time lag of approximately one month between administrations. Time 1 survey administration took place between August 17 and September 21, 2007. Time 2 survey administration took place between September 22 and October 23, 2007. The same participating individuals completed the survey packet during each administration timeframe.

Following each administration timeframe, completed surveys were returned to the University of Kansas for data entry. Prior to the second administration timeframe, participant agencies were sent a list of de-identified individuals who completed the survey during the first administration who should have received the survey packet at Time 2, as well as optimum dates for Time 2 administration.

Time Lag. As noted above, agencies were instructed to administer the Time 1 and Time 2 survey packets one month apart; date of administration was self-reported by the participating agencies. Time lag between administrations was analyzed for 279 participants. Table 3 reports the frequency and percentage of days between Time 1 and Time 2 administration. The vast majority of participants had a time lag between 20 and 49 days, with 50.5% of participants completing the Time 2 survey between 25 and 35 days of time lag.

Table 3

Frequencies and Percents for Time Lag Between Time 1 and Time 2 Survey

Administration

Administration Time Lag	*n*	%
< 20 days	27	9.3
20-29 days	68	23.4
30-39 days	107	36.8
40-49 days	60	20.6
> 49 days	17	5.8
Missing	12	4.1

Measures

The Phase III survey packet contained four measures: the Protective Factors Survey (PFS), the PRIME-MD Patient Health Questionnaire-9 (PHQ-9), the Perceived Stress Scale (PSS), and an adapted version of the Rand 36-item Health Survey 1.0 (Appendix A).

Protective Factors Survey (PFS)*.* The PFS begins with a demographic section composed of two sections, one to be completed by agency program staff and one to be completed by the individual participants. The section for staff use gathers information related to survey administration and program dosage (e.g., the types and amount of services the participant is receiving). The section for participant use gathers data on common demographic variables (e.g., age, sex, race/ethnicity, marital status, family income, level of education).

Following the demographic section, the PFS consists of items assessing multiple protective factors against child abuse and neglect. The PFS has completed

two phases of development intended to establish and improve reliability and validity. The present study was conducted during the third phase of development.

Phase I. The Phase I PFS was generated and reviewed by a national workgroup of CBCAP administrators, FRIENDS staff, parents, and researchers specializing in family support, maltreatment, and psychological measurement. The initial pool of 49 items was generated by the workgroup from a review of existing reliable and validated measures of individual protective factors; items were selected to reflect six protective factors: 1) parenting skills, 2) nurturing/attachment and building relationships, 3) parental resilience, 4) social support, 5) problem solving/communication, and 6) knowledge of child development. The Phase I PFS was field tested with 349 participants in Kansas and Texas. The participant sample was mostly female (90%) with a large percentage of Hispanic or Latino (52%), White (29%), and African American (12%) participants. Participant ages were distributed as follows: under 18 years of age (10%), 18-25 (41%), 26-35 (36%), 35-45 (9%), over 45 (4%). Exploratory factor analyses (EFA) from Phase I resulted in six adjusted factors. Knowledge of child development (Knowledge of Parenting/Child Development) was excluded from the factor analyses because the items were not expected to correlate with each other and reflect a latent construct (Counts & Preacher, 2006).

Phase II. At the start of Phase II, a second literature review was completed to focus the operational definitions of the protective factors and assist with revision of current items and addition of new items. Sixty-six items were written and selected for

the Phase II PFS to reflect the six protective factors identified in Phase I: 1) Family

Functioning/Resiliency, 2) Social Support, 3) Concrete Support, 4) Knowledge of

Parenting/Child Development, 5) Nurturing and Attachment, and 6) Problem Solving/

Communication; approximately 19 items from Phase I were adapted for use in Phase

II. In addition, validity measures that measured risk factors for child abuse and

neglect were included in Phase II. The validation measures for Phase II were the

Perceived Stress Scale (PSS: Cohen & Williamson, 1988) (see description in the

Phase III section); Primary Care Evaluation of Mental Disorders (PRIME-MD)

Patient Health Questionnaire-9 (PHQ-9; Spitzer, Kroenke, & Williams, 1999) (see

description in the Phase III section); Brief COPE (Carver, 1997); and the Brief Child

Abuse Potential Inventory (BCAP; Ondersma, Chaffin, Simpson, & LeBreton, 2005).

The Brief COPE is a measure of adaptive and maladaptive coping strategies. For this

study, the following subscales were used: 1) denial, 2) substance abuse, 3) positive

reframing, 4) use of emotional social support, and 5) use of instrumental social

support. Individual subscales of the Brief COPE were selected, as opposed to using

the entire measure, to limit the total number of items; these particular subscales were

selected because of evidence that they relate to risk factors for child abuse and neglect

(e.g., substance abuse) or because they were hypothesized to relate to the PFS. The

BCAP is a screening tool for the detection of physical child abuse. Each participant

completed the PFS, BCAP, and one additional validity measure (Brief COPE, PSS, or

PHQ-9); the measures were counterbalanced to combat order effects (Counts et al.,

2009).

In Phase II, the PFS was administered to 249 individuals receiving home visitation services from 11 agencies in four states. The participant sample was mostly female (87.1%) with a racial/ethnic composition of White/Non-Hispanic (61.8%), Native American/American Indian/Alaskan Native (12%), African American (9.2%), Hispanic or Latino (5.6%), Black/African Nationals/Caribbean Islanders (5.6%), multi-racial (2.8%), and Asian and Native American/Pacific Islander less than one percent. The average age of participants was 28 years. The majority of participants were birth parents to their children (96%) and reported annual incomes equal to or less than $30,000 (80%) (Counts et al., 2009).

Analyses for Phase II utilized exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and construct validation. Results from the EFA indicated that items from the Family Functioning/Resiliency and Problem Solving/Communication scales consistently loaded strongly on the same factor and thus a four factor solution was selected, collapsing the scales into Family Functioning/Communication. Reliability was assessed with internal consistency estimates for the subscales. Three subscales demonstrated adequate internal consistency: Family Functioning/ Communication (Cronbach's α = .94); Social Emotional Support (Cronbach's α = .86); Nurturing and Attachment (Cronbach's α = .83). The internal consistency estimate for the Concrete Support factor fell below the 0.70 general standard of acceptability (Cronbach's α = .63). As in Phase I, Knowledge of Parenting/Child Development was excluded from factor analyses due to the disparate nature of the items. Validation was assessed through relationship to the measures of risk for child

abuse and neglect. Table 4 reports the zero-order correlations among the four PFS

subscales and the validation measures (Counts et al., 2009).

Table 4

Correlations among Phase II PFS Subscales and Validation Scales

Validation Scale	Family Functioning/ Communication	Social Emotional Support	Concrete Support	Nurturing and Attachment
BCAP ($n = 204$)	-.54**	-.43**	-.35**	-.34**
PSS ($n = 60$)	-.38**	-.28*	-.54**	-.30*
PHQ-9 ($n = 67$)	-.35*	-.54**	-.09	-.27*
COPE – Denial ($n = 87$)	-.26**	-.07	-.17	.16
COPE - Substance Use ($n = 87$)	-.17	-.21	-.10	-.16
COPE - Emotional Social Support ($n = 87$)	.38**	.58**	.24*	.21
COPE - Instrumental Social Support ($n = 87$)	.26**	.52**	.25*	-.03
COPE – Positive Reframing ($n = 87$)	.39**	.36**	.32*	.24*

*p<.05, **p<.01

The EFA and CFA resulted in removal of 37 items from the PFS based on low

loadings or cross-loadings. Based on the strength of the relationship between the

BCAP and the PFS subscales and individual items, it was determined that this

relationship did not need to be replicated and the BCAP was removed from further

study. The subscales of the Brief COPE showed an inconsistent pattern of

relationships to the PFS subscales and items and thus were removed from further

study. The PSS and PHQ were selected for investigation in Phase III to further

examine the relationship between these validation measures and the improved PFS
(Counts et al., 2009).

Phase III. The PFS Phase III instrument consists of 28 Likert-type items and
one item that assesses child age, for a total of 29 items (Appendix A, Section 1). The
PFS items are at a sixth to eighth grade reading level. Based on the factor structure
from Phase II, there are four subscales which account for 22 of the items: 1) Family
Functioning/Communication, 2) Social Emotional Support, 3) Concrete Support, and
4) Nurturing and Attachment. Six individual items, which do not form a coherent
scale, are referred to collectively as the Knowledge of Parenting/Child Development
items. Table 5 presents the subscale and item information for the PFS Phase III
instrument.

Table 5

Phase III PFS Subscales and Items

PFS Subscale	Number of Items and Item Numbers
Family Functioning/Communication	8 (Items 1, 3, 4, 5, 7, 8, 11, 12)
Social Emotional Support	5 (Items 2, 6, 9, 13, 16)
Concrete Support	4 (Items 10, 14, 15, 17)
Nurturing and Attachment	5 (Items 24, 25, 26, 27, 29)
Knowledge of Parenting/Child Development	6 (Items 19, 20, 21, 22, 23, 28)

Physical Health and Functioning. The measure of caregiver physical health
and functioning used in the present study consisted primarily of items from the *RAND
36-Item Health Survey 1.0* (Hays, Sherbourne, & Mazel, 1993). The *Rand 36-Item
Health Survey 1.0* uses the same items as the *Medical Outcomes Study Short Form –
36 Items* (MOS SF-36; Ware & Sherbourne, 1992) (Appendix A, Section 2). The

MOS SF-36 is trademarked and requires strict adherence to item wording and scoring. The *Rand 36-Item Health Survey 1.0* is freely distributed, including scoring instructions. The MOS SF-36 measures health status and was designed for use in clinical practice and research, health policy evaluations, and general population surveys; it is appropriate for individuals 14 years old or older and can be self-administered or administered by an interviewer. The MOS SF-36 measures eight health concepts: 1) physical functioning, 2) bodily pain, 3) role limitations due to physical health problems, 4) role limitations due to personal or emotional problems, 5) general mental health, 6) social functioning, 7) energy/fatigue, and 8) and general health perceptions. It also includes a single item that provides an indication of perceived change in health. For the complete measure, these concepts form two composite scales: physical health and mental health (Hays et al., 1993). The MOS SF-36 has demonstrated clinical validity through its ability to differentiate between patient groups varying in severity of medical and psychiatric conditions (McHorney, Ware, & Raczek, 1993). For the majority of items, the *Rand 36-Item Health Survey 1.0* asks participants to rate their experience of physical and emotional health and functioning for the previous four weeks on a variety of Likert-type scales. The present study used 19 items from the *RAND 36-Item Health Survey 1.0*. Each of the subscales utilized in the present study (Role Limitations due to Physical Health, Energy/ Fatigue, Social Functioning, Pain, General Health, Physical Functioning) has demonstrated adequate internal reliability (Cronbach's α = .78 - .93) in prior studies

(McHorney et al., 1993). Information about the subscales used is presented in Table

6.

Table 6

Subscale and Item Information from the Rand 36-Item Health Survey 1.0

Subscale	Item Example	Number of Items and Item Numbers
Role Limitations due to Physical Health	"Accomplished less than you would like."	4 (Items 4, 5, 6, 7)
Energy/Fatigue	"Did you feel worn out?"	4 (Items 12, 13, 14, 15)
Social Functioning	"To what extent have your physical or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?"	2 (Items 8, 16)
Pain	"How much bodily pain have you had?"	2 (Items 10, 11)
General Health	"I am as healthy as anybody I know."	5 (Items 1, 17, 18, 19, 20)
Physical Functioning*	"Does your physical health now limit you in climbing several flights of stairs?"	10 (Items 2, 3)

* Physical Functioning was shortened to two items in this study.

As noted above, the Physical Functioning subscale on the SF-36 consists of 10

items. Due to limitations in the number of questions that could be included in the

overall survey packet, it was not possible to use all 10 items. The MOS SF-36 has

been shortened in a number of versions (e.g., SF-20, SF-12, SF-8). The two items

used as a proxy for the full Physical Functioning subscale in the SF-12 were selected

for use in this study. These two items have been shown to be the equivalent of the full

subscale in terms of means, standard errors, and ability to differentiate patient groups

(Ware, Kosinski, & Keller, 1996).

In addition, a single item, "To what extent does your physical health now interfere with your ability to care for your children?," was added to address the role of parenting (Item 9). This item was adapted from a similar item used with two additional questions to assess caregiver health in LONGSCAN, a collaborative research project previously described (LONGSCAN, n.d.).

Primary Care Evaluation of Mental Disorders (*PRIME-MD) Patient Health Questionnaire-9* (PHQ-9; Spitzer et al., 1999). The PHQ-9 is a nine-item measure of depression based on diagnostic criteria for major depressive disorder in the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision* (DSM-IV-TR; American Psychiatric Association, 2000). The PHQ-9 uses a four-point scale ranging from "Not at all" (1) to "Nearly every day" (4) to measure the experience of depressive symptoms over the previous two weeks (Appendix A, Section 3). Items include "Little interest or pleasure in doing things," "Poor appetite or overeating," and "Thoughts that you would have been better off dead or hurting yourself in some way." The PHQ-9 has demonstrated internal reliability (Cronbach's $\alpha = .89$ in a primary care population) and validity through association with the MOS SF-20 (see above), self-reported sick days and clinic visits, and structured interviews by a mental health professional (Kroenke, Spitzer, & Williams, 2001).

Perceived Stress Scale (PSS; Cohen & Williamson, 1988). This study used the 10-item version of the PSS to measure the experienced level of stress (Appendix A, Section 4). Cohen and Williamson (1988) recommend use of the 10-item PSS over the four- and 14-item alternate versions (Cohen et al., 1983) based on superior

reliability and equivalent validity of the 10-item PSS compared to the 14-item version in a large national sample. The PSS was designed for use with community samples with at least a junior high level of education. The PSS uses a five-point Likert-type scale ranging from "Never" (0) to "Very Often" (4) to measure the experience of stress-related thoughts and feelings over the previous month. Items include "Been upset because of something that happened unexpectedly?," "Found that you could not cope with all the things you had to do?," and "Been angered because of things that happened that were outside of your control?" The 10-item PSS has demonstrated adequate internal reliability (Cronbach's $\alpha = .78$) and construct validity through association with numerous measures of appraised stress, life events, self-reported physical illness, and health behaviors (Cohen & Williamson, 1988).

Analytic Strategy

To examine the study hypotheses, models of the relationships among the variables of interest (see Figure 2) were tested using structural equation modeling (SEM). Bootstrapping was performed in conjunction with SEM in order to test for mediation. Imputation of missing data was completed prior to analyses to facilitate use of SEM.

Data Preparation. Prior to imputation and analyses, some items were reverse scored or recoded. On the measure of stress (PSS), items 4, 5, 7 and 8 were reverse scored. On the PFS, items 14, 15, 17, 19, 21, and 23 were reverse scored. Per measure scoring instructions, all health items were coded on a 0 to 100 scale, such that higher

scores indicate better reported health. The recoded health items were then each divided by 100 to facilitate estimation in SEM.

Missing Data Procedure. Imputing missing data maximizes the use of partial data without introducing bias (Graham, Cumsille, & Elek-Fisk, 2003). Imputation estimates how a single participant would respond to a specific question in order to retain important characteristics of the data set as a whole. AMELIA II (Honaker, King, & Blackwell, 2006) uses a bootstrapping-based EM algorithm to create multiple imputed datasets which are individually analyzed; results from each imputed dataset are then combined (Horton & Kleinman, 2007) using Rubin's Rules (Rubin, 1987). The advantage of using a bootstrapping-based EM algorithm over other methods of handling missing data is that it is unlikely to introduce bias into the parameter estimates (Graham et al., 2003). AMELIA II also includes features for imputing time-series data, which is appropriate for the present study. A large sample size is required in order to generate accurate parameter estimates in SEM. Due to this, other common approaches to handling missing data in statistical analyses such as listwise deletion, pairwise deletion, or mean substitution are not appropriate because they would require excluding a portion of the data from the analyses and introduce bias into the data for various reasons (Graham et al., 2003; Horton & Kleinman, 2007; Schafer & Graham, 2002).

In the present study, the percentage of missing data for variables used in analyses was 1.2%; no individual item exceeded 2.4% missing data, except two items not intended to be completed by all participants, which had up to 7.6% missing data.

Missing data were imputed five times prior to analyses using AMELIA II, resulting in five datasets. As described above, analyses were completed on each of these five datasets and results were combined. The resulting estimates of the parameters and confidence intervals for these estimates were used to test significance. Confidence intervals are used to test if a parameter is zero; if zero is not within the 95% confidence interval (equivalent to a null hypothesis test at $\alpha = .05$), the parameter is significantly different from zero.

Structural Equation Modeling (SEM). Structural equation modeling (SEM) is a data analysis procedure that allows for the creation of latent variables from multiple measured variables and estimates the relationships among them. SEM uses confirmatory rather than exploratory modeling to answer theory-driven questions. The primary advantages of SEM are its ability to correct for measurement error and to simultaneously test causal relationships among multiple variables (e.g., hypothesis testing involving multiple mediators) (Klem, 2000).

SEM permits the simultaneous analysis of several regression equations to generate an estimated covariance matrix, or a prediction of the relationships among variables. This estimated covariance matrix is then compared to the covariance matrix of the observed data, or actual relationships present in the data. The closeness of fit of the estimated model to the observed data is evaluated through several goodness-of-fit statistics. For this study, the following goodness of fit indices were examined: (a) chi-square statistic (χ^2), (b) root mean square error of approximation (RMSEA; Steiger, 1990), (c) non-normed fit index or Tucker Lewis Index (NNFI/TLI; Tucker & Lewis,

1973), and (d) standardized root mean square residual (SRMR; Jöreskog & Sörbom, 1996).

The initial goodness-of-fit statistic, the chi-square, is of limited usefulness because it reflects the sample size. For large sample sizes, the chi-square will nearly always be large and significant, signaling a poor model fit; the reverse is true for small sample sizes. Due to this, greater consideration was given to the other fit indices. The RMSEA is an index of absolute model fit. It indicates the amount of misfit per degree of freedom, with smaller values indicating better model fit. Values greater than .10 indicate a poor fit, values .08 to .10 indicate a mediocre fit, values .05 to .08 indicate an acceptable fit, values less than .05 indicate a close fit, and a value of .00 indicates an exact fit (Browne & Cudeck, 1993). The NNFI/TLI indicates the relative improvement in model fit over a "null" model, which assumes that all covariances or correlations in the model are zero. For the NNFI, values of .90 to .95 indicate acceptable model fit, values of .95 to .99 indicate close model fit, and a value of 1.00 or greater indicates exact fit. The SRMR reports the standardized difference between the predicted and observed correlations in the model. A value less than .08 indicates good fit and a value of zero indicates exact fit (Hu & Bentler, 1999; Kenny, 2003).

For the present study, SEM was the most appropriate technique for analysis because it allowed for the creation of latent variables based on the multiple scales and subscales of the measures used. In addition, it allowed for multiple mediators, in this case stress and depression, to be tested simultaneously (see below). Structural

equation models were created using LISREL 8.80 (Jöreskog & Sörbom, 2006). (See Appendix B for example of LISREL 8.80 syntax used for analyses.)

Mediation (Indirect Effects). A mediation hypothesis explores whether an observed relationship between a predictor variable (X) and an outcome variable (Y) is explained, partially or completely, by a third (mediating) variable (M). Mediation models are causal and assume that X causes M which causes Y, if complete mediation is occurring; mediation can also be partial, in which case there is a direct effect from X to Y in addition to an indirect effect (Baron & Kenny, 1986).

Maxwell and Cole (2007) recommend the use of at least three time points for mediation analyses in order to avoid bias when estimating indirect effects. When using three time points, X at time point one (t_1) predicts M at time point two (t_2) which predicts Y at time point three (t_3). If data from one or two time points are used instead, Cole and Maxwell (2003) caution that it can be difficult to draw causal inferences between variables that are measured simultaneously. The authors suggest an alternative technique, referred to as the half-longitudinal design, for testing mediation when data are available from only two time points. In this technique, X at t_1 predicts M at t_2 (a) controlling for M at t_1, and M at t_1 predicts Y at t_2 (b) controlling for both X and Y at t_1 (Figure 2). Cole and Maxwell (2003) propose that if the variables are presumed to be stable and the relationships are presumed to be stationary over time then the path from M_1 to Y_2 should be equal to the path from M_2 to Y_3, thereby approximating a three time point model. Controlling for prior levels of M and Y in the model, as described above, helps address the assumption of stability.

This model also allows for a test of direct effects from X_1 to Y_2 (c'). In the present study, stability and stationarity for M (Stress and Depression) and Y (Protective Factors) were assumed based on literature review (see Introduction) and previously established relationships in Phase II of the PFS development (see Table 4).

Figure 2

Two Time Point Mediation Model as suggested by Cole and Maxwell (2003)
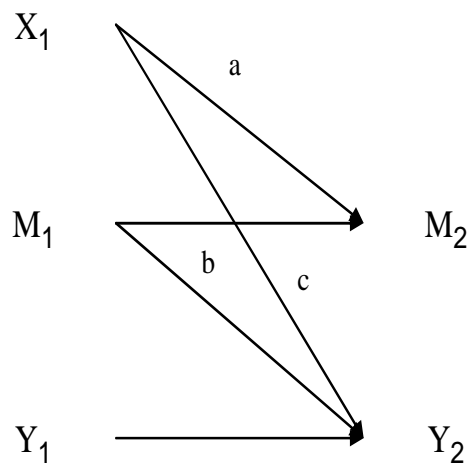
An additional issue in mediation analyses is the hypothesized presence of multiple mediators. Preacher and Hayes (2008, in press) suggest that when multiple mediators are hypothesized they should be tested simultaneously rather than individually. Multiple mediators are likely to be inter-correlated and testing them individually will inflate their relationships with both the predictor and outcome variables.

The indirect effect of X on Y through M is the product of the a (X → M) and b (M → Y) pathways. A significant indirect effect is present if this product is not zero. As the distribution of the product of two coefficients (in this case, the a and b

pathways) is always skewed, normal theory hypothesis testing, which assumes that variables are normally distributed, is not appropriate. To test indirect effects without assuming a normal distribution, Shrout and Bolger (2002) recommend the use of bootstrapping.

Bootstrapping treats the study sample as a population, of size N, from which multiple samples each of size N are taken using sampling with replacement (e.g., any given case could be present in the same sample multiple times). Analyses are run on each bootstrap sample and results are used to create an approximation of the sampling distribution for each parameter. Confidence intervals are generated from each distribution by identifying a cutoff at the top and bottom 2.5% (for a 95% confidence interval) with correction in the specific percentage for bias (Efron & Tibshirani, 1986); confidence intervals can be used to test hypotheses. In the case of mediation, bootstrapping is used to create a distribution of the indirect effect (e.g., product of a and b pathways). As described above, confidence intervals are used to test if the indirect effect is zero; if zero is not within the 95% confidence interval (equivalent to a test of $\alpha = .05$), the indirect effect is significant.

To test for indirect effects, the present study used PRELIS, within LISREL 8.80 (Jöreskog & Sörbom, 2006), to create 5000 bootstrap samples for each model (see below), 1000 from each imputed dataset as described above. SEM was used for analyses on each of the 5000 bootstrap samples and results were used to create a distribution for each parameter.

Models to Test Study Hypotheses. For the present study, the following models were examined:

1. *Measurement model.* A measurement model (confirmatory factor analysis) permits the researcher to test the proposed factor structure, which posits that items load onto their hypothesized latent variables and not on other latent variables.

2. *Full model of direct and mediation effects* (Figure 3). This model permitted the researcher to test the simultaneous direct effects of each caregiver health latent variable on each protective factors latent variable. In addition, it allows the researcher to test if stress and depression individually mediate these relationships. The model design was based on the recommendations of Cole and Maxwell (2003) and Preacher and Hayes (in press) described above. (See Appendix B for LISREL 8.80 syntax for the model.)

3. *Single predictor model of direct and mediation effects* (Figure 4). These seven models permitted the researcher to test the direct effects of one caregiver health latent variable on each protective factors latent variable. In addition, the models allowed the researcher to test if stress and depression individually mediate these relationships. In the full model (Model 2), shared variance among the caregiver health latent variables may limit the model's ability to detect the individual impact of each

variable; therefore, these individual predictor models allow for observing the impact of each caregiver health latent variable on protective factors.

Figure 3

Full Model of Direct and Mediation Effects
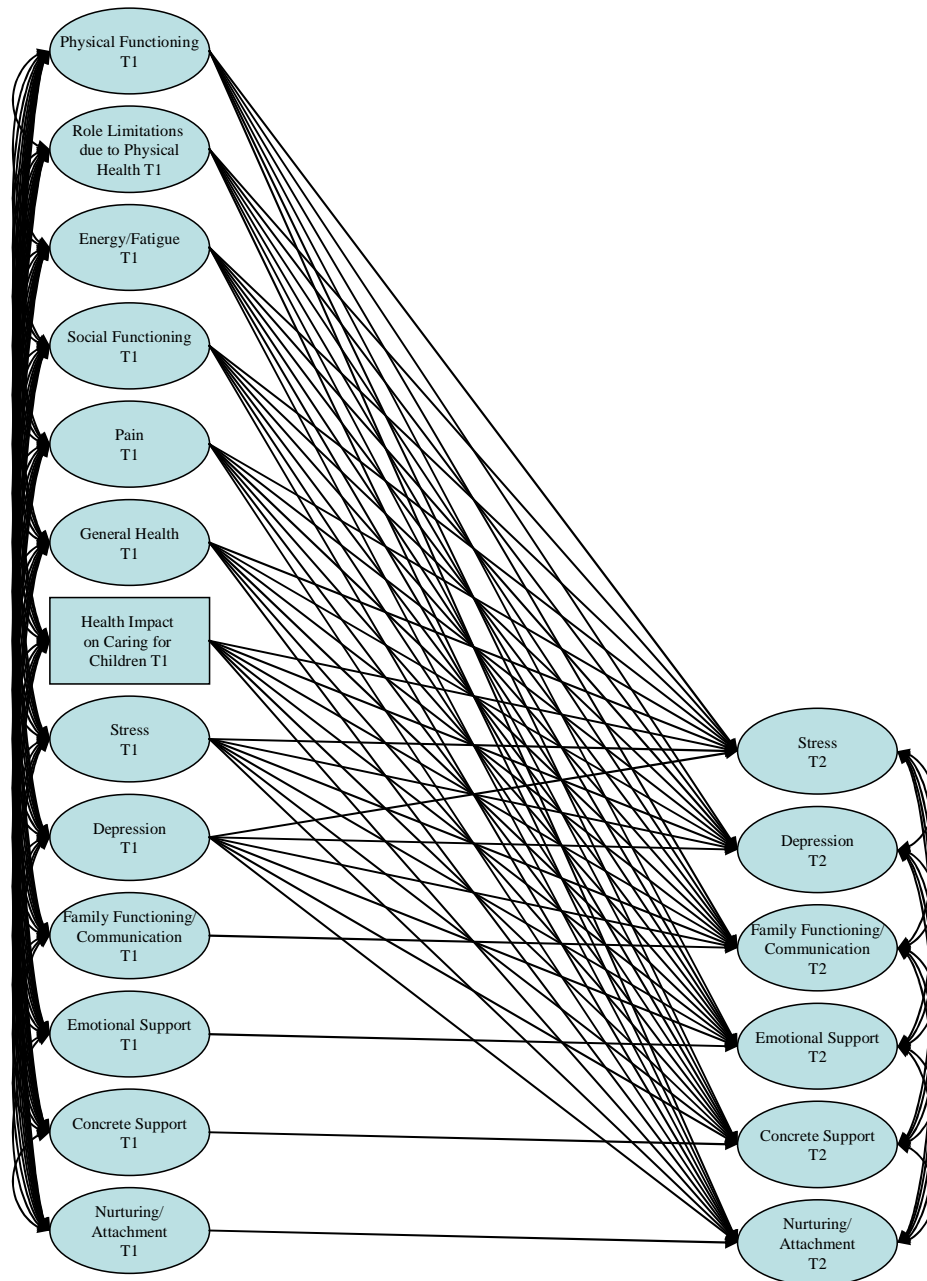
Figure 4

Example of Single Predictor Model of Direct and Mediation Effects
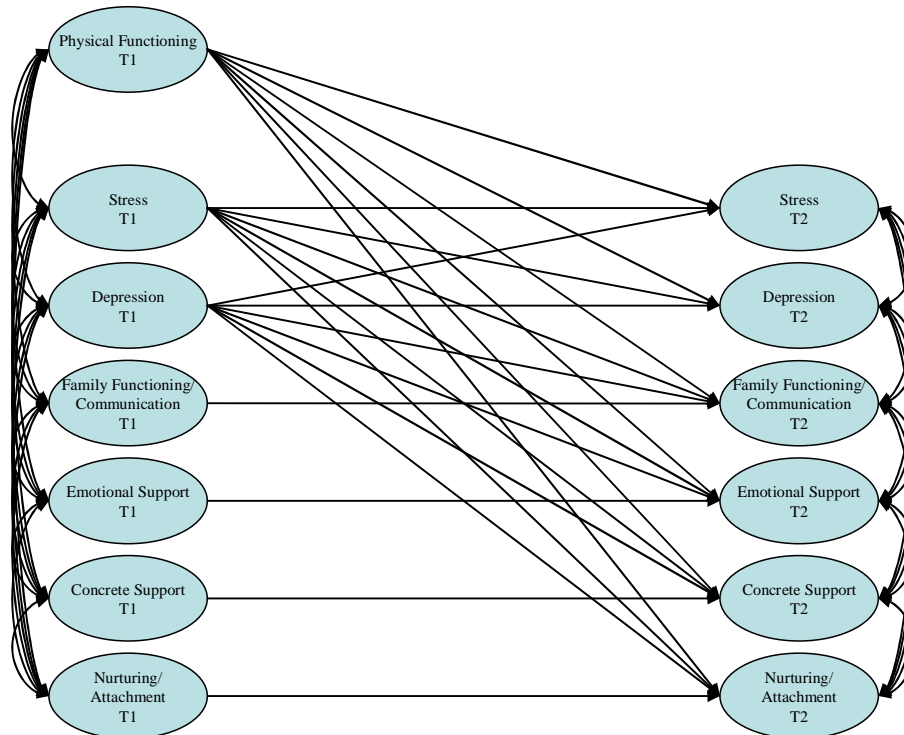
Exclusion of Knowledge of Parenting/Child Development Items. The six

items identified collectively as Knowledge of Parenting/Child Development were

excluded from all analyses due to concerns about the validity and utility of the items.

There is little evidence that these six items measure the intended concepts, as used in

the original CSSP model of protective factors. The lack of operational definitions in

the original model and the nature of the items make it difficult to clearly identify what

is measured. To the extent to which these items may measure some aspects of

parenting knowledge, they do not provide comprehensive evaluation of all

dimensions of parenting knowledge or behavior as proposed by other models (e.g.,

Strauss & Fauchier, 2007). In addition, in analyses of previous versions of the PFS

these items were analyzed individually as they do not represent a large construct.

Prior analyses have indicated that caregiver responses on these items vary by age of

the identified child, however, it is not known how parenting knowledge should relate

to the age of the child (e.g., when should caregivers have particular knowledge?)

making interpretation difficult. This issue is complicated by the items themselves

which ask about one child although many caregivers may be responsible for multiple

children, raising questions about how responses might vary for different children in

the same family.

Results

Study Sample

The study sample included only those participants who completed the survey

packet at both Time 1 and Time 2. As described above, 691 participants completed

the survey packet at Time 1 and 291 (42.1%) of these participants completed the

survey packet at Time 2. Comparison tests were conducted to determine how the

study sample (N = 291) differed significantly from the participants who completed

only Time 1 (N = 400) (Tables 7 and 8).

Table 7

Comparison of Time 1 (T1) Only Participants to Time 1 and 2 (T1 and 2)

Participants (Study Sample) on Demographics Variables at Time 1

Variable	T1 Only ($N = 400$)		T1 and 2 ($N = 291$)		Comparison Test
Age:	$M = 30.82$		$M = 30.49$		$t(526) = 0.47$, $p=.636$
Gender:					$\chi^2 (1, N=611) = 1.19, p=.274$
Female	$n = 294$	(73.9%)	$n = 253$	(86.9%)	
Male	$n = 39$	(9.8%)	$n = 25$	(8.6%)	
Race/Ethnicity:					$\chi^2 (8, N=680) = 14.33, p=.074$
White	$n = 273$	(68.6%)	$n = 181$	(62.2%)	
African American	$n = 52$	(13.1%)	$n = 46$	(15.8%)	
Black	$n = 33$	(8.3%)	$n = 26$	(8.9%)	
Hispanic or Latino	$n = 13$	(3.3%)	$n = 24$	(8.2%)	
Multi-racial	$n = 9$	(2.3%)	$n = 7$	(2.4%)	
Native American	$n = 3$	(0.8%)	$n = 4$	(1.4%)	
Asian	$n = 4$	(1.0%)	$n = 1$	(0.3%)	
Native Hawaiian/ Pacific Islanders	$n = 1$	(0.3%)	$n = 0$	(0.0%)	
Other	$n = 3$	(0.8%)	$n = 0$	(0.0%)	
Marital Status:					$\chi^2 (5, N=681) = 37.68, p<.001$
Married	$n = 237$	(59.5%)	$n = 115$	(39.5%)	
Single	$n = 80$	(20.1%)	$n = 101$	(34.7%)	
Partnered	$n = 20$	(5.0%)	$n = 28$	(9.6%)	
Divorced	$n = 41$	(10.3%)	$n = 21$	(7.2%)	
Separated	$n = 14$	(3.5%)	$n = 20$	(6.9%)	
Widowed	$n = 2$	(0.5%)	$n = 2$	(0.7%)	

Family Housing:			χ^2 (3, N=683) = 25.67, p<.001
Rent	n = 152 (38.2%)	n = 153 (52.6%)	
Own	n = 204 (51.3%)	n = 93 (32.0%)	
Shared housing with relatives/friends	n = 32 (8.0%)	n = 36 (12.4%)	
Temporary	n = 7 (1.8%)	n = 6 (2.1%)	
Family Income[a]:	M = 3.62	M = 2.83	t(669) = 5.49, p<.001
Education[b]:	M = 4.73	M = 4.01	t(678) = 4.99, p<.001
Administration Format:			χ^2 (2, N=600) = 145.3, p<.001
Face-to-face	n = 22 (5.5%)	n = 65 (22.3%)	
Participant with staff present	n = 87 (21.9%)	n = 162 (55.7%)	
Participant only	n = 215 (54.0%)	n = 49 (16.8%)	
Administration Language:			χ^2 (2, N=616) = 0.87, p=.646
English	n = 329 (82.7%)	n = 284 (97.6%)	
Spanish	n = 2 (0.6%)	n = 1 (0.3%)	
CPS Involvement:			χ^2 (2, N=602) = 80.34, p<.001
No	n = 182 (45.7%)	n = 183 (62.9%)	
Yes	n = 25 (6.3%)	n = 71 (24.4%)	
Not sure	n = 117 (29.4%)	n = 24 (8.2%)	
Length of Time in Program (in days):	M = 98.30	M = 256.93	t(537) = 5.59, p<.001
Attendance[c]:	M = 3.80	M = 3.66	t(488) = 2.42, p=.016

Note. p < .05 used as cut off for significant differences. [a] 1 = $0-10,000, 2 = $10,001-20,000, 3 = $20,001-30,000, 4 = $30,001-40,000, 5 = $40,001-50,000, 6 = > $50,001. [b] 1 = Elementary or junior high school, 2 = Some high school, 3 = High school diploma or GED, 4 = Trade/Vocational Training, 5 = Some college, 6 = 2-year college degree (Associate's), 7 = 4-year college degree (Bachelor's), 8 = Master's degree, 9 = PhD or other advanced professional degree (law, medicine, etc.). [c] 1 = Less than 25%, 2 = 25-49%, 3 = 50-74%, 4 = 75-100%.

Table 8

Comparison of Time 1 (T1) Only Participants to Time 1 and 2 (T1 and 2)

Participants (Study Sample) on Study Measures at Time 1

Variable	T1 Only (N = 400)	T1 and 2 (N =291)	Comparison Test
PFS:			
Family Functioning/ Communication	M = 28.56	M = 26.83	$t(659) = 3.90, p<.001$
Emotional Support	M = 18.32	M = 17.89	$t(675) = 1.51, p=.131$
Concrete Support	M = 17.00	M = 16.10	$t(680) = 2.42, p=.016$
Nurturing/ Attachment	M = 26.23	M = 25.14	$t(665) = 4.82, p<.001$
PSS (Stress):	M = 12.27	M = 14.77	$t(656) = -4.37, p<.001$
PHQ-9 (Depression):	M = 12.51	M = 13.71	$t(652) = -3.29, p=.001$
Rand Health Survey:			
General Health	M = 74.56	M = 68.40	$t(685) = 3.74, p<.001$
Physical Functioning	M = 86.10	M = 82.99	$t(683) = 1.49, p=.136$
Role Limitations due to Physical Health	M = 85.90	M = 78.24	$t(682) = 3.18, p=.002$
Social Functioning	M = 85.09	M = 79.55	$t(684) = 3.11, p=.002$
Pain	M = 81.26	M = 78.66	$t(683) = 1.44, p=.150$
Energy/Fatigue	M = 60.70	M = 54.83	$t(680) = 3.60, p<.001$
Health Impact on Caring for Children	M = 94.59	M = 92.76	$t(676) = 1.33, p=.183$

Note. $p < .05$ used as cut off for significant differences.

These participant groups did not vary significantly in age, gender, or race/ethnicity. Participants in the study sample did vary significantly on marital status and family housing. In addition, they reported significantly lower levels of family income and educational attainment. Participants in the study sample were more likely to complete the survey with program staff and had a significantly greater length of program involvement; however, they had a significantly lower level of program attendance compared to participants who completed the survey packet at Time 1 only.

The groups also varied significantly in reported involvement with Child Protective Services (CPS).

At Time 1, the study sample reported significantly lower scores on three subscales of the PFS (Family Functioning/Communication, Concrete Support, and Nurturing and Attachment). They also reported significantly higher levels of stress and depression. Participants in the study sample varied significantly on four subscales of the measure of physical health such that they reported lower general health, more role limitations due to physical health, lower social functioning, and lower energy.

Examination of Normality

Items used for analyses were examined for normality. Maximum likelihood estimation, one estimation procedure used in SEM, provides more accurate parameter estimates and standard errors when data are normally distributed. Table 9 reports values for items with skewness or kurtosis greater than 3.00.

Table 9

Items with Skewness or Kurtosis Greater than 3.00

Item	Time 1		Time 2	
	Skewness	Kurtosis	Skewness	Kurtosis
Health Measure (20 items)				
Q9: To what extent does your physical health now interfere with your ability to care for your children?	--	9.01	--	--
PHQ-9 (9 items)				
Q8: Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual.	--	8.05	--	7.50
Q9: Thoughts that you would have been better off dead or hurting yourself in some way.	4.32	20.14	4.17	18.20
PFS (28 items)				
Q9: I have others who will listen when I need to talk about my problems.	--	--	--	4.05
Q12: My family is close to one another.	--	--	--	3.20
Q20: I know how to help my child learn.			--	3.34
Q24: I am happy being with my child.	--	6.57	--	5.16
Q25: My child and I are very close to each other.	--	4.80	--	--
Q29: My child comes to me when he/she is feeling upset.	--	3.27	--	3.82

Model Fit

Model fit was examined for the measurement model (confirmatory factor analysis), full model, and each of the seven single predictor models (Table 10). For all models, the chi-square was significant; however, as described above, the chi-

square statistic is generally significant when the sample size is large, limiting its usefulness. The RMSEA statistic indicated acceptable fit for all models. Similarly, the NNFI/TLI statistic indicated acceptable fit for all models. Finally, the SRMR statistic indicated good fit for all models.

Table 10

Model Fit Statistics

Model	$\chi2$	df	p	RMSEA	NNFI/ TLI	SRMR
Measurement	10650.4	4882	<.0001	0.063	0.94	0.07
Full	10678.0	4902	<.0001	0.063	0.94	0.07
Physical Functioning	7637.2	3345	<.0001	0.068	0.94	0.08
Role Limitations due to Physical Health	7892.5	3511	<.0001	0.066	0.94	0.08
Energy/Fatigue	8301.8	3511	<.0001	0.069	0.94	0.08
Social Functioning	7674.7	3345	<.0001	0.068	0.94	0.08
Pain	7654.5	3345	<.0001	0.068	0.94	0.08
General Health	8144.2	3596	<.0001	0.067	0.94	0.08
Health Impact on Caring for Children	7581.9	3263	<.0001	0.069	0.94	0.08

Full Model

In examination of the full model, there was no evidence that the caregiver health subscales were related to Stress, Depression, or the protective factors (Table 11). In addition, there was no evidence that Stress and Depression were related to the protective factors (Table 11). Accordingly, there was also no evidence of mediation in this model (Table 12).

Table 11

Full Model: Structural Parameters

Predictor	Outcome	Estimate	LL 95% CI	UL 95% CI
T1 Physical Functioning	T2 Stress	0.95	-1.54	3.45
	T2 Depression	0.26	-0.83	1.35
	T2 Family Functioning/ Communication	0.19	-1.24	1.62
	T2 Emotional Support	-0.16	-0.72	0.40
	T2 Concrete Support	0.23	-0.79	1.25
	T2 Nurturing/Attachment	-0.55	-1.93	0.83
T1 Role Limitations due to Physical Functioning	T2 Stress	-2.55	-10.34	5.24
	T2 Depression	-1.10	-4.37	2.35
	T2 Family Functioning/ Communication	-1.27	-5.58	3.04
	T2 Emotional Support	-0.43	-2.16	1.31
	T2 Concrete Support	-0.83	-4.03	2.36
	T2 Nurturing/Attachment	1.07	-3.28	5.41
T1 Energy/ Fatigue	T2 Stress	-0.88	-3.79	2.03
	T2 Depression	-0.32	-1.56	0.93
	T2 Family Functioning/ Communication	-0.13	-1.75	1.50
	T2 Emotional Support	0.00[a]	-0.65	0.65
	T2 Concrete Support	-0.38	-1.56	0.79
	T2 Nurturing/Attachment	0.63	-0.95	2.21
T1 Social Functioning	T2 Stress	7.49	-17.48	32.46
	T2 Depression	2.51	-8.24	13.26
	T2 Family Functioning/ Communication	3.36	-10.50	17.21
	T2 Emotional Support	0.42	-5.05	5.88
	T2 Concrete Support	2.27	-7.83	12.37
	T2 Nurturing/Attachment	-3.22	-17.10	10.67
T1 Pain	T2 Stress	-1.78	-8.76	5.21
	T2 Depression	-0.61	-3.57	2.35
	T2 Family Functioning/ Communication	-0.72	-4.55	3.12
	T2 Emotional Support	0.21	-1.35	1.59
	T2 Concrete Support	-0.69	-3.42	2.04
	T2 Nurturing/Attachment	0.80	-3.03	4.62

T1 General Health	T2 Stress	1.73	-5.45	8.91
	T2 Depression	0.49	-2.56	3.54
	T2 Family Functioning/ Communication	0.74	-3.19	4.68
	T2 Emotional Support	0.09	-1.45	1.62
	T2 Concrete Support	0.90	-1.88	3.67
	T2 Nurturing/Attachment	-0.82	-4.76	3.12
T1 Health Impact on Caring for Children	T2 Stress	-1.62	-6.78	3.54
	T2 Depression	-0.65	-2.88	1.58
	T2 Family Functioning/ Communication	-0.67	-3.57	2.23
	T2 Emotional Support	0.09	-1.06	1.25
	T2 Concrete Support	-0.55	-2.64	1.54
	T2 Nurturing/Attachment	0.71	-2.18	3.60
T1 Stress	T2 Family Functioning/ Communication	1.44	-2.97	5.85
	T2 Emotional Support	0.25	-1.51	2.01
	T2 Concrete Support	0.75	-2.53	4.04
	T2 Nurturing/Attachment	-0.98	-5.44	3.49
T1 Depression	T2 Family Functioning/ Communication	0.67	-4.62	5.96
	T2 Emotional Support	-0.22	-2.26	1.82
	T2 Concrete Support	0.56	-3.19	4.30
	T2 Nurturing/Attachment	-1.10	-6.32	4.12

[a] Estimate > 0.

Table 12

Full Model: Bootstrap Confidence Intervals Testing Indirect Effects

Predictor	Mediator	Outcome	LL 95% CI	UL 95% CI
Physical Functioning	Stress	Family Functioning/ Communication	-0.75	5.40
		Emotional Support	-0.48	6.81
		Concrete Support	-1.59	3.29
		Nurturing/Attachment	-10.12	3.79
Physical Functioning	Depression	Family Functioning/ Communication	-0.33	1.73
		Emotional Support	-0.35	0.51
		Concrete Support	-0.31	2.01
		Nurturing/Attachment	-10.72	0.49

Role Limitations due to Physical Health	Stress	Family Functioning/ Communication	-40.27	0.53
		Emotional Support	-29.41	1.29
		Concrete Support	-21.19	4.04
		Nurturing/Attachment	-1.67	131.84
Role Limitations due to Physical Health	Depression	Family Functioning/ Communication	-27.10	0.58
		Emotional Support	-1.36	0.96
		Concrete Support	-2.15	1.76
		Nurturing/Attachment	-0.36	170.89
Energy/Fatigue	Stress	Family Functioning/ Communication	-14.80	1.84
		Emotional Support	-7.80	1.02
		Concrete Support	-5.40	1.72
		Nurturing/Attachment	-3.78	7.39
Energy/Fatigue	Depression	Family Functioning/ Communication	-15.01	0.37
		Emotional Support	-0.57	0.48
		Concrete Support	-0.75	1.57
		Nurturing/Attachment	-0.15	198.12
Social Functioning	Stress	Family Functioning/ Communication	-8.76	106.94
		Emotional Support	-103.86	57.27
		Concrete Support	-7.66	78.37
		Nurturing/Attachment	-730.64	1.00
Social Functioning	Depression	Family Functioning/ Communication	-1.45	77.25
		Emotional Support	-4.20	6.08
		Concrete Support	-3.57	9.93
		Nurturing/Attachment	-1092.02	0.54
Pain	Stress	Family Functioning/ Communication	-15.31	7.58
		Emotional Support	-7.94	15.29
		Concrete Support	-15.79	3.56
		Nurturing/Attachment	-0.67	173.22
Pain	Depression	Family Functioning/ Communication	-16.57	0.46
		Emotional Support	-1.22	1.04
		Concrete Support	-2.01	1.56
		Nurturing/Attachment	-0.29	262.93

General Health	Stress	Family Functioning/ Communication	-5.45	23.31
		Emotional Support	-15.82	12.38
		Concrete Support	-3.60	15.20
		Nurturing/Attachment	-254.71	0.40
General Health	Depression	Family Functioning/ Communication	-0.26	27.05
		Emotional Support	-0.67	0.81
		Concrete Support	-1.31	1.72
		Nurturing/Attachment	-459.07	0.48
Health Impact on Caring for Children	Stress	Family Functioning/ Communication	-28.15	0.96
		Emotional Support	-24.96	1.09
		Concrete Support	-14.33	2.13
		Nurturing/Attachment	-1.56	71.52
Health Impact on Caring for Children	Depression	Family Functioning/ Communication	-34.15	0.48
		Emotional Support	-1.30	1.28
		Concrete Support	-2.14	1.02
		Nurturing/Attachment	-0.33	151.25

As suggested above, multi-collinearity among the caregiver health subscales may have limited the ability to detect the individual impact of each variable. Table 13 reports the covariances among the caregiver health latent variables. All relationships were significant, suggesting possible multi-collinearity.

Table 13

Covariances among Caregiver Health Latent Variables

	Physical Func.	Role Limit.	Energy/ Fatigue	Social Func.	Pain	General Health	Care Child
Physical Func.	--	--	--	--	--	--	--
Role Limit.	0.54 LL 0.43 UL 0.64	--	--	--	--	--	--
Energy/ Fatigue	0.42 LL 0.30 UL 0.53	0.46 LL 0.36 UL 0.57	--	--	--	--	--
Social Func.	0.53 LL 0.40 UL 0.66	0.73 LL 0.64 UL 0.81	0.64 LL 0.54 UL 0.74	--	--	--	--
Pain	0.55 LL 0.44 UL 0.66	0.64 LL 0.55 UL 0.73	0.51 LL 0.41 UL 0.61	0.75 LL 0.65 UL 0.84	--	--	--
General Health	0.50 LL 0.37 UL 0.61	0.56 LL 0.47 UL 0.66	0.54 LL 0.45 UL 0.64	0.56 LL 0.44 UL 0.68	0.63 LL 0.54 UL 0.73	--	--
Care Child	0.49 LL 0.38 UL 0.59	0.42 LL 0.32 UL 0.52	0.33 LL 0.22 UL 0.44	0.66 LL 0.56 UL 0.75	0.60 LL 0.51 UL 0.69	0.44 LL 0.34 UL 0.55	--

Note. For each pair of variables, the parameter estimate, lower limit of the 95% confidence interval (LL), and upper limit of the 95% confidence interval (UL) is reported.

Physical Functioning Model

There was no evidence that Physical Functioning was significantly related to

the protective factors, Stress, or Depression (Table 14). There were significant

relationships between one of the protective factors and both Stress and Depression

(Table 14). Higher levels of Stress at Time 1 predicted higher levels of Family

Functioning/Communication at Time 2. Reversely, higher levels of Depression at

Time 1 predicted lower levels of Family Functioning/Communication at Time 2.

Finally, there was no evidence of mediation in this model (Table 15).

Table 14

Physical Functioning Model: Structural Parameters

Predictor	Outcome	Estimate	LL 95% CI	UL 95% CI
T1 Physical Functioning	T2 Stress	0.07	-0.25	0.39
	T2 Depression	-0.08	-0.48	0.32
	T2 Family Functioning/ Communication	-0.08	-0.49	0.33
	T2 Emotional Support	-0.08	-0.48	0.32
	T2 Concrete Support	-0.00	-0.20	0.19
	T2 Nurturing/Attachment	-0.09	-0.50	0.31
T1 Stress	T2 Family Functioning/ Communication	0.31	0.00[a]	0.63
	T2 Emotional Support	0.02	-0.27	0.30
	T2 Concrete Support	-0.01	-0.30	0.28
	T2 Nurturing/Attachment	-0.04	-0.38	0.31
T1 Depression	T2 Family Functioning/ Communication	-0.60	-0.93	-0.26
	T2 Emotional Support	-0.29	-0.62	0.03
	T2 Concrete Support	-0.22	-0.53	0.09
	T2 Nurturing/Attachment	0.00[a]	-0.36	0.37

[a] Estimate > 0.

Table 15

Physical Functioning Model: Bootstrap Confidence Intervals Testing Indirect Effects

Predictor	Mediator	Outcome	LL 95% CI	UL 95% CI
Physical Functioning	Stress	Family Functioning/ Communication	-0.26	0.27
		Emotional Support	-0.19	0.29
		Concrete Support	-0.12	0.18
		Nurturing/Attachment	-0.07	0.12
Physical Functioning	Depression	Family Functioning/ Communication	-0.10	0.17
		Emotional Support	-0.07	0.09
		Concrete Support	-0.06	0.06
		Nurturing/Attachment	-0.08	0.07

Role Limitations due to Physical Health Model

All four items which contributed to the Role Limitations due to Physical Health latent variable had just two response options (Yes or No). These items cannot be normally distributed due to this. If normality is violated when using maximum likelihood estimation, parameter estimates are accurate but standard errors are biased downward (e.g., smaller than actual error) resulting in increased likelihood of parameter estimates being significant (e.g., increased Type I error) (Boomsma & Hoogland, 2001). Bootstrap confidence intervals were used to correct for this issue in the tests for direct effects (Nevitt & Hancock, 2001) (Table 16).

There was no evidence that Role Limitations due to Physical Health significantly was related to the protective factors or Stress. Role Limitations was significantly related to Depression such that greater reported role limitations at Time 1 predicted higher levels of Depression at Time 2 (Table 16). Stress was not significantly related to any of the protective factors. Depression was significantly

related to one of the protective factors. Higher levels of Depression at Time 1

predicted lower levels of Family Functioning/Communication at Time 2 (Table 16).

Depression significantly mediated a relationship between Role Limitations and

Family Functioning/Communication; greater levels of Role Limitations at Time 1

predicted higher levels of Depression at Time 2, and higher levels of Depression at

Time 1 predicted a lower level of Family Functioning/Communication at Time 2

(Table 17).

Table 16

Role Limitations due to Physical Health Model: Structural Parameters

Predictor	Outcome	Estimate	LL 95% CI	UL 95% CI
T1 Role Limitations due to Physical Health	T2 Stress	-0.18	-0.39	0.04
	T2 Depression	-0.31	-0.58	-0.01
	T2 Family Functioning/ Communication	-0.19	-0.47	0.04
	T2 Emotional Support	-0.20	-0.45	0.01
	T2 Concrete Support	-0.10	-0.32	0.10
	T2 Nurturing/Attachment	0.05	-0.24	0.32
T1 Stress	T2 Family Functioning/ Communication	0.34	-0.01	0.92
	T2 Emotional Support	0.03	-0.31	0.54
	T2 Concrete Support	-0.01	-0.37	0.33
	T2 Nurturing/Attachment	-0.03	-0.46	0.37
T1 Depression	T2 Family Functioning/ Communication	-0.64	-1.35	-0.24
	T2 Emotional Support	-0.33	-0.97	0.09
	T2 Concrete Support	-0.26	-0.65	0.14
	T2 Nurturing/Attachment	0.09	-0.41	0.66

Table 17

Role Limitations due to Physical Health Model: Bootstrap Confidence Intervals

Testing Indirect Effects

Predictor	Mediator	Outcome	LL 95% CI	UL 95% CI
Role Limitations due to Physical Health	Stress	Family Functioning/ Communication	-0.23	0.02
		Emotional Support	-0.10	0.08
		Concrete Support	-0.08	0.08
		Nurturing/Attachment	-0.08	0.10
Role Limitations due to Physical Health	Depression	Family Functioning/ Communication	0.01	0.50
		Emotional Support	-0.04	0.34
		Concrete Support	-0.05	0.25
		Nurturing/Attachment	-0.19	0.14

Energy/Fatigue Model

There was no evidence that Energy/Fatigue was significantly related to the protective factors, Stress, or Depression (Table 18). There were significant relationships between one of the protective factors and both Stress and Depression (Table 18), consistent with previously described models. Higher levels of Stress at Time 1 predicted higher levels of Family Functioning/Communication at Time 2 while higher levels of Depression at Time 1 predicted lower levels of Family Functioning/ Communication at Time 2. There was no evidence of mediation in the Energy/Fatigue model (Table 19).

Table 18

Energy/Fatigue Model: Structural Parameters

Predictor	Outcome	Estimate	LL 95% CI	UL 95% CI
T1 Energy/ Fatigue	T2 Stress	-0.09	-0.28	0.11
	T2 Depression	-0.09	-0.29	0.12
	T2 Family Functioning/ Communication	0.10	-0.11	0.31
	T2 Emotional Support	-0.02	-0.23	0.18
	T2 Concrete Support	0.12	-0.24	0.48
	T2 Nurturing/Attachment	0.21	-0.03	0.46
T1 Stress	T2 Family Functioning/ Communication	0.34	0.03	0.65
	T2 Emotional Support	0.02	-0.27	0.31
	T2 Concrete Support	0.00[a]	-0.29	0.29
	T2 Nurturing/Attachment	0.01	-0.34	0.36
T1 Depression	T2 Family Functioning/ Communication	-0.49	-0.81	-0.16
	T2 Emotional Support	-0.23	-0.54	0.07
	T2 Concrete Support	-0.15	-0.47	0.16
	T2 Nurturing/Attachment	0.15	-0.21	0.52

[a] Estimate > 0.

Table 19

Energy/Fatigue Model: Bootstrap Confidence Intervals Testing Indirect Effects

Predictor	Mediator	Outcome	LL 95% CI	UL 95% CI
Energy/Fatigue	Stress	Family Functioning/ Communication	-0.15	0.07
		Emotional Support	-0.06	0.06
		Concrete Support	-0.05	0.05
		Nurturing/Attachment	-0.06	0.06
Energy/Fatigue	Depression	Family Functioning/ Communication	-0.10	0.21
		Emotional Support	-0.07	0.13
		Concrete Support	-0.04	0.13
		Nurturing/Attachment	-0.14	0.07

Social Functioning Model

There was no evidence that Social Functioning was significantly related to the

protective factors, Stress, or Depression (Table 20). There were again significant

relationships between one of the protective factors and both Stress and Depression

(Table 20). Higher levels of Stress at Time 1 predicted higher levels of Family

Functioning/Communication at Time 2 and higher levels of Depression at Time 1

predicted lower levels of Family Functioning/Communication at Time 2. There was

no evidence of mediation in this model (Table 19).

Table 20

Social Functioning Model: Structural Parameters

Predictor	Outcome	Estimate	LL 95% CI	UL 95% CI
T1 Social	T2 Stress	-0.17	-0.49	0.16
Functioning	T2 Depression	-0.26	-0.59	0.06
	T2 Family Functioning/ Communication	0.15	-0.20	0.50
	T2 Emotional Support	0.23	-0.11	0.58
	T2 Concrete Support	-0.15	-0.49	0.19
	T2 Nurturing/Attachment	0.21	-0.21	0.03
T1 Stress	T2 Family Functioning/ Communication	.036	0.03	0.69
	T2 Emotional Support	0.09	-0.21	0.39
	T2 Concrete Support	-0.05	-0.35	0.24
	T2 Nurturing/Attachment	0.03	-0.34	0.40
T1 Depression	T2 Family Functioning/ Communication	-0.44	-0.80	-0.07
	T2 Emotional Support	-0.10	-0.45	0.26
	T2 Concrete Support	-0.29	-0.65	0.07
	T2 Nurturing/Attachment	0.18	-0.25	0.61

Table 21

Social Functioning Model: Bootstrap Confidence Intervals Testing Indirect Effects

Predictor	Mediator	Outcome	LL 95% CI	UL 95% CI
Social Functioning	Stress	Family Functioning/ Communication	-0.20	0.23
		Emotional Support	-0.63	9.73
		Concrete Support	-2.23	1.47
		Nurturing/Attachment	-0.87	4.13
Social Functioning	Depression	Family Functioning/ Communication	-0.69	7.96
		Emotional Support	-0.94	1.73
		Concrete Support	-0.52	3.81
		Nurturing/Attachment	-2.55	1.10

Pain Model

There was no evidence that Pain was significantly related to the protective factors or Stress. Pain was significantly related to Depression such that greater reported pain at Time 1 predicted higher levels of depression at Time 2 (Table 22). One of the protective factors, Family Functioning/Communication, was significantly related to both Stress and Depression as previously described (Table 22). Higher levels of Stress at Time 1 predicted higher levels of Family Functioning/ Communication at Time 2 whereas higher levels of Depression at Time 1 predicted lower levels of Family Functioning/Communication at Time 2. Finally, there was no evidence of mediation in this model (Table 23).

Table 22

Pain Model: Structural Parameters

Predictor	Outcome	Estimate	LL 95% CI	UL 95% CI
T1 Pain	T2 Stress	-0.01	-0.20	0.17
	T2 Depression	-0.21	-0.40	-0.02
	T2 Family Functioning/ Communication	0.02	-0.18	0.22
	T2 Emotional Support	0.08	-0.12	0.28
	T2 Concrete Support	-0.10	-0.29	0.09
	T2 Nurturing/Attachment	0.02	-0.22	0.26
T1 Stress	T2 Family Functioning/ Communication	0.32	0.01	0.63
	T2 Emotional Support	0.03	-0.26	0.31
	T2 Concrete Support	-0.02	-0.31	0.26
	T2 Nurturing/Attachment	-0.03	-0.37	0.32
T1 Depression	T2 Family Functioning/ Communication	-0.51	-0.84	-0.18
	T2 Emotional Support	-0.19	-0.49	0.12
	T2 Concrete Support	-0.25	-0.55	0.05
	T2 Nurturing/Attachment	0.07	-0.29	0.43

Table 23

Pain Model: Bootstrap Confidence Intervals Testing Indirect Effects

Predictor	Mediator	Outcome	LL 95% CI	UL 95% CI
Pain	Stress	Family Functioning/ Communication	-0.21	0.23
		Emotional Support	-0.21	0.38
		Concrete Support	-0.12	0.23
		Nurturing/Attachment	-0.11	0.20
Pain	Depression	Family Functioning/ Communication	-0.13	0.11
		Emotional Support	-0.06	0.06
		Concrete Support	-0.05	0.05
		Nurturing/Attachment	-0.05	0.07

General Health Model

There was no evidence that General Health was significantly related to the protective factors. General Health was significantly related to both Stress and Depression such that lower reported General Health at Time 1 predicted higher levels of Stress and Depression at Time 2 (Table 24). Also, Depression was significantly related to one of the protective factors, Family Functioning/Communication. Higher levels of Depression at Time 1 predicted lower levels of Family Functioning/ Communication at Time 2 (Table 24). Depression significantly mediated a relationship between General Health and Family Functioning/Communication; lower levels of General Health at Time 1 predicted higher levels of Depression at Time 2, and higher levels of Depression at Time 1 predicted a lower level of Family Functioning/Communication at Time 2 (Table 25).

Table 24

General Health Model: Structural Parameters

Predictor	Outcome	Estimate	LL 95% CI	UL 95% CI
T1 General Health	T2 Stress	-0.29	-0.48	-0.10
	T2 Depression	-0.30	-0.49	-0.10
	T2 Family Functioning/ Communication	-0.11	-0.32	0.10
	T2 Emotional Support	-0.02	-0.23	0.18
	T2 Concrete Support	0.13	-0.07	0.32
	T2 Nurturing/Attachment	0.09	-0.15	0.33
T1 Stress	T2 Family Functioning/ Communication	0.30	-0.01	0.62
	T2 Emotional Support	0.02	-0.27	0.31
	T2 Concrete Support	0.02	-0.28	0.31
	T2 Nurturing/Attachment	0.00[a]	-0.35	0.35
T1 Depression	T2 Family Functioning/ Communication	-0.57	-0.89	-0.24
	T2 Emotional Support	-0.23	-0.53	0.07
	T2 Concrete Support	-0.16	-0.45	0.13
	T2 Nurturing/Attachment	0.09	-0.26	0.45

[a] Estimate < 0.

Table 25

General Health Model: Bootstrap Confidence Intervals Testing Indirect Effects

Predictor	Mediator	Outcome	LL 95% CI	UL 95% CI
General Health	Stress	Family Functioning/ Communication	-0.27	0.02
		Emotional Support	-0.14	0.12
		Concrete Support	-0.12	0.10
		Nurturing/Attachment	-0.12	0.14
General Health	Depression	Family Functioning/ Communication	0.01	0.44
		Emotional Support	-0.05	0.28
		Concrete Support	-0.06	0.19
		Nurturing/Attachment	-0.19	0.13

Health Impact on Caring for Children Model

There was no evidence that Health Impact on Caring for Children was significantly related to the protective factors or Stress. This latent variable was significantly related to Depression such that greater impact on caring for children at Time 1 predicted higher levels of Depression at Time 2 (Table 26). The item measuring Health Impact on Caring for Children had high kurtosis (see Table 9) and this result should be interpreted with caution due to this. Consistent with previously described models, one of the protective factors, Family Functioning/Communication was significantly related to both Stress and Depression (Table 26). Higher levels of Stress at Time 1 predicted higher levels of Family Functioning/Communication at Time 2. Higher levels of Depression at Time 1 predicted lower levels of Family Functioning/Communication at Time 2. There was no evidence of mediation in the Health Impact on Caring for Children model (Table 27).

Table 26

Health Impact on Caring for Children Model: Structural Parameters

Predictor	Outcome	Estimate	LL 95% CI	UL 95% CI
T1 Health Impact on Caring for Children	T2 Stress	0.00[a]	-0.15	0.15
	T2 Depression	-0.19	-0.35	-0.04
	T2 Family Functioning/ Communication	0.01	-0.16	0.17
	T2 Emotional Support	0.13	-0.04	0.29
	T2 Concrete Support	-0.08	-0.24	0.07
	T2 Nurturing/Attachment	-0.01	-0.21	0.18
T1 Stress	T2 Family Functioning/ Communication	0.32	0.00[a]	0.63
	T2 Emotional Support	0.06	-0.23	0.34
	T2 Concrete Support	-0.03	-0.32	0.26
	T2 Nurturing/Attachment	-0.04	-0.38	0.31
T1 Depression	T2 Family Functioning/ Communication	-0.52	-0.82	-0.21
	T2 Emotional Support	-0.20	-0.49	0.09
	T2 Concrete Support	-0.22	-0.51	0.06
	T2 Nurturing/Attachment	0.07	-0.27	0.41

[a] Estimate > 0.

Table 27

Health Impact on Caring for Children Model: Bootstrap Confidence Intervals Testing

Indirect Effects

Predictor	Mediator	Outcome	LL 95% CI	UL 95% CI
Health Impact on Caring for Children	Stress	Family Functioning/ Communication	-0.07	0.09
		Emotional Support	-0.03	0.04
		Concrete Support	-0.04	0.02
		Nurturing/Attachment	-0.04	0.03
Health Impact on Caring for Children	Depression	Family Functioning/ Communication	-0.02	0.30
		Emotional Support	-0.04	0.19
		Concrete Support	-0.03	0.16
		Nurturing/Attachment	-0.13	0.09

Additional Analyses

Limited evidence for causal effects of caregiver physical health on future stress, depression, or protective factors was found in the models described above. Relationships among caregiver physical health and stress, depression, and protective factors were examined within the measurement model at Time 1 only (Table 28) to explore if additional significant relationships were present. Because relationships were examined within the measurement model, all latent variables were allowed to correlate with each other, meaning for each covariance (e.g., relationship between two latent variables) all other latent variables in the model are controlled for.

At Time 1, each of the caregiver health variables (Physical Functioning, Role Limitation, Energy/Fatigue, Social Functioning, Pain, General Health, and Health Impact on Caring for Children) was significantly negatively related to Stress and Depression such that decreased health related to increased Stress and Depression. All significant relationships between caregiver health and protective factors were positive, meaning that better health was related to higher protective factors. Physical Functioning was significantly related to Concrete Support on the PFS. Pain and Health Impact on Caring for Children were significantly related to three protective factors, Family Functioning/Communication, Social Emotional Support, and Concrete Support. The remaining four caregiver health variables, Role Limitations due to Physical Health, Energy/Fatigue, Social Functioning, and General Health, were significantly related to all four protective factors (Family Functioning/

Communication, Social Emotional Support, Concrete Support, and Nurturing and

Attachment).

Table 28

Covariances among Physical Health Subscales and Stress, Depression, and the PFS

Subscales at Time 1

	Stress	Depression	FFC	ES	CS	NA
Physical	-0.37	-0.49	0.09	0.10	0.20	0.10
Func.	LL -0.49	LL -0.60	LL -0.04	LL -0.03	LL 0.07	LL -0.04
	UL -0.25	UL -0.38	UL 0.22	UL 0.24	UL 0.34	UL 0.24
Role	-0.38	-0.52	0.21	0.21	0.14	0.13
Limit.	LL -0.49	LL -0.62	LL 0.09	LL 0.08	LL 0.00[a]	LL 0.00[a]
	UL -0.26	UL -0.42	UL 0.33	UL 0.33	UL 0.27	UL 0.26
Energy/	-0.51	-0.56	0.21	0.23	0.19	0.16
Fatigue	LL -0.61	LL -0.65	LL 0.09	LL 0.11	LL 0.06	LL 0.04
	UL -0.41	UL -0.47	UL 0.33	UL 0.35	UL 0.32	UL 0.29
Social	-0.72	-0.78	0.33	0.39	0.28	0.23
Func.	LL -0.81	LL -0.86	LL 0.21	LL 0.26	LL 0.14	LL 0.09
	UL -0.64	UL -0.70	UL 0.46	UL 0.51	UL 0.42	UL 0.37
Pain	-0.44	-0.53	0.31	0.33	0.17	0.10
	LL -0.55	LL -0.64	LL 0.19	LL 0.21	LL 0.03	LL -0.04
	UL -0.32	UL -0.42	UL 0.44	UL 0.45	UL 0.31	UL 0.23
General	-0.54	-0.57	0.41	0.38	0.15	0.23
Health	LL -0.65	LL -0.66	LL 0.30	LL 0.27	LL 0.01	LL 0.10
	UL -0.44	UL -0.47	UL 0.52	UL 0.50	UL 0.29	UL 0.36
Care	-0.43	-0.41	0.27	0.29	0.21	0.12
Child	LL -0.53	LL -0.51	LL 0.16	LL 0.17	LL 0.09	LL -0.00
	UL -0.33	UL -0.31	UL 0.38	UL 0.40	UL 0.33	UL 0.25

[a] Estimate > 0. *Note.* For each pair of variables, the parameter estimate, lower limit of the 95% confidence interval (LL), and upper limit of the 95% confidence interval (UL) is reported. FFC = Family Functioning/Communication, ES = Social Emotional Support, CS = Concrete Support, NA = Nurturing and Attachment.

Discussion

The present study is the first known study to examine the relationships among caregiver physical health and protective factors against child abuse and neglect within the context of child maltreatment prevention. The relationships among caregiver physical health and stress and depression in this context were also explored, as well as the role of stress and depression as possible mediators of the caregiver physical health-protective factors relationships. As prior relationships among health and stress or depression and stress or depression and protective factors have been established in the literature, the present study sought to connect these relationships and begin to highlight the importance of caregiver physical health in parent and family functioning related to child maltreatment. One goal of the study was to allow for establishment of causal relationships among these variables, using caregiver physical health as the primary predictor variable. A second goal was to replicate known relationships among these variables from the current literature within the child maltreatment prevention context.

Four hypotheses were tested in the present study, each suggesting predictive relationships among the variables of interest: 1) better caregiver physical health will result in higher levels of protective factors as assessed by the Protective Factors Survey (PFS), 2a) better caregiver physical health will result in lower levels of caregiver stress, 2b) better caregiver physical health will result in lower levels of caregiver depression, 3a) higher levels of caregiver stress will result in lower levels of protective factors, 3b) higher levels of caregiver depression will result in lower levels

of protective factors, 4a) caregiver stress will partially mediate the relationship between caregiver physical health and protective factors, and 4b) caregiver depression will partially mediate the relationship between caregiver physical health and protective factors. Repeated measures at two time points allowed for testing of predictive hypotheses.

Overall, results from the present study indicated no support for a direct, predictive effect of caregiver physical health on any of the protective factors among the participant caregivers receiving child maltreatment prevention services. There was minimal evidence for a predictive effect of caregiver physical health on stress and partial support for the predictive effect of caregiver physical health on depression. There was no support for a negative predictive effect of stress on any of the protective factors, however, there was a positive predictive effect of stress on one of the protective factors (Family Functioning/Communication). There was substantial support for the predictive effect of depression on one protective factor (Family Functioning/Communication) but not the other three. Finally, there was no evidence that stress served as a mediator in the tested models. There was partial support for the role of depression as a mediator in the relationship from caregiver physical health to protective factors. Results from post hoc analyses supported correlational relationships among all caregiver physical health variables, stress, and depression at a single time point. There was also substantial support for correlational relationships among the caregiver physical variables and the protective factors. Results relevant to each study hypothesis are discussed in more detail below.

Hypothesis 1: Caregiver physical health → Protective factors

The first hypothesis – that better caregiver health would result in higher levels of protective factors as assessed by the PFS – was not supported. Direct predictive relationships from caregiver physical health to protective factors were not found in any of the tested models. The current literature on health and protective factors or parenting is small and generally correlational, and thus did not provide strong evidence for the expectation that caregiver physical health would influence protective factors over time. Wilson and colleagues (1996) did report that poor physical health could increase the risk for child maltreatment by serving as a life stressor. Studies which have identified a relationship between caregiver poor health status and dysfunctional parenting (e.g., Evans et al., 2006) have generally focused on parents with severe, chronic illness such as HIV or pain.

The lack of significant findings for the influence of caregiver physical health on protective factors may be due to several overall study limitations which are described later in more detail. First, the time period that was allowed for caregiver physical health to influence protective factors may not have been sufficient for effects to develop. Additionally, the study sample overall reported generally good health which may have limited the effect of health on protective factors. The selection of the study sample and health measure allows for more generalizability to the general population but a focus on caregivers with identified poor health may have allowed for finding significant effects.

Hypothesis 2: Caregiver physical health → Stress and Depression

The second study hypothesis (2a) – that better caregiver health would result in lower levels of caregiver stress – was minimally supported. In one model (General Health), a negative relationship with stress was found such that participants with lower general health at Time 1 reported more stress at Time 2.

Results from previous research do not provide much guidance on the specific relationships to expect among physical health and stress. Physical health, stress, and depression are significantly inter-related, making it difficult to draw lines of cause and effect. The majority of the previous research on stress and physical health has focused on the negative impact of stress on health, though it is commonly accepted that poor health is a life stressor (Martin & Brantley, 2004). Additionally, previous studies have often examined psychopathology (e.g., depression or anxiety) related to health status rather than the more general concept of stress (e.g., Kroenke et al, 1994).

It is difficult to explain the predictive effect of general health on stress as the only significant finding across the tested models and the lack of significant results for the other caregiver physical health variables. Considering the nature of the General Health subscale items, these five items, compared to the other health items, tap comparison to other individuals (Items 17 and 18) and anticipation about future health (Item 19). They are also the only items, with the exception of the two Physical Functioning items, that do not specify a four week timeframe to consider when answering the question. Consequently, these items may be more global and affected by subjective perceptions of overall health and concern about health. The different

nature of these items, particularly the components of comparison and anticipation, might help explain the predictive effect on future stress. It is significant that this overall estimation of physical health predicted higher levels of stress within the short time frame provided.

Several factors may have contributed to the lack of findings for the predictive effect of the other caregiver physical health variables (Physical Functioning, Role Limitations, Energy/Fatigue, Social Functioning, Pain, and Health Impact on Caring for Children) on stress. As noted elsewhere, stress and depression are highly correlated with each other and the relationship between physical health and depression has received more attention than the relationship between physical health and stress. Parceling out the relationship of depression to stress may have lowered the unique effect of health on stress below the level of significance. In addition, as later described in detail, the study sample reported a generally good level of health across subscales, perhaps limiting the effect of increased stress. Finally, the short time lag between repeated measures allowed minimal time for caregiver physical health variables to result in increased stress.

The second hypothesis (2b) also suggested that better caregiver health would result in lower levels of caregiver depression; this hypothesis was partially supported. In four models (Role Limitations, Pain, General Health, and Health Impact on Caring for Children), a negative relationship between caregiver health and depression was found. Individuals who reported higher role limitations, higher pain, lower general

health, and higher health impact on caring for their children at Time 1 also reported higher levels of depression at Time 2.

The findings of the present study that role limitations due to physical health and pain, a physical symptom, predict higher levels of depression are consistent with prior reports (e.g., Kroenke et al., 1994) of positive relationships between physical symptoms or functional impairment and depression. The present study replicated these findings in a child maltreatment context and in a population of young caregivers. As described above, the General Health items ask for both a comparison to others and expectations for future health; it is not surprising that lower scores on these items would be related to increases depression scores over time. Similarly, it makes sense that caregivers who report that health limits their ability to care for their children would later report more depression; these individuals may feel a sense of guilt or worthlessness due to their limitations, which may be amplified in the context of receiving parenting-related services. This finding is also consistent with previous literature (e.g., Norton et al., 2005) which has suggested that limitations due to poor health, compared to other dimensions of illness, are most strongly related to depression. The predictive effect of these caregiver physical health subscales on depression was significant across the short time lag, demonstrating how quickly caregiver depression can increase related to poor health. These findings are also significant given that the mean level of depression across participants as reported on the PHQ-9 was in the range of none to mild depression according to interpretation guidelines.

Numerous factors may explain the lack of significant effects from health in the remaining models (Physical Functioning, Energy/Fatigue, Social Functioning) to depression. A relationship between physical functioning and depression would have been expected based on prior findings (e.g., Norton et al., 2005) as described above. The lack of a significant finding suggests the inability to complete necessary tasks or responsibilities (role limitations) has more emotional impact than limited ability to complete specific physical tasks (e.g., climbing stairs); this may be particularly true given the context of the study as participants were focused on their role as caregiver. Lower levels of energy and reduced social interaction are often symptoms of depression; controlling for depression at Time 1 may have affected the relationships among these health subscales and depression at Time 2 by reducing the impact of the health variables. Additionally, individuals with lower energy and decreased social interaction may have also reported higher levels of depression at Time 1 limiting the possibility of a significant increase at Time 2. Finally, lower energy and decreased social interaction are often common experiences for individuals parenting a young child and working; the universal nature of these experiences may decrease the emotional impact over time.

In addition, as noted previously, the short time lag between survey administrations and the generally good health reported by participants may have limited significant effects. Also, as previously described, the mean level of depression across participants was relatively low, perhaps limiting the ability to detect some effects.

Hypothesis 3: Stress and Depression → Protective factors

The third study hypothesis (3a), higher levels of caregiver stress would result in lower levels of protective factors, was not supported. In five models (Physical Functioning, Energy/Fatigue, Social Functioning, Pain, and Health Impact of Caring for Children), a consistent pattern of stress positively relating to one PFS subscale, Family Functioning/Communication, was demonstrated; higher levels of stress resulted in higher level of Family Functioning/Communication, the opposite direction of the predicted relationship.

The positive predictive effect of stress on a protective factor, Family Functioning/Communication (e.g., family's ability to share openly, support each other, and solve problems), was not expected. The finding is also contrary to results from Phase II of the PFS development and validation which established a negative correlation between stress and each of the PFS subscales, including Family Functioning/Communication (see Table 4). The present study is the first examination of the unique effect of stress on each protective factor, removing the influence of depression or other factors such as physical health or the other protective factors. For Family Functioning/Communication, partialing out these other influences appears to have changed the nature of the relationship with stress.

Several processes have may have contributed to this unexpected finding. Prior research has suggested that caregiver stress is related to increased perceived family conflict (Noll et al., 1994). Additionally, Cohen and Dotan (1976) reported that both personal stress and communication increased during times of external crisis such as

war. The authors suggested that increased communication may be one method of coping with increased stress. In the present study, caregivers with higher levels of reported stress may have perceived greater conflict in their families, making the family's method of handling conflict more salient when completing the PFS. Similarly, a higher level of caregiver stress may have contributed to a greater awareness of problems or need for problem-solving. Caregivers with higher reported stress may have also increased communication and problem-solving within their families in an attempt to decrease stress. Another explanation is that participants who were investing the most energy in improving their family functioning, perhaps increasing their stress at Time 1, demonstrated improvement as a result of their efforts at Time 2. The demonstrated predictive effect of stress on Family Functioning/ Communication in the majority of tested models is significant given the short timeframe for development of causal effects and a reported mean stress level consistent with normative data from a national sample (Cohen & Williamson, 1988), indicating that the study sample did not overall report a substantially elevated level of stress.

Little previous research was found relating stress, independent of depression, to general protective factors. For the present study, the hypothesized negative relationships among stress and the protective factors was based on the well-established relationship between stress and depression (see Steptoe & Ayers, 2004) and the demonstrated relationships in the literature among depression and general protective factors (see following discussion). The lack of significant findings

consistent with the study hypothesis for three protective factors (Social Emotional Support, Concrete Support, Nurturing and Attachment) may indicate that stress, independent from depression and physical health, does not predict these protective factors. Other limiting factors include the short time lag provided for causal effects to develop and a mean reported stress level not elevated above expectations based on measure norms.

The third hypothesis (3b) also suggested that higher levels of caregiver depression would result in lower levels of protective factors; this hypothesis was partially supported. In all seven single predictor models (Physical Health, Role Limitations, Energy/Fatigue, Social Functioning, Pain, General Health, and Health Impact on Caring for Children), caregiver depression was negatively related Family Functioning/Communication, one of the protective factors. Higher reported levels of depression at Time 1 related to lower reported levels of Family Functioning/ Communication at Time 2.

The supported negative relationship between depression and Family Functioning/Communication (e.g., family's ability to share openly, support each other, and solve problems) is consistent with the existing literature. Previous studies have found that parental depression is positively associated with parental hostility and negatively associated with quality of the mother-father relationship (Bronte-Tinkew et al., 2007; Graham et al., 2002). The present study replicated these associations in a child maltreatment prevention context. In addition, the predictive effect of depression on family communication and problem-solving was observed across a short

timeframe, demonstrating the speed with which caregiver depression can decrease family functioning. This finding is also significant given the relatively low level of depression reported by participants as previously described.

The current literature has provided evidence for associations among depression and other protective factors (Social Emotional Support, Concrete Support, Nurturing and Attachment). As one example, Cornish et al. (2006) found that depressed mothers, compared to never depressed mothers, had more negative perceptions of their children's behavior and more feelings of hostility toward their children than non-depressed mothers; parental perceptions and the parent-child bond is encompassed in the protective factor Nurturing and Attachment. Numerous studies have also explored how depression relates to poor social functioning (e.g., Coyne, 1976), similar to the protective factor Social Emotional Support, and the ability to get needed resources (e.g., Miller & Seligman, 1975), similar to Concrete Support. The present study did not establish the predictive effect of depression on the other protective factors. Several factors may have contributed to the lack of findings. As previously noted, the mean level of depression across participants was not clinically significant according to guidelines used in clinical and research settings; the low level of depressive symptoms or lack of variability across participants may have limited effect on these protective factors. In addition, the short time lag, later discussed as a limitation, may not have allowed for predictive effects to develop.

Hypothesis 4: Mediation by Stress and Depression

The fourth set of study hypotheses addressed mediation of the caregiver physical health and protective factors relationship by stress and depression. The hypothesis (4a) that stress would partially mediate the relationship between caregiver physical health and protective factors was not supported. There was no evidence that stress served as a mediator in any of the tested models. As previously described, there were no models that had both a significant pathway from caregiver physical health to stress and from stress to protective factors decreasing the likelihood that mediation through stress would occur.

The fourth hypothesis (4b) also predicted that depression would partially mediate the relationship between caregiver physical health and protective factors; this hypothesis was partially supported. In two models (Role Limitations, General Health), depression mediated the relationship between the caregiver physical health variable and one of the protective factors, Family Functioning/Communication, such that higher role limitations or lower general health resulted in higher levels of depression, which resulted in lower Family Functioning/Communication. As described further in the study limitations, only partial mediation can be concluded based on the study design and analytic strategy.

Finding significant mediation by depression in two models is consistent with both a meta-analysis examining risk factors for child abuse and neglect (Wilson et al., 1996) and lay theories about the influence of health. Often, it is believed that health negatively impacts outcomes such as protective factors through serving as a stressor,

which would be consistent with findings that dimensions of caregiver health (Role Limitations and General Health) had an indirect effect on family communication and problem-solving through increasing caregiver depression.

In two models (Pain and Health Impact on Caring for Children), the same a pathways (health → depression) and b pathways (depression → Family Functioning/Communication) were significant; however, significant mediation by depression was not supported. Item variability can affect the strength of examined relationships; the item measuring Health Impact on Caring for Children had high kurtosis (see Table 9) which may have affected the detection of significant mediation. In addition, limitations of the mediation model utilized are later discussed.

Other Findings

Numerous significant relationships among the variables of interest were found at Time 1. As described previously, each of the caregiver health variables was significantly negatively related to both Stress and Depression. All significant relationships between caregiver health and protective factors were positive. Physical Functioning was significantly related to Concrete Support. Pain and Health Impact on Caring for Children significantly related to three protective factors, Family Functioning/Communication, Social Emotional Support, and Concrete Support. The remaining four caregiver health variables, Role Limitations due to Physical Health, Energy/Fatigue, Social Functioning, and General Health, significantly related to all four protective factors (Family Functioning/Communication, Social Emotional

Support, Concrete Support, and Nurturing and Attachment). For each covariance, the influence of all other latent variables in the model was controlled.

Exploring these results was not part of the original hypotheses or analytic plan; the relationships were examined due to the minimal significant results in the predictive models. These single time point results support the study goals to establish and replicate relationships among caregiver physical health, stress, depression, and protective factors in the context of child maltreatment prevention.

Correlational relationships among physical health, stress, and depression were expected based on the current literature. The findings of the present study both support the current literature and make a contribution through establishing these relationships for each of seven dimensions of health and in a population of young caregivers without a universal identified health problem. Often, studies of correlates of health have been completed with older participants or individuals with serious or chronic illness.

Role Limitations due to Physical Health and General Health were both related to all four protective factors. These caregiver physical health latent variables also demonstrated the most interesting relationships in the predictive models with mediation demonstrated through depression to Family Functioning/Communication. Taken together, the results suggest these two dimensions of health, compared to the others measured, have the most substantial relationships to the protective factors. The relationships among role limitations and protective factors is consistent with the literature as the importance of impairment or disability has been demonstrated for

depression, as described above, and child and family outcomes (Dura & Beck, 1988). It is significant that Energy/Fatigue and Social Functioning were related to all protective factors given that the influence of depression was controlled for as low energy and decreased social interaction can be symptoms of depression as previously described. The relationship between Social Functioning and protective factors is also consistent with identified risks for child maltreatment which include social isolation and negative interactions (CDC, 2007). As noted above, low energy and decreased opportunities for social support may be common experiences when parenting young children and working; the commonality of these experiences and their relationship to protective factors highlights these as areas for assessment and intervention.

Pain related to all protective factors except Nurturing and Attachment. The relationships among pain and the protective factors (Family Functioning/ Communication, Social Emotional Support, Concrete Support) are consistent with current literature which has reported that mothers with chronic pain report social difficulties and problems completing day-to-day parenting tasks (Evans et al., 2005). It is surprising that Pain did not relate to the protective factor Nurturing and Attachment given previous findings that mothers with chronic pain report poorer mother-child relationships (Evans et al., 2006). It is difficult to explain the finding that Physical Functioning related only to Concrete Support and not to the other three protective factors. The nature of the Physical Functioning items suggest that participants who score low on those items (e.g., indicating lower functioning) were the most impaired individuals in the study sample because they had difficulty

completing basic tasks (e.g., climbing stairs, pushing a vacuum) and likely reported

poor health on the other subscales as well. Partialling out the influence of all of the

health subscales may have left little explainable variance in the Physical Functioning

items, decreasing the likelihood of significant relationships.

Study Limitations

      Several limitations result from the design of the present study which included

testing for direct and indirect effects using data collected at two time points with a

relatively short time lag. Foremost, testing for indirect effects using a two time point

model does not allow for direct testing of the c pathway ($X_1 \rightarrow Y_3$). This makes it

impossible to determine if complete mediation is occurring because changes in the

direct effect as a result of mediation cannot be tested; only partial mediation can be

assessed (Cole & Maxwell, 2003). Additionally, Cole and Maxwell's (2003)

suggested model requires both variable stability (e.g., M_1 to M_2) and relationship

stationarity (e.g., M_1 to Y_2) over time to approximate relationships for a third time

point (M_2 to Y_3). As described previously, in the present study, stability and

stationarity in the model was assumed based on literature review (see Introduction)

and previously established relationships in Phase II of the PFS development (Counts

et al., 2009). However, because there is no Y_3 data, it is not possible to test the

stationarity of the $M \rightarrow Y$ relationship. In addition, the surprising finding that stress

positively predicted Family Functioning/Communication, the opposite direction of

the hypothesized relationship, draws into question the assumptions about the nature of

stationarity in the $M \rightarrow Y$ relationships.

The short time lag between time points in the present study generates two additional limitations. Due to research design restrictions, time lag between time points was set at one month. As described above, time lag varied from less than 20 days to greater than 49 days, with 50.5% of participants having a time lag of 25 to 35 days. In mediation analyses it is necessary for the time lag to be long enough to allow for causal effects to occur from one variable to the next (Cole & Maxwell, 2003); if a sufficient time lag does not occur, causality is brought into question. In the present study, the short time lag may not have been sufficient for the predictor (caregiver health) and mediator (stress and depression) variables to exert detectable effects on the outcome (PFS) variables limiting significant results. In addition, Cole and Maxwell (2003) warn that the magnitude of indirect effects may vary greatly with the length of time lag. The varying time lags across participant individuals may have affected findings in the present study. Also, alternative results may have been found had a different lag been used. Given the limitations described based on mediation model, assumption of stationarity, and effect of time lag, the results related to indirect effects in the present study should be interpreted with caution.

Significant relationships among the caregiver physical health variables suggest multi-collinearity (see Table 13) which may have limited the ability to detect effects in the full model which included all caregiver physical health variables. This prevented examining the effect of each health variable controlling for all other health variables (e.g., the independent effect of each variable on the model). The single

predictor models used do not allow for partialling out the influence of the other health variables.

The study sample places some limits on the generalizability of results. The study sample was predominantly young, female, and Caucasian. In comparison to participants who did not complete both time points of the study, the study sample had lower rates of being married, lower socio-economic status, longer program involvement but lower rates of attendance, lower scores on three subscales of the PFS (Family Functioning/Communication, Concrete Support, and Nurturing and Attachment), higher stress scores, higher depression scores, and lower reported levels of health on four subscales (General Health, Role Limitations, Social Functioning, Energy/Fatigue). Taken together, these differences suggest a group of individuals with lower reported resources, lower family functioning, lower mental and physical health, and greater perceived need for parenting services. Results may not be generalizable to individuals who are older, male, or report higher levels of functioning.

The nature of the survey items and the format for administration may have affected participant responses. The majority of participants (55.7%) completed the survey packet with program staff present and 22.3% completed the survey packet through a face-to-face interview with staff. Given that participant individuals were receiving services related to parenting and the potential lack of confidentiality in responses, they may have been motivated to respond in a positive fashion reporting better health, lower stress, lower depression, and greater protective factors. In

addition, several items were face valid for sensitive topics such as suicidal ideation (PHQ-9, Question 9), ability to care for children (Health measure, Question 9), or closeness of relationship to child (PFS, Questions 24, 25, and 29). These items tended to demonstrate higher skew and kurtosis (see Table 9), perhaps indicating a social desirability response bias. The restricted response range for these items may have limited the potential to detect effects.

Another limitation of the present study may be the overall health status of the participant individuals. The average health subscale scores for the participant individuals were similar, though slightly elevated (i.e., indicating better health), compared to baseline data from the Medical Outcomes Study ($N = 2471$), which examined a diverse group of medical outpatients (Rand Corporation, 2009). Raw scores on the health items ranged from 0 to 100; for the present study, subscale averages ranged from 68.40 to 82.99 ($SD = 22.51 – 34.59$), with the exception of the lowest average ($M = 54.63$, $SD = 22.47$) on the Energy/Fatigue subscale. Scores on the single item measuring health impact on caring for children were also elevated ($M = 92.76$, $SD = 17.87$). While participant health status in the present study was similar to a large population of medical outpatients and demonstrated good range across participants, overall health status may be have too good to allow for detectable effects on stress, depression, or the subscales of the PFS.

The overall good health reported by the study sample may be one feature of the limitation of self-selection bias. The survey packet did not assess whether participants were voluntarily receiving parenting-related services or how the

participants got connected to the participating agency; however, it is assumed that most study participants elected to seek out and receive the services. In addition, study participants self-selected whether to complete the study packet at both time points. This introduces two opportunities for self-selection bias. As previously noted, the study population reported good health, a minimal level of depressive symptoms, and stress consistent with expectations based on national norms. Individuals who were experiencing poor health, elevated stress or depression, and perhaps more reduced levels of protective factors may not have either invested time and energy in parenting-related services or elected to spend extra time completing the survey packets. This potential self-selection bias also influences the generalizability of the results.

Finally, the models tested in the present study did not control for some factors which may vary with or affect the variables of interest. These factors include demographic variables such as race, family income, or marital status. Differences in health status by racial group and socioeconomic status are commonly reported in the literature (CDC, 2008a, 2008b) such that being Caucasian and higher socioeconomic status are associated with better health. The relationship between race/ethnicity and scores on the PFS has not been investigated and differences may exist. Additionally, the relationships among the variables of interest may have been influenced by marital status as caregivers experienced parenting alone, parenting with support, or parenting with a non-supportive partner. Given that surveys were collected from 15 agencies in nine states, differences may have existed across agencies. Services provided by agencies were not standardized, meaning not all participants had the same program

experience. Variability in agencies, services provided, and demographic characteristics of the sample allowed for a larger *N* and adds to the generalizability of the findings; however, not controlling for these factors introduces variance, which may have limited the ability to detect effects.

Implications and Future Directions

The goals of the present study were to establish relationships among the variables of interest (caregiver physical health, stress, depression, protective factors) and replicate existing relationships from the literature in the child maltreatment prevention context. Results provided evidence for some predictive effects from health to stress and depression and from stress and depression to protective factors, specifically family functioning and communication even over the short time lag, demonstrating the speed with which change could occur with appropriate assessment and intervention. Additionally, post hoc analyses supported both of the study goals by establishing numerous relationships among the variables of interest at a single time point.

Among the caregiver physical health variables, Role Limitations due to Physical Health and General Health appeared to most closely relate to protective factors as each was found to relate to all four protective factors at a single time point and depression was found to mediate the predictive relationship between each of these variables and Family Functioning/Communication. As measures of general perceptions of health and ability to complete to necessary tasks, these associations are logical. The present study highlights the importance of assessing these factors in

caregivers. Staff who provide parenting-related services can assess caregivers on these dimensions with a minimal number of questions and serve to connect caregivers to needed medical care or resources to assist with completing parenting or work demands.

Additionally, one protective factor, Family Functioning/Communication, appeared to be particularly related to stress, depression, and caregiver physical health. This protective factor reflects how families handle conflict, support one another during times of stress, and family cohesion. It seems hopeful to this author that these dimensions of family functioning, which seem complex compared to other protective factors such as concrete support, could be improved not only through direct intervention but also through effectively addressing caregiver depression and health.

The present study adds to the validation of the Protective Factors Survey (PFS). Previously the PFS was correlated with the same measures of stress and depression used in the present study and a measure of potential for child abuse (see Measures). In the present study, predictive relationships from stress and depression to the PFS were established. In addition, numerous single time point positive relationships among the caregiver health variables and the PFS were found, as well as mediation through depression from two caregiver health variables, Role Limitations and General Health, to one protective factor, Family Functioning/Communication.

There are numerous future directions which can extend the present study, address limitations, and further knowledge about the role of caregiver physical health in preventing child maltreatment. Perhaps foremost, future research could address

methodological limitations of the present study by allowing for a longer time lag for predictive effects to develop. As noted throughout this discussion, the short time lag may have limited the ability to find significant effects. In addition, the present study did not allow for testing mediation over a minimum of three time points, which introduced significant limitations. Ideally, future research would involve repeated assessment of the variables of interest to study the effect of health over a longer period of time and allow for more robust tests of mediation.

In addition, future research should examine the potential influence of factors such as demographic characteristics or services received. These factors could be controlled through analyses or study design by limiting participation to particular agencies, program types, or demographic groups. Understanding potential group differences is important information for the development of the PFS, as well as a future step for better understanding factors which may affect a relationship between health and protective factors.

As noted in the literature review, little prior research had explored the relationships among caregiver physical health and protective factors in the context of child maltreatment prevention. The present study examined the predictive role of health as this was the primary variable of interest. In addition to further exploring the causal relationships from health to protective factors, future research could examine the predictive effect of protective factors on health. Examining the relationships in both directions will be necessary to shed light on the likely complex nature of the connections.

Studying protective factors among caregivers with identified poor health or health risk factors would extend the present study and potentially result in more significant findings. This could be accomplished in at least two ways. Studying the PFS in a population of caregivers with identified illnesses taken from a medical context would extend current research on health and parenting through adding the specific context of child maltreatment prevention. Alternatively, caregivers receiving parenting-related services who also report poor health could be studied more specifically. Numerous health conditions and behaviors such as obesity, poor diet, and smoking can contribute to feeling "unhealthy" without an identified illness. In addition, these conditions and behaviors are known to relate to demographic characteristics such as socioeconomic status (CDC, 2008a). While any further investigation of the role of caregiver health would be of importance, it is felt that continuing to examine the general concept of health (as opposed to specific illness), particularly in high risk groups, would provide results which are both relevant and generalizable.

Preventing child maltreatment and the resulting long-lasting negative effects is a multi-faceted and complex social issue. Many protective factors against child abuse and neglect have been identified. Despite the fact that many of these protective factors, such as social support or emotional health, are known to relate to physical health, caregiver physical health has not yet been included in any of major frameworks of risk or protective factors against child maltreatment. This disconnect is also apparent in clinical practice as parenting programs may fail to address caregiver

health status or health-related stress and health care providers may fail to assess how patients are coping with demands of parenting. The present study sought to bridge this gap by exploring the relationships among caregiver physical health and protective factors in a child maltreatment context. The study serves as an initial step in the process of describing those relationships and establishing the importance of caregiver physical health in prevention frameworks. Ultimately, it is hoped that further research can serve to build clinical connections between the parenting services community and the medical community such that caregivers with poor health receive needed family support and preventative health behaviors can be encouraged through family intervention, both working toward improved family health and decreased potential for child maltreatment.

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Appendix A

Protective Factors Survey Packet:
       Section 1: Protective Factors Survey (PFS)
       Section 2: Adapted Rand 36-item Health Survey 1.0
       Section 3: Patient Health Questionnaire-9 (PHQ-9)
       Section 4: Perceived Stress Scale (PSS)

Note: For formatting purposes only, the measures in the PFS survey packet have been altered from those used in the present study.

PROTECTIVE FACTORS SURVEY
PILOT PHASE III

FOR STAFF USE ONLY

1. Participant ID # _____   2. Date survey completed: ____/____/_____

3. How was the survey completed?
   ☐ Completed in face to face interview
   ☐ Completed by participant with program staff available to explain items as needed
   ☐ Completed by participant without program staff present

4. Which language version was used?
   ☐ English   ☐ Spanish

5. Has the participant had any involvement with Child Protective Services?
   ☐ NO   ☐ YES   ☐ NOT SURE

6. Date participant began program: __/__/__

7. **Type of Services**: Identify the type of program that most accurately describes the services that the participant is currently receiving. Check all that apply.
☐ Parent Education   ☐ Home Visiting   ☐ Parent Support Group
☐ Parent/Child Interaction ☐ Pre-Natal Class   ☐ Family Literacy
☐ Advocacy (self, community) ☐ Resource and Referral ☐ Marriage Strengthening/Prep
☐ Fatherhood Program   ☐ Family Resource Center ☐ Job Skills/Employment Prep
☐ Planned and/or Crisis Respite   ☐ Skill Building/Ed for Children
☐ Homeless/Transitional Housing   ☐ Adult Education (i.e. GED/Ed)
☐ Other _____

8. **Service Intensity**: Indicate the number of hours of service that the participant has received ACROSS ALL PROGRAMS:

Estimated service hours: _____

9. **Participant's Attendance**: Indicate the percentage of time the participant attends program activities. Please consider attendance across all programs.
   ☐ 75 - 100%
   ☐ 50 - 74%
   ☐ 25 - 49%
   ☐ Less than 25%

PROTECTIVE FACTORS SURVEY
PILOT PHASE III

FOR PARTICIPANT USE:

1. Participant ID #: _____

2. Sex: ☐ Male
      ☐ Female

3. Age (in years): _____

4. Children in Your Household: Please indicate the children living in your household by age and your relationship to each child. (Examples of relationship to child: Birth Parent, Step-parent, Grandparent/Great-Grandparent, Foster Parent, Adoptive Parent, Other relative, Non-relative.)

Age of child	Your relationship to the child

5. Race/Ethnicity. Please choose the ONE that best describes what you consider yourself to be:
      ☐ Native American (American Indian/Alaskan Native)
      ☐ Asian
      ☐ African American
      ☐ Black (African Nationals/Caribbean Islanders)
      ☐ Hispanic or Latino
      ☐ Middle Eastern
      ☐ Native Hawaiian/Pacific Islanders
      ☐ White (Non Hispanic/European American)
      ☐ Multi-racial
      ☐ Other _____

6. What country were you born in? _____

7. Marital Status:
 ☐ Married ☐ Partnered ☐ Single
 ☐ Divorced ☐ Widowed ☐ Separated

8. Family Housing:
 ☐ Own
 ☐ Rent
 ☐ Shared housing with relatives/friends
 ☐ Temporary (shelter, temporary with friends/relatives)
 ☐ Homeless

9. Family Income:
 ☐ $0-$10,000
 ☐ $10,001-$20,000
 ☐ $20,001-$30,000
 ☐ $30,001-$40,000
 ☐ $40,001-$50,000
 ☐ more than $50,001

10. Highest Level of Education:
 ☐ Elementary or junior high school
 ☐ Some high school
 ☐ High school diploma or GED
 ☐ Trade/Vocational Training
 ☐ Some college
 ☐ 2-year college degree (Associate's)
 ☐ 4-year college degree (Bachelor's)
 ☐ Master's degree
 ☐ PhD or other advanced professional degree (law, medicine, etc.)

11. Which of the following do you currently receive? (Check all that apply)
 ☐ Food Stamps
 ☐ Medicaid (State Health Insurance)
 ☐ Earned Income Tax Credit
 ☐ TANF
 ☐ Head Start/Early Head Start Services

Section 1

Part I. Please *circle* the number that describes how often the statements are true for you or your family. The 1 to 7 scale represents different amounts of time.

	Never	Very Rarely	Rarely	About Half the Time	Frequently	Very Frequently	Always
1. In my family, we talk about problems.	1	2	3	4	5	6	7
2. When I am worried about my children, I have someone to talk to.	1	2	3	4	5	6	7
3. When we argue, my family listens to "both sides of the story."	1	2	3	4	5	6	7
4. In my family, we take time to listen to each other.	1	2	3	4	5	6	7
5. My family pulls together when things are stressful.	1	2	3	4	5	6	7
6. I have family, friends, or neighbors I could talk to if I am feeling down.	1	2	3	4	5	6	7
7. When something goes wrong in our family, we are there to help each other.	1	2	3	4	5	6	7
8. My family is able to solve our problems.	1	2	3	4	5	6	7

Part II. Please *circle* the number that best describes how much you agree or disagree with the statement.

	Strongly Disagree	Mostly Disagree	Slightly Disagree	Neutral	Slightly Agree	Mostly Agree	Strongly Agree
9. I have others who will listen when I need to talk about my problems.	1	2	3	4	5	6	7
10. In times of need, I know where to get help for my family with things like food or clothing.	1	2	3	4	5	6	7
11. My family can talk about almost anything.	1	2	3	4	5	6	7
12. My family is close to one another.	1	2	3	4	5	6	7
13. When I am lonely, there are several people I can talk to.	1	2	3	4	5	6	7
14. I would have no idea where to turn if my family needed food or housing.	1	2	3	4	5	6	7
15. I wouldn't know where to go for help if I had trouble making ends meet.	1	2	3	4	5	6	7
16. If there is a crisis, I have others I can talk to.	1	2	3	4	5	6	7
17. If I needed help finding a job, I wouldn't know where to go for help.	1	2	3	4	5	6	7

Part III. This part of the survey asks about parenting and your relationship with your child. For this section, **please focus on the child that you hope will benefit most from your participation in our services**. Please write the child's age and then answer questions with this child in mind.

18. Child's Age

_____

	Strongly Disagree	Mostly Disagree	Slightly Disagree	Neutral	Slightly Agree	Mostly Agree	Strongly Agree
19. There are many times when I don't know what to do as a parent.	1	2	3	4	5	6	7
20. I know how to help my child learn.	1	2	3	4	5	6	7
21. My child misbehaves just to upset me.	1	2	3	4	5	6	7

Please tell us how often each of the following happens in your family.

	Never	Very Rarely	Rarely	About Half the Time	Frequently	Very Frequently	Always
22. I praise my child when he/she behaves well.	1	2	3	4	5	6	7
23. When I discipline my child, I lose control.	1	2	3	4	5	6	7
24. I am happy being with my child.	1	2	3	4	5	6	7
25. My child and I are very close to each other.	1	2	3	4	5	6	7
26. I am able to soothe my child when he/she is upset.	1	2	3	4	5	6	7
27. I spend time with my child doing what he/she likes to do.	1	2	3	4	5	6	7

(FOR PARENTS OF CHILDREN AGES 1-18). Please answer the following questions if the child you hope will benefit most from our services is over one year old.

	Strongly Disagree	Mostly Disagree	Slightly Disagree	Neutral	Slightly Agree	Mostly Agree	Strongly Agree
28. My child has a lot of friends in his/her same age group.	1	2	3	4	5	6	7
29. My child comes to me when he/she is feeling upset.	1	2	3	4	5	6	7

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Section 2

Please answer the following questions about your health. Circle ONE number on each line.

	Excellent	Very Good	Good	Fair	Poor
1. In general, would you say your health is:	1	2	3	4	5

The following items are about activities you might do during a typical day. Does your **physical health now** limit you in these activities? If so, how much?

	Yes, limited a lot	Yes, limited a little	No, not limited at all
2. **Moderate activities**, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf.	1	2	3
3. Climbing **several** flights of stairs.	1	2	3

During the **past 4 weeks**, have you had any of the following problems with your work or other regular daily activities **as a result of your physical health**?

	Yes	No
4. Cut down the amount of time you spent on work or other activities.	1	2
5. **Accomplished less** than you would like.	1	2
6. Were limited in the **kind** of work or other activities.	1	2
7. Had **difficulty** performing the work or other activities (for example, it took extra effort).	1	2

	Not at all	Slightly	Moderately	Quite a bit	Extremely
8. During the **past 4 weeks,** to what extent has your **physical health or emotional problems** interfered with your normal social activities with family, friends, neighbors, or groups?	1	2	3	4	5
9. To what extent does your **physical health now** interfere with your ability to care for your children?	1	2	3	4	5

	None	Very mild	Mild	Moderate	Severe	Very severe
10. How much **bodily** pain have you had during the **past 4 weeks**?	1	2	3	4	5	6

	Not at all	A little bit	Moderately	Quite a bit	Extremely
11. During the **past 4 weeks,** how much did **pain** interfere with your normal work (including both work outside the home and housework)?	1	2	3	4	5

These questions are about how you feel and how things have been with you **during the past 4 weeks**. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the **past 4 weeks** . . .

	All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the Time
12. Did you feel full of pep?	1	2	3	4	5	6
13. Did you have a lot of energy?	1	2	3	4	5	6
14. Did you feel worn out?	1	2	3	4	5	6
15. Did you feel tired?	1	2	3	4	5	6

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
16. During the **past 4 weeks,** how much of the time has your **physical health or emotional problems** interfered with your social activities (like visiting with friends, relatives, etc.)?	1	2	3	4	5

How TRUE or FALSE is <u>each</u> of the following statements for you?

	Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
17. I seem to get sick a little easier than other people.	1	2	3	4	5
18. I am as healthy as anybody I know.	1	2	3	4	5
19. I expect my health to get worse.	1	2	3	4	5
20. My health is excellent.	1	2	3	4	5

Section 3

Over the last 2 weeks, how often have you been bothered by any of the following problems?

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things.	1	2	3	4
2. Feeling down, depressed, or hopeless.	1	2	3	4
3. Trouble falling or staying asleep, or sleeping too much.	1	2	3	4
4. Feeling tired or having little energy.	1	2	3	4
5. Poor appetite or overeating.	1	2	3	4
6. Feeling bad about yourself or that you are a failure or have let yourself or your family down.	1	2	3	4
7. Trouble concentrating on things, such as reading the newspaper or watching television.	1	2	3	4
8. Moving or speaking so slowly that other people could have noticed? Or the opposite-being so fidgety or restless that you have been moving around a lot more than usual.	1	2	3	4
9. Thoughts that you would have been better off dead or hurting yourself in some way.	1	2	3	4

Section 4

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate how often you felt or thought a certain way.

In the last month, how often have you…

	Never	Almost Never	Sometimes	Fairly Often	Very Often
1. Been upset because of something that happened unexpectedly?	0	1	2	3	4
2. Felt that you were unable to control the important things in your life?	0	1	2	3	4
3. Felt nervous and "stressed"?	0	1	2	3	4
4. Felt confident about your ability to handle your personal problems?	0	1	2	3	4
5. Felt that things were going your way?	0	1	2	3	4
6. Found that you could not cope with all the things that you had to do?	0	1	2	3	4
7. Been able to control irritation in your life?	0	1	2	3	4
8. Felt that you were on top of things?	0	1	2	3	4
9. Been angered because of things that happened that were outside of your control?	0	1	2	3	4
10. Felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Appendix B

Example of LISREL 8.80 syntax

Note: The example provided is the syntax for the full model.

DA NO=291 NI=102 MA=CM ME=ML RP=5
RA=stephdisorder2.dat

MO NY=102 NE=19 LY=FU,FI PS=SY,FI TE=SY,FI BE=FU,FI AP=56

! Physical Functioning
FR LY 1 1 LY 2 1
EQ LY 1 1 LY 2 1
FR TE 1 1 TE 2 2

! Role Limitations
FR LY 3 2 LY 4 2 LY 5 2 LY 6 2
FR TE 3 3 TE 4 4 TE 5 5 TE 6 6

! Energy Fatigue
FR LY 7 3 LY 8 3 LY 9 3 LY 10 3
FR TE 7 7 TE 8 8 TE 9 9 TE 10 10

! Social Functioning
FR LY 11 4 LY 12 4
EQ LY 11 4 LY 12 4
FR TE 11 11 TE 12 12

! Pain
FR LY 13 5 LY 14 5
EQ LY 13 5 LY 14 5
FR TE 13 13 TE 14 14

! General Health
FR LY 15 6 LY 16 6 LY 17 6 LY 18 6 LY 19 6
FR TE 15 15 TE 16 16 TE 17 17 TE 18 18 TE 19 19

! Care Child
FR LY 20 7
VA 0.0 TE 20 20

! Stress 1
FR LY 21 8 LY 22 8 LY 23 8 LY 24 8 LY 25 8 LY 26 8 LY 27 8 LY 28 8 LY 29 8
LY 30 8
FR TE 21 21 TE 22 22 TE 23 23 TE 24 24 TE 25 25 TE 26 26 TE 27 27 TE 28 28 TE
29 29 TE 30 30

! Depression 1

FR LY 31 9 LY 32 9 LY 33 9 LY 34 9 LY 35 9 LY 36 9 LY 37 9 LY 38 9 LY 39 9
FR TE 31 31 TE 32 32 TE 33 33 TE 34 34 TE 35 35 TE 36 36 TE 37 37 TE 38 38 TE 39 39

! FFR 1
FR LY 40 10 LY 41 10 LY 42 10 LY 43 10 LY 44 10 LY 45 10 LY 46 10 LY 47 10
FR TE 40 40 TE 41 41 TE 42 42 TE 43 43 TE 44 44 TE 45 45 TE 46 46 TE 47 47

! ES 1
FR LY 48 11 LY 49 11 LY 50 11 LY 51 11 LY 52 11
FR TE 48 48 TE 49 49 TE 50 50 TE 51 51 TE 52 52

! CS 1
FR LY 53 12 LY 54 12 LY 55 12 LY 56 12
FR TE 53 53 TE 54 54 TE 55 55 TE 56 56

! NA 1
FR LY 57 13 LY 58 13 LY 59 13 LY 60 13 LY 61 13
FR TE 57 57 TE 58 58 TE 59 59 TE 60 60 TE 61 61

! Stress 2
FR LY 62 14 LY 63 14 LY 64 14 LY 65 14 LY 66 14 LY 67 14 LY 68 14 LY 69 14 LY 70 14 LY 71 14
FR TE 62 62 TE 63 63 TE 64 64 TE 65 65 TE 66 66 TE 67 67 TE 68 68 TE 69 69 TE 70 70 TE 71 71

! Depression 2
FR LY 72 15 LY 73 15 LY 74 15 LY 75 15 LY 76 15 LY 77 15 LY 78 15 LY 79 15 LY 80 15
FR TE 72 72 TE 73 73 TE 74 74 TE 75 75 TE 76 76 TE 77 77 TE 78 78 TE 79 79 TE 80 80

! FFR 2
FR LY 81 16 LY 82 16 LY 83 16 LY 84 16 LY 85 16 LY 86 16 LY 87 16 LY 88 16
FR TE 81 81 TE 82 82 TE 83 83 TE 84 84 TE 85 85 TE 86 86 TE 87 87 TE 88 88

! ES 2
FR LY 89 17 LY 90 17 LY 91 17 LY 92 17 LY 93 17
FR TE 89 89 TE 90 90 TE 91 91 TE 92 92 TE 93 93

! CS 2
FR LY 94 18 LY 95 18 LY 96 18 LY 97 18
FR TE 94 94 TE 95 95 TE 96 96 TE 97 97

! NA 2
FR LY 98 19 LY 99 19 LY 100 19 LY 101 19 LY 102 19
FR TE 98 98 TE 99 99 TE 100 100 TE 101 101 TE 102 102

FI PS 1 1 PS 2 2 PS 3 3 PS 4 4 PS 5 5 PS 6 6 PS 7 7 PS 8 8 PS 9 9 PS 10 10 PS 11 11
FI PS 12 12 PS 13 13 PS 14 14 PS 15 15 PS 16 16 PS 17 17 PS 18 18 PS 19 19
VA 1.0 PS 1 1 PS 2 2 PS 3 3 PS 4 4 PS 5 5 PS 6 6 PS 7 7 PS 8 8 PS 9 9
VA 1.0 PS 10 10 PS 11 11 PS 12 12 PS 13 13 PS 14 14 PS 15 15 PS 16 16 PS 17 17
PS 18 18 PS 19 19

! Latent Variable Correlations at T1
FR PS 1 2 PS 1 3 PS 1 4 PS 1 5 PS 1 6 PS 1 7 PS 1 8 PS 1 9 PS 1 10 PS 1 11 PS 1 12
PS 1 13 PS 2 3 PS 2 4 PS 2 5 PS 2 6 PS 2 7 PS 2 8 PS 2 9 PS 2 10 PS 2 11 PS 2 12
PS 2 13 PS 3 4 PS 3 5 PS 3 6 PS 3 7 PS 3 8 PS 3 9 PS 3 10 PS 3 11
FR PS 3 12 PS 3 13 PS 4 5 PS 4 6 PS 4 7 PS 4 8 PS 4 9 PS 4 10 PS 4 11 PS 4 12 PS 4
13 PS 5 6 PS 5 7 PS 5 8 PS 5 9 PS 5 10 PS 5 11 PS 5 12 PS 5 13 PS 6 7 PS 6 8 PS 6 9
PS 6 10 PS 6 11 PS 6 12 PS 6 13 PS 7 8 PS 7 9 PS 7 10 PS 7 11 PS 7 12 PS 7 13 PS 8
9 PS 8 10 PS 8 11 PS 8 12 PS 8 13 PS 9 10 PS 9 11 PS 9 12 PS 9 13 PS 10 11 PS 10
12 PS 10 13 PS 11 12 PS 11 13 PS 12 13

! Latent Variable Corrections at T2
FR PS 14 15 PS 14 16 PS 14 17 PS 14 18 PS 14 19 PS 15 16 PS 15 17 PS 15 18 PS
15 19 PS 16 17 PS 16 18 PS 16 19 PS 17 18 PS 17 19 PS 18 19

! Time 1 DVs to Time 2 DVs
FR BE 14 8 BE 15 9 BE 16 10 BE 17 11 BE 18 12 BE 19 13 BE 14 9 BE 15 8

! Time 1 S & D to Time 2 PFS
FR BE 16 8 BE 17 8 BE 18 8 BE 19 8 BE 16 9 BE 17 9 BE 18 9 BE 19 9

! Time 1 Health to Time 2 DVs
FR BE 14 1 BE 14 2 BE 14 3 BE 14 4 BE 14 5 BE 14 6 BE 14 7 BE 15 1 BE 15 2
BE 15 3 BE 15 4 BE 15 5 BE 15 6 BE 15 7 BE 16 1 BE 16 2 BE 16 3 BE 16 4 BE 16
5 BE 16 6 BE 16 7 BE 17 1 BE 17 2 BE 17 3 BE 17 4 BE 17 5 BE 17 6 BE 17 7 BE
18 1 BE 18 2 BE 18 3 BE 18 4 BE 18 5 BE 18 6 BE 18 7 BE 19 1 BE 19 2 BE 19 3
BE 19 4 BE 19 5 BE 19 6 BE 19 7

! Indirect Effects
CO PA(1) = BE 14 1 * BE 16 8
CO PA(2) = BE 15 1 * BE 16 9
CO PA(3) = BE 14 1 * BE 17 8
CO PA(4) = BE 15 1 * BE 17 9
CO PA(5) = BE 14 1 * BE 18 8
CO PA(6) = BE 15 1 * BE 18 9

CO PA(7) = BE 14 1 * BE 19 8
CO PA(8) = BE 15 1 * BE 19 9
CO PA(9) = BE 14 2 * BE 16 8
CO PA(10) = BE 15 2 * BE 16 9
CO PA(11) = BE 14 2 * BE 17 8
CO PA(12) = BE 15 2 * BE 17 9
CO PA(13) = BE 14 2 * BE 18 8
CO PA(14) = BE 15 2 * BE 18 9
CO PA(15) = BE 14 2 * BE 19 8
CO PA(16) = BE 15 2 * BE 19 9
CO PA(17) = BE 14 3 * BE 16 8
CO PA(18) = BE 15 3 * BE 16 9
CO PA(19) = BE 14 3 * BE 17 8
CO PA(20) = BE 15 3 * BE 17 9
CO PA(21) = BE 14 3 * BE 18 8
CO PA(22) = BE 15 3 * BE 18 9
CO PA(23) = BE 14 3 * BE 19 8
CO PA(24) = BE 15 3 * BE 19 9
CO PA(25) = BE 14 4 * BE 16 8
CO PA(26) = BE 15 4 * BE 16 9
CO PA(27) = BE 14 4 * BE 17 8
CO PA(28) = BE 15 4 * BE 17 9
CO PA(29) = BE 14 4 * BE 18 8
CO PA(30) = BE 15 4 * BE 18 9
CO PA(31) = BE 14 4 * BE 19 8
CO PA(32) = BE 15 4 * BE 19 9
CO PA(33) = BE 14 5 * BE 16 8
CO PA(34) = BE 15 5 * BE 16 9
CO PA(35) = BE 14 5 * BE 17 8
CO PA(36) = BE 15 5 * BE 17 9
CO PA(37) = BE 14 5 * BE 18 8
CO PA(38) = BE 15 5 * BE 18 9
CO PA(39) = BE 14 5 * BE 19 8
CO PA(40) = BE 15 5 * BE 19 9
CO PA(41) = BE 14 6 * BE 16 8
CO PA(42) = BE 15 6 * BE 16 9
CO PA(43) = BE 14 6 * BE 17 8
CO PA(44) = BE 15 6 * BE 17 9
CO PA(45) = BE 14 6 * BE 18 8
CO PA(46) = BE 15 6 * BE 18 9
CO PA(47) = BE 14 6 * BE 19 8
CO PA(48) = BE 15 6 * BE 19 9
CO PA(49) = BE 14 7 * BE 16 8
CO PA(50) = BE 15 7 * BE 16 9

CO PA(51) = BE 14 7 * BE 17 8
CO PA(52) = BE 15 7 * BE 17 9
CO PA(53) = BE 14 7 * BE 18 8
CO PA(54) = BE 15 7 * BE 18 9
CO PA(55) = BE 14 7 * BE 19 8
CO PA(56) = BE 15 7 * BE 19 9

ST .8 ALL

LE
PhysFunc RoleLim EngyFatg SocFunc Pain GenHlth CareChld Stress1 Dep1 FFR1
ES1 CS1 NA1 Stress2 Dep2 FFR2 ES2 CS2 NA2

 OU AD=OFF ND=3 IT=5000 NS PV=fullmedpv.pv SV=fullmedsv.sv
GF=fullmedgf.gf