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Adult siblings: Does disability influence family cohesion, coping, and overall self -mastery?

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ADULT SIBLINGS: DOES DISABILITY INFLUENCE FAMILY COHESION, COPING, AND OVERALL SELF-MASTERY?

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A DISSERTATION

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ABSTRACT

The current study explores the relationship between two groups of adult siblings: a group whose sibling had a disability and a group whose sibling did not have a disability. Based on previous literature review, a theoretical model was constructed to elucidate the relationships of the participants' perceptions of their family's strengths in relation to coping and experiencing feelings of self-mastery/self-esteem. Participants were recruited from a local undergraduate psychology course and university campus through fliers and newspaper ads, and from SibNet, a sibling listserve via the Internet. One hundred and ninety one siblings completed the survey packet that contained measures on family strength, family adaptability and cohesion, coping, and self-mastery/self-esteem. One hundred and eight were in the nondisability group, while eighty three siblings were in the disability group. Structural equation modeling revealed that the overall trimmed model (N =191), as well as the two trimmed models by group (n =109, n = 83), had sound fit indices (GFI = 0.98, 0.97, 0.95, respectively) and therefore represented the data well.

The overall model found family strength to be a good predictor of family adaptability and cohesion, coping, and self-mastery/self-esteem, with an additional positive relationship between emotion- and problem-focused coping and a negative relationship between emotion-focused coping and self-mastery/self-esteem, where the higher the emotion-focused coping, the lower the self-esteem/self-mastery. When the models were separated into groups (disability versus nondisability), pathways no longer existed between family strengths and coping but did remain on adaptation and cohesion, as well as on self-mastery/self-esteem. The most interesting finding revealed that while the nondisability group showed no relationship between coping styles and self-mastery/self-esteem, the disability group maintained the negative relationship between emotion-focused coping and self-mastery/self-esteem as seen in the overall model. These findings suggest that, independent of family strength, adaptability, and cohesion, the coping style of a sibling of a person with a disability may affect overall self-mastery/self-esteem; however, the results must be considered within adult lifespan development theory to adequately explain the different findings between the two groups, mostly due to age, gender, and developmental stage.

DEDICATION

I thank my family who have diligently stood by and supported me through out this process in countless ways. For that I will be eternally grateful. I thank my friends and peers, especially Stephanie Chopko, Ph.D., for being my sounding boards, my strength, and often my voice of reason. Most importantly, I dedicate this work to my brother Thad, for had I not been blessed to be his sister; my life would have never known the power of such an extraordinary individual.

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LIST OF ABBREVIATIONS

AD/HD	Attention-Deficit/Hyperactivity Disorder
AFSI	American Family Strength Inventory
AGFI	adjusted goodness of fit
EFC	emotion-focused coping
FACES	Family Adaptability and Cohesion Evaluation Scales
GFI	goodness of fit index
MR/DD	mental retardation/developmental disability
NFI	normed fit index
PFC	problem-focused coping
PGFI	parsimony goodness of fit index
PNFI	parsimony normed fit index
PTSD	Post-Traumatic Stress Disorder
RFI	relative fit index
RMSEA	root mean square error of approximation
RMR	root mean square residual
SEM	structural equation modeling
SMSE	Pearlin's Self-Mastery/Self-Esteem Scales
WAYS	Ways of Coping Questionnaire

INTRODUCTION

"I don't know why, but outside support groups, many siblings rarely talk about their brothers or sisters with special needs. It's not so much that we hide the fact that we have a sibling with a disability. We just don't discuss it with most people, and psychologists tell us that's not healthy. We need to talk to someone - a therapist, a best friend, other siblings in a support group, or siblings on the Internet."

-Mary McHugh, 2003

Background and Significance

Siblings represent a unique aspect of the family system. These individuals are born into the same family, share the same parents, and experience events through parallel and intertwined lives (Seligman & Darlington, 1997). During childhood, siblings are proximally close due to birth order, living conditions, and family environment. Often beginning in adolescence, differences in non-shared physical and emotional experiences are typical, as separate identities are formed and independence is achieved. Young sibling camaraderie is often replaced by adolescent rivalry. Whether this rivalry is resolved, worsened, or remains static over time depends on the combination of the individual's personality traits combined with overall family dynamics (Cicirelli, 1982). As siblings proceed into adulthood, research shows that the sibling bond that may have once been strained by adolescence is once again strengthened through a variety of common experiences in adulthood (e.g., marriage, career development, child birth, parental care taking demands, etc.) (Cicirelli, 1982). Siblings remain constant sources of long-distance advice, encouragement, and support as they become aunts and uncles, and provide familial support and companionship (Bank & Kahn, as cited in Seligman & Darling, 1997). The consistency of siblings' influence is perhaps more appreciated when viewed from a population perspective. Young adults have approximately 4 living siblings (Adams, 1968), while middle-aged adults have a mean of 2.2 living siblings. The elderly, age 60-69, 70-79, and 80+ have approximately 2.88, 2.18, and 1.08 living siblings, respectively (Cicirelli, 1979).

Researchers have yet to sufficiently capture the complexity of typical sibling relationships (Seligman & Darling, 1997) and the majority of the research focuses on relationships between the ages of 3 and 18. Little is known about adult sibling relationships and even less is know about the psychosocial impact of the sibling bond between adult siblings. The literature is particularly lacking within the adult disability population, namely the effects of being an adult sibling to an adult brother or sister who has a disability.

Cicirelli (1982) suggests that some general conclusions regarding adult sibling relationships can be made. First, although the number declines sharply in old age, the majority of individuals still have living siblings until the end of their lifespan and almost all adults throughout their lives maintain contact with their siblings. Second, most adult siblings feel affectionately close to one another, with the most between sisters. Third, age lessens sibling rivalry, which is traditionally greatest between brothers. Greater maturity and less frequent contact help to alleviate rivalry over time. However, rivalry can be re-activated by parental caretaking, family estate managing, inheritance, etc. Fourth, sisters provide a unique role over the entire lifespan, likely performing more caretaking roles over time and typically having stronger relationships with other siblings than do brothers However, sibling relationships are different when one of them has a developmental disability.

Approximately 3 million American children and adults have (or had) a brother or sister with mental retardation and/or developmental disability (MR/DD) (Siegel & Silverstein, 1994). Seligman and Darling's argument perhaps most accurately captures the present known research on sibling relationships of individuals with disabilities: "From an empirical point of view, the question of whether siblings are not affected, are helped, or are harmed by the presence of a brother or sister with a disability remains open to speculation... The factors that interact and subsequently lead to adjustment or psychological difficulties are many and combine in complex ways" (p. 142). Very few studies have focused on adult sibling dyads where one of the siblings has a developmental disability. In a review of three existing adult studies, most adults remained involved with their brothers or sisters with disabilities, and the relationships were usually viewed in a positive light (with similar ratings in affection and companionship toward nondisabled siblings). Again, asymmetry exists in adult relationships in that their siblings without disabilities provide a disproportionate amount of help and support to the siblings with disabilities. However, siblings with disabilities try to help the nondisabled siblings as well (providing babysitting for nondisabled siblings and family). Adult sibling dyads involving disability have been found to have less competition in life aspirations, such as marriage partners, career choices, and social status than those without disability (Begun, 1989; Seltzer, Begun, Seltzer, & Krauss, 1991; Zetlin, 1986).

To date, sibling research within the disability and chronic illness literature has focused a) mostly on child siblings; b) has been largely derived from parental report; and c) during its early history, focused largely on negative, internalizing behaviors, such as depression, self-worth, and/or adjustment difficulties (Farber, 1960, 1963; Gath, 1973; Siegel & Silverstein, 1994; Tew & Laurence, 1973; Vadasy, Fewell, Meyer, & Schell, 1984). The shift to exploring positive affects of having a sibling with a disability began in 1972 with a study by Francis Grossman, whose subject pool consisted of Yale college students who had a sibling with a disability. The percentage of students that referenced positive effects, such as more empathy, and more awareness and acceptance of others with disabilities, equaled those students who reported more externalizing, interactive behaviors. Grossman's findings were supported by subsequent studies that either reported positive effects or no harmful effects of having a sibling with a disability or chronic illness (Lobato, Faust, & Spirito, 1988; Simeonsson & McHale, 1981; Taylor, 1980). Meyer (1993) also found positive views by siblings and grandparents of an individual with a disability. Although negative sibling research declined between 1970-1990, the increase in positive research remained small (Helff & Glidden , 1998).

Positivity in families of children with disabilities has mostly been focused on the development of parental positivity after the introduction of child with disabilities into the family. Scorgie and Sobsey (2000) conducted a qualitative analysis of the pathways that lead to parents achieving a positive perception of their child with a disability. Their findings yielded three processes: (a) forming new identities (e.g., new parenting role expectations), (b) efforts to find meaning in the situation, and (c) developing a sense of personal control. These processes have not been looked at within the sibling context, perhaps because siblings do not meet these processes until adulthood, when faced with caretaking for their sibling and for their own family and children.

Though sparse, enough family focused research currently exists to speculate about sibling relationships, especially when combined with casual observation and anecdotal evidence of siblings (Seligman & Darling, 1997). This research seems to center around family adaptation, with particular focus on mothers and their coping strategies in raising a child with MR/DD. A limited amount of information on how siblings adapt to having a brother or sister with MR/DD is also available; some siblings are relatively unaffected (Hannah & Midlarsky, 1999) while others may be considered psychologically "at risk" (Seligman & Darling, 1997). In addition, it appears that the sibling without disability, specifically sisters, often put his/her own needs on hold so as to meet the needs of the sibling with disabilities (Stoneman et al., 1988, 1991). Successfully deferring one's own needs becomes a source of satisfaction for the sibling without the disability if the needs of others (including the sibling with the disability) are met (Siegel & Silverstein, 1994). However, the literature shows that as adults, these siblings often report feeling guilty about past resentment due to overt embarrassing behaviors, feelings of alienation, and increased parental attention given to their disabled sibling (Siegel & Silverstein, 1994).

In an effort to empirically unravel the sibling bonds involving a disability, Stoneman (1998) provides a developmental framework exploring various aspects of the sibling relationship. Her model emphasizes the relationship between typical development and the development of individuals with MR/DD, rather than comparing the various etiologies of the MR/DD. By comparing and contrasting typical verses atypical development as a whole, variations between these two groups would be highlighted; specifically those variations that are developmentally vulnerable, such as psychosocial impact of the atypical sibling environment. While Stoneman acknowledges that theory comparing and contrasting typical versus atypical sibling relationships provides invaluable information, developmental models have now become more comprehensive, to include family systems and environmental influences. She suggests that by exploring environmental factors, such as family structure, socio-economic status (SES), other siblings in the home, living arrangements, and educational attainment, one more accurately captures the complexity of the sibling relationship. The relationship becomes conceptualized as a unit of developmental change, therefore acknowledging the reciprocal and dynamic influence that siblings have on each other (Stoneman, 1998).

According to Cicirelli (1982), sibling variables, such as age, gender, and birth order, have an effect within the family unit. He postulates that a child may be treated differently within a family related to their status in these areas. Gallo and Knafl (1993) suggest that sibling adjustment may depend on specific child and family characteristics. These characteristics, coupled with demographic variables, form a child's interaction and behavior patterns within the family structure. The proposed study will attempt to explore the relationship between certain demographic variables (e.g., age, gender, birth order, etc.) and constructs of perceived emotional development (e.g., family strengths, cohesion, adaptation, coping, and self-mastery). Furthermore, as suggested by Lobato et al. (1988), the presence or absence of a disease or disability will be conceptualized as a risk factor that will mediate these individual and family characteristics.

Theoretical Components

Strong Families

Given Stoneman's recognition of the large role that the families play in sibling relationships, the assumption is made that the stronger the family, the more adaptive and cohesive the siblings would be. Dunst et. al. (1988) concluded that the various types of strengths that families possess reflect the way in which families cope and grow. Family relations were a significant predictor of internalizing and externalizing behaviors, and self-esteem for brothers and sisters of children with disabilities (Hannah & Midlarsky, 1999). According to Stinnett, Chesser, and DeFrain, (1979) a *strong family* is one whose relationship patterns, interpersonal skills and competencies, and social and psychological characteristics create a sense of positive family identity, promote satisfying and fulfilling interaction among family members, encourage the development of the potential of the family group and individual family members, and contribute to the family's ability to effectively deal with stress and crisis.

Since beginning their research in 1974, Stinnett and DeFrain (1985) have found that the qualities of a strong family in America fit into six categories: 1) commitment to the family; 2) spend time together; 3) communicate effectively; 4) appreciation and affection for each other; 5) effective stress and crisis management; and 6) a common belief in spiritual well-being. By using these six categories, the authors developed the American Family Strength Inventory (AFSI), composed of 82 brief questions and 4 additional questions that are global measures of family strength. While Stinnett and DeFrain's findings have been replicated on a variety of races and single versus married households, they have not tested their six-component theory on siblings, much less siblings who have a brother or sister with a disability. However, based on previous findings, one might expect that those siblings who rank their families as being "stronger" on each of the six components may show more adaptability, family cohesion, effective coping, and self-efficacy.

Flaherty and Glidden (2000) studied parents who had a child with Down syndrome and parents who had adopted a child with Down syndrome. Both groups were compared on family strengths. Findings revealed that neither set of families differed significantly on a measure of family strength. While these findings are informative, they represent the parents' perspective on family strengths, not the siblings' perspective. In one of the few studies conducted on adult siblings, Seltzer, Greenberg, Orsmond, and Krauss (1997) found that adult siblings of adults with mental retardation and mental illness who had positive family bonds were more likely to be involved with other family members in the long-term care of their disabled siblings.

Adaptability & Cohesion

Adaptability and cohesion have been identified as two important underlying dimensions of variation within family systems (Olson, McCubbin, Barnes, Larsen, Muxen, & Wilson, 1983). These dimensions are curvilinearly related to positive psychological functioning, in that the scores that fall in the middle ranges indicate optimal performance. Adaptability refers to the degree to which the family power structure, roles, and rules of communication are rigid or changeable. Within this dimension, both overly adaptive (chaotic) and underadaptive (rigid) families are problematic, while those in the middle range (flexible and structured) are optimal. Cohesion refers to the level of bonding and the degree of autonomy family members experience. Both overly cohesive (enmeshed) and undercohesive (disengaged) families are problematic, while those that fall in the middle range (separated or connected) are optimal. Family cohesion, cared-for person's gender, and the presence of behavior problems were found to be predictors of caregiver gratification (Greenberg, Seltzer, & Greenley, 1993).

Beavers and Voeller (1983) have objected to Olson et. al.'s theory on adaptability and cohesion, regarding the issue that one's view of family cohesion may be influenced by individual autonomy, which, according to Beavers and Voeller, should be made a separate construct from cohesion. Further, they postulate that autonomy "define[s] clearly that awesome boundary between self and others, even those whom one loves dearly" (pg. 86). Another area of disagreement is the curvilinear relationship between adaptability and optimal functioning. Beavers and Voeller feel that one's capacity to be adaptable is ever changing and growing, and therefore should be placed on a continuum ranging from dysfunctional to optimal. In other words, the more adaptability in the family system, the more autonomy or individuation the members show, the better they function (Farrell & Barnes, 1993).

Another issue of debate according to Beavers and Voeller is that adaptability and cohesion are not mutually exclusive. Families who are low on cohesion view their interpersonal rewards as coming from outside the family (centripetal) whereas families high on cohesion view the family as an abundant source of gratification (centrifugal). Cohesion relates to adaptability in that as adaptability increases, extreme centripetal/centrifugal styles diminish. In other words, families high on adaptation dimension would not be likely to score high on cohesion extremes. Conversely, if families are low on adaptability, then more extreme ranges of cohesion are expected to be found. In summary, an interaction effect exists between adaptability and cohesion such that individuals may function best when adaptability is high and cohesion is intermediate.

In an attempt to unify clinical and sociological perspective on family systems theories, Farrell and Barnes (1993) suggest that the foundations of the adaptability/cohesion debate within clinical and sociological research could be better understood if: a) each family member were surveyed and b) gender was taken into consideration. Gender may play an influential role when measuring adaptability and cohesion, because males tend to perceive less cohesion within their family than females. Olson et. al. found that families with adolescent children tended to be less cohesive and more chaotic than families at earlier stages of development. Further, adolescent children rated their families as being less cohesive and more rigid than did their parents. Within the pediatric chronic illness literature, family cohesion and adaptability were found to mediate the impact of pediatric cancer on the healthy sibling (Cohen, Friedrich, Jaworski, Copeland, & Pendergrass, 1994). Siblings who were better adapted come from families who exhibited high levels of family cohesion and adaptability.

Taking into consideration the research, theories, and criticisms on adaptability and cohesion, the current study adds to the body of literature in a number of ways. First, this study further elucidates an often-overlooked member of the family unit, the sibling. Second, the age of the siblings (adults) used in this study is unique, given that most adaptability/cohesion studies focus on parents and adolescents reflecting on their current family, rather than reporting based on their family of origin. Third, the area of gender will be explored to address the discrepancy between reports of adaptability and cohesion and in males versus females. Finally, the comparison of the disability versus nondisability sibling groups will reveal the impact a disability and its influence upon family adaptability and cohesion.

Coping

The concept of coping has been adopted by many disciplines, such as biology and sociology; however, the concept was originally rooted in psychology. While "coping" has many vernacular definitions, each meaning shares a central idea, the struggle with external and internal demands, conflicts, and distressing emotions (Lazarus & Folkman, 1984). Lazarus and Folkman define coping "at the psychological level of analysis as *the process of managing demands (external or internal) that are appraised as taxing or exceeding the resources of the person*" (italics original, 1984). According to its authors, this definition is multifaceted. First, the process of coping is emphasized rather than being a trait or style. The coping process refers to "(1) what the person *actually does in a particular encounter*, and (2) *how what is done changes* as the encounter unfolds, or from encounter to encounter when they are united by some common theme" (p. 287, italics original). Further, they postulate that since process and state are both responses to change depending upon circumstance, then both concepts are analogous. Viewing coping as a process also includes its complexity and variability whereas viewed from a "trait" perspective, such intricacies are lost. Second, coping is viewed as an entity that is managed rather than mastered, since most human problems (e.g., aging, illness, and sudden change) can not be mastered, but are redefined, accepted, endured, and tolerated. Third, the term "appraisal" emphasizes the importance of psychological mediation because it is based on one's mental interpretation of an event; therefore it is mentally appraised. Finally, Lazarus and Folkman view coping as initiating effort rather than remaining stagnant about a concern. While the concepts of coping and adaptation are similar, it is the aforementioned mobilization of effort that differentiates the two concepts. Adaptation refers to processes affecting how well a person gets along, while coping occurs only when the person cannot routinely handle requirements or demands (Lazarus & Folkman, 1984). Therefore, in the model used for the current study, adaptability and cohesion are hypothesized to be positively related to coping, in that as adaptability is high, so too will be coping, assuming that the more adaptable the individual is, the more coping efforts will be employed.

Functions of Coping. Lazarus and Folkman (1984) contend that the functional importance lies in the distinction between "problem-focused" and "emotion-focused" coping. Problem-focused coping refers to constructive, directed efforts towards alleviating a harmful, threatening, or challenging condition. Emotion-focused coping refers to directed efforts to regulate the emotional self, whether the regulation targets behavior and expression, physiological disturbances, subjective distress, or all three. One coping strategy can serve both problem- and emotion-focused coping functions. For example, the problem-focused efforts of taking care of a neighbor's children after the parents were in a car accident can be simultaneously emotion-focused by making the person feel needed. According to one study, 98% of 1,332 subjects used both methods of coping, therefore illustrating the importance of both concepts (Folkman & Lazarus, 1980). Further, it has been speculated that the wider the variety of coping responses and resources one can employ decreases emotional stress more than using any single coping strategy repeatedly across crises (Pearlin & Schooler, 1978).

Coping with Siblings. Lazarus and Folkman (1984) suggest that their dual model concept of emotion- and problem-focused coping needs to be examined thoroughly by exploring multiple situations and multiple family members. The current study will attempt to measure coping of siblings who do or do not have a sibling with a disability; therefore, providing coping information on the differences between these two contexts. It is believed that the data on coping gathered from this study will mimic the coping data collected from individuals from two different cohorts: those with serious illness and parents of young children with disabilities.

Within the serious illness population, Lazarus and Folkman (1984) found that people who are ill are aware of danger signals to their health and are actively preventing complications, while also maintaining morale throughout their illness. It was concluded that these patients likely employ both emotional-regulation and problem-solving forms of coping. The serious illness population is similar to the sibling population. Both people with illness and siblings of a brother or sister with a disability must be alert to signals and are often active in the prevention of complications for themselves and their sibling. Therefore, it can be assumed that siblings of individuals with disabilities may employ both problem- and emotion-focused coping. Pearlin and Schooler (1979) also concluded that using a variety of coping responses may decrease emotional distress significantly more than using just one form of coping. In fact, Evans et al. (1992) did find evidence of siblings using both problem- and emotion-focused coping strategies.

According to Judge (1998), parents of young children with disabilities report higher levels of family strength when they use problem-focused coping instead of emotion-focused coping. Problem-focused coping involves efforts to alter the cause of the stress (e.g., active problem solving, seeking social supports) while emotion-focused coping represents efforts to regulate an emotional response to stress (e.g., detaching from situation, wishful thinking, self-blame). Emotion-focused coping is related to reports of depressed mood (Aldwin & Revenson, 1987; Bolger, 1990; Cronkite & Moos, 1984; Folkman & Lazarus, 1986) while problem-focused coping is associated with reduced distress (Aldwin & Revenson, 1987; Coyne, Aldwin, & Lazarus, 1981; Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). Folkman and Moskowitz (2000) found that adult caregivers of terminally ill loved ones who demonstrated positive affect viewed the exhausting and stressful experience of being a caregiver as worthwhile and valuable. This finding indicated the importance of how the caregiving efforts are perceived.

Based on the illness literature and on the studies focusing on parenting young children with disabilities, it is predicted that whether an adult sibling will use more problem- or more emotion-focused coping will be dependent upon their family strengths scores, such that higher family strength scores will indicate higher problem-focused coping and lower family strength scores will reveal tendencies towards emotion-focused coping.

Whether a person copes by employing mostly problem- or emotion-focused coping strategies depend on the circumstance. Stressful work episodes (i.e., threats to self-esteem) are linked to problem-focused coping while health related concerns (i.e., threat to loved one's well being) are dealt with using mostly emotion-focused coping (Lazarus & Folkman, 1984). Problem-focused coping is used in situations that are perceived as being changeable, whereas emotion-focused coping is used more often when situations that are perceived as unchangeable (Lazarus & Folkman, 1988). When threats to self-esteem are high, individuals tend to use more confrontive coping, more self-control, accept more responsibility, use more escape-avoidance, and seek less social support than when threats to self-esteem were low. When a loved one's well-being is at stake, individuals tend to use more confrontive coping, more escape-avoidance, less planful problem solving, and less distancing than when a loved one's well-being was not at stake. For purposes of this research, it is hypothesized that siblings who have a brother or sister with a disability will employ more emotion-focused coping, such as distancing or positive reappraisal, given the likelihood that these individuals are (1) more prone to have threats to their well-being than the nondisabled population and (2) are less amenable to change due to their disability.

Further illustrating the link between illness or disability and family coping styles, researchers in Japan attempted to identify the family coping strategies among families with chronically ill children and to explore the relationship between the family system (variables), family burden, and family coping. One hundred fifty-two families with chronically ill children were administered the Japanese version of Family Adaptability and Cohesion Evaluation Scales II and the Family Coping Behavior Inventory II. The results revealed that family cohesion and adaptability in families with a chronically ill child tended to be lower than families who do not experience a childhood illness. Positive relationships were found between coping pattern, family cohesion and family burden, and between problem solving coping patterns and family burden. Normalization coping patterns were negatively related with the family burden but positively related to family cohesion. Finally, the crisis response coping pattern was positively related with family burden and negatively related with family cohesion (Nojima, Nakano, & Miyai, 1994). Therefore, families were less likely to follow crisis coping patterns if their cohesion is high.

Cognitive Appraisal. If coping is in part a reaction to a perceived stressful situation, then one's cognitive appraisal of the situation must be considered. Psychological stress results from a person's interpretation of the social and physiological assessment of the environment (Lazarus & Folkman, 1984). This evaluative process is termed "cognitive appraisal." According to Lazarus and Folkman, appraisals of environmental situations result in psychological stress when the individual perceives harm, threat, and/or challenge. Harm corresponds to damage already done, threat represents the potential for harm, and challenge suggests the possibility for significant gain under difficult circumstances. Lazarus and Folkman (1984) highlight the importance of including the concept of appraisal in their theory because it accounts for individual differences in perceived stress and consequent coping. Since siblings are individuals sharing similar experiences, it is imperative that individual differences are accounted for to yield information regarding coping styles. According to Lazarus and Folkman, if the participant siblings feel harmed, threatened, or challenged by their brother or sister, then their coping will be mediated by these feelings.

While Lazarus and Folkman do not specifically cite sibling relationships when giving examples of their theory, its applicability to sibling relationships and coping becomes apparent. For example, each appraisal category (e.g., harm, threat, and challenge) can be applied to sibling relationships. *Harm* is defined as a temporary (e.g., verbal insult, poor job evaluation, acute illness) or permanent (e.g., sibling with a disability) damage to one's well-being. Long-term or permanent harm often requires a shift in values and commitments in order for the person to prevent any further damage or loss. This functional shift involves coping. Introducing a child with disabilities into a family, whether its origin is organic or consequential, can be initially perceived as a source of permanent or long-term harm.

Likewise, *threat* seems to mediate the dynamics of coping by introducing future considerations or "anticipatory coping." Threat requires an evaluation of what will happen, when it will happen, and how bad it will be; the possibilities for preventing, surviving, or tolerating it; and the chances for recouping in the event that it actually occurs. Unfortunately, the answers to these questions are not always readily available, therefore increasing ambiguity and uncertainty. At this point, seeking relevant information to decrease the unknown becomes relevant. Lazarus and Folkman (1984) state that while anticipatory coping is rare, it is more likely that people cope in the present much the same as they have coped in the past because these past coping strategies provide clues about what to expect and what to do in the future. Therefore, it is reasonable to assume that adult siblings of brothers and sisters with disabilities often feel threatened from the ambiguity and uncertainty of their siblings' current conditions and their futures (e.g., health care, housing, legal guardian, etc.), which could hinder effective coping. Additionally, it is likely that adult siblings will cope with their brother or sister in the present in the same manner as they did in the past (e.g., growing up together).

Finally, *challenge*, similarly to threat, is future-oriented, focusing on what can be gained rather than what might be lost. Lazarus and Folkman suggest, "the most important elements in coping with challenge are a positive outlook and the enthusiasm with which encounters are addressed". Further, they postulate "people may cope better when challenged than when threatened, because they are less conflicted and suffer less from such emotions as anxiety, anger, guilt, or jealousy. Their whole being is attuned to pursuing their commitment" (p. 291, 1984). Perhaps if a sibling viewed his or her relationship with an atypical sibling as a challenge rather than a threat, the relationship would be more positive because coping styles would be more effective and efficient. In sum, it is hypothesized that the cognitive appraisal of harm, threat, and challenge of the disability by the nondisabled sibling will be a mediator of overall coping efficacy.

Cognitive appraisal and subsequent coping styles employed determine psychological stress reactions, emotional experiences, and adaptive outcomes. Folkman (1979) suggests that the impact of a stressor (e.g., illness or disability) can be affected by five categories of coping resources: health/energy/morale (e.g., physical and emotional well-being), problem solving skills, social networks, general and specific beliefs (e.g., self-efficacy, religion, existential beliefs), and utilitarian resources (e.g., financial resources, socioeconomic status). The demographic variables and the measure of self-efficacy included in this study will include some of Folkman’s resources.

Self-Mastery/Self-Esteem

Self-mastery refers to the extent that a person feels a sense of control over their life's outcomes (Pearlin & Schooler, 1979). In the closely related topic of self-efficacy, Bandura (1977) linked mastery and efficacy by stating, "cognitive events are induced and altered most readily by experience of mastery arising from effective performance" (p. 191). Self-mastery is therefore perceived control over situational outcomes while self-efficacy is the confidence in one's ability to effectively engage in situations toward a desired goal (Majer, 2003). Bandura's well-known theory on self-efficacy includes four types of efficacy expectations: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal. Self-mastery influences the first type, performance accomplishment. Mastery suggests that one has successfully achieved at a certain level and is therefore psychologically equipped to succeed at the next level. Success raises mastery levels while failures lower mastery levels. A greater sense of mastery implies a higher self-esteem and self-efficacy. Mastery is also heavily influenced by vicarious experiences, Bandura's second efficacy expectation. The importance of sharing vicarious experiences between siblings and families in an effort to increase self-mastery seems obvious: the more the family members model task accomplishment (e.g., caretaking for sibling with disabilities) and prosocial behavior (e.g., effective communication and coping, stress and crisis management, adaptability and cohesion, etc.), the more the siblings develop a sense of self-mastery. Verbal persuasion, Bandura’s third efficacy expectation, suggests that individuals used words of encouragement and support to motivate behavioral success in others, therefore building efficacy. Bandura postulates however, that this type of efficacy expectation is the weakest because it does not facilitate an authentic experience for the individual. Verbal suggestions may build efficacy if the individual experiences successes based on suggestions but these can be easily extinguished if the experience fails. Finally, according to Bandura, emotional arousal affects perceived self-efficacy, specifically in coping because individuals typically avoid stressful situations where coping skills are questioned which therefore can reduce feelings of self-efficacy.

Largely driven by experimental animal research, conceptualizations of coping have been equated with mastery, as postulated by Bandura. Animals use coping strategies to control aversive environmental conditions which in turn lessen psychophysiological disturbances (Miller, 1980; Ursin, 1980). Humans employ thoughts to problem solve, thereby reducing stress. Coping is equated with mastery in its vernacular use as well, meaning that if someone has coped with a situation, a sense of mastery is implied. If coping was unsuccessful, it's assumed that the person's efforts were inadequate (Lazarus & Folkman, 1988).

Pearlin and Schooler (1979) consider psychological constructs such as self-esteem and self-mastery as general psychological resources, which are personality characteristics that are employed to withstand challenging life events. Self-mastery represents the individual's perception of the degree to which one's life events are under one's own control, whereas self-esteem represents the degree of positive regard towards one's self (Pearlin & Schooler, 1979). Self-mastery and self-esteem are affected by coping responses. These constructs represent the "self" or who people perceived themselves to be. Coping responses, on the other hand, represent what people *do* when faced with trying situations. Therefore, self-mastery and self-esteem are linked to coping in that the more people *do* cope, the more they *are* self-mastered and have increased self-esteem. Mastery fosters the development of a repertoire of coping mechanisms (DeVellis & DeVellis, 2001). Levels of self-mastery and self-esteem, as measured in this study, will serve as a representation of the effectiveness of coping. In other words, siblings, either with or without a brother or sister with a disability, may not be able to separate themselves from their sibling and his/her issues; however, effective coping responses may limit the amount of emotional stress therefore increasing perceptions of self-mastery and self-esteem. As Pearlin and Schooler (1979) conclude, "It is because of variations in coping efficacy that people exposed to similar life-strains may harbor quite different levels of stress" (p. 8).

Self-efficacy, as it relates to siblings and disability, has been sparsely explored. In a parental efficacy model, higher levels of self-efficacy exhibited by parents of a child with pervasive developmental disorder lead to lower levels of reported parental stress and fewer psychological symptoms (Sirbasku-Cohen et. al, 2001). Parental response to a child with disability appears to be modeled by typically developing offspring. Adolescents of siblings with a disability, who perceived their mothers as emphasizing and modeling prosocial and empathic behavior, reported a higher degree of interpersonal competence and self-efficacy (Grissom and Borkowski, 2002). Sisters were more self-efficacious across levels of sibling disability and relative age; however they did not differ from brothers on reports of interpersonal competence or maternal attitudes and actions. For the group without a disabled sibling, maternal attitude and action were not predictive of higher levels of self-efficacy. Therefore, parental attitudes and behaviors regarding the sibling with the disability increase levels of self-efficacy in other siblings, especially sisters.

Demographic Effects

The impact of demographic or categorical variables, such as age and gender, on sibling adjustment continues to be an important area of study. Such research has yielded some predictions as to how sibling relationships function related to specific demographic variables, such as gender, age, and etiology of sibling's disability, and its subsequent cognitive effects. The following section reviews studies representative of findings from sibling studies with children primarily based on parental report.

Gender

Perhaps the most obvious influential demographic factor to consider when studying sibling relationships is gender. While the findings are mixed, research shows that the most effected relationship between individuals who have siblings with a disability is that of the sister (Grossman, 1972; Seligman & Darling, 1989). Sisters typically assume an expanded child-care role, which becomes even greater when the sibling with MR/DD has fewer adaptive and self-help skills (Stoneman et al., 1988, 1991). Girls who perceive this as a negative impact on their life more often tend to express their maladjustment internally, through depression and anxiety, while boys have a tendency to be more demonstrative and external, showing a higher level of aggression and acting out behaviors (Siegel & Silverstein, 1994; Labato, Barbour, Hall, & Miller, 1987). It was initially believed that the increased burden of caregiving deprived girls of engaging in age-appropriate activities and peer relationships; however this assumption has not been supported by some research (Stoneman, Brody, Davis, & Crapps, 1988; Lobato et. al., 1987). Schwab (1989) found that females had a more positive perception of their sibling with a disability than males. Furthermore, although girls typically engage in more caregiving activities than do boys, at least one study found that boys with disabled siblings perform equally as much caregiving duties as girls with nondisabled siblings (McHale & Gamble, 1989). Cicirelli (1985) suggested that children whose gender matched that of their sibling with disabilities were negatively affected; however other studies have not supported this assumption (Hannah & Midlarsky, 1999). All of the findings noted above are based children and parental report. Gender effects within the target population of this study, adult siblings, have yet to be adequately assessed.

Age and Spacing Effects

Stoneman (1998) feels that study of siblings should include a strong emphasis on age-related changes to incorporate development. Sibling relationships are in a constant state of change and adaptation, developing over time and being altered by life events. Aging is a process of change over time and its effects therefore must be taken into consideration.

Age as a Process of Coping. Maladaptive behaviors during childhood are characterized by a wave pattern. In other words, these behaviors are common until the age of 3 or 4, they decrease in early childhood, increase again during adolescence, and then decline once again in adulthood. Hannah and Midlarsky (1999) found an inverse relationship between maladaptive coping (e.g., internalizing and externalizing behaviors) and age, such that as a child ages, their maladaptive behaviors increase. This finding suggests that perhaps as children move into adolescence, adaptive coping strategies enable increased competence and adjustment; however it has yet to be demonstrated within the adult sibling population.

What has been demonstrated as siblings age is that past unresolved issues may interfere with relationship quality and with the ability to enjoy time together. However, the first death of an older sibling appears to have a profound effect on other siblings such that a sudden awareness of mortality has the ability to break through previously unresolved emotional issues (Moyer, 1992).

Age and disability diagnosis also appears to affect adult sibling relationships and coping. A study comparing adult siblings of brothers or sister who either had a mental illness or mental retardation found that the age and time of diagnosis of the sibling affected the siblings' relationship. The siblings of those with mental retardation reported that their lives had been more strongly influenced, and seemed to cope better, in the areas of career choice, whether to have children, choice of romantic relationships, plans for their future, and feelings about people with disabilities. On the other hand, siblings of those with mental illness did not report having any domains affected by their relationship with their sibling. The authors suggested age of diagnosis as an explanation for this finding such that the adult siblings of individuals with mental retardation had always known their sibling's diagnosis throughout their life whereas the siblings of those individuals with mental illness learned of their sibling's diagnosis well into adulthood (Seltzer, Greenberg, Krauss, Gordon, et. al., 1997).

Age as a Process of Cognitive Change. Understanding the developmental characteristics of the sibling's particular disability can help to predict how that relationship will change and vary over time (Stoneman, 1998). Depending on the etiology of the MR/DD, children will differ in their levels of intellectual, language, and adaptive competencies. Babies with Down syndrome tend to be developmentally delayed, when compared to normally developing babies, in the areas of language, motor, and affective competence (Stoneman, 1998). On the other hand, children with hydroencephalus show hyperverbal behavior and echolalia (Blackman, 1990). The competence level of the child with MR/DD influences his/her interaction with his/her sibling(s). When the gap between competencies becomes larger, time spent interacting with the sibling declines, as does relational reciprocity. Consequently, the more competent, nondisabled sibling assumes a more dominant, controlling role, even if that sibling is younger (Stoneman, Brody, Davis, & Crapps, 1988). This often results in sibling *role reversal*, whereby the younger sibling assumes common responsibilities and duties characteristic of an older sibling (Brody, Stoneman, Davis, & Crapps, 1991). A particularly interesting finding is that even though one would assume that limited cognitive abilities of the sibling with MR/DD would in turn affect the sibling bond, research supports the contrary. The severity of sibling's cognitive limitations does not affect the strength of the sibling bond. In fact, neither sibling positivity, nor sibling adaptation have been found to be affected by the limited cognitive abilities of the sibling with the disability (Brody, et. al, 1991).

While role reversal may represent an area of psychological discomfort for young siblings, other concerns develop later in life in regards to having a sibling with a disability. Aging siblings with disabilities present new challenges, such as caretaking responsibilities, maintaining health care, locating appropriate housing and cognitive decline. This decline results largely from the natural processes of aging but also from the various etiologies of a disability. Individuals with disabilities have a shortened life span when compared to the typical population however; certain etiological differences of MR/DD have been found to show specific aging effects. For example, individuals with Down syndrome have an earlier onset of Alzheimer's disease when compared with the typical population (Janicki, 2001). This is a relatively recent finding given that the current population living with Down syndrome is living longer now than ever before, due to improvements in quality of life factors such as health care, accessibility to services, and increased independence. While effects of age and birth order have been explored within the children population of siblings, little is known about the effects of age and birth order among the adult sibling population.

Levinson's Stages of Adult Development

To fully consider the influence of family members, including siblings, upon one's life, one must look at the individual's developmental stage. Original stage theorist such as Kohlberg, Piaget, and Erickson laid the groundwork for more modern theorists such as Levinson. Most stage theorists focused on specific subjects (e.g., children, men, or women) at certain stages in life (e.g., infancy, childhood, etc.) in different conflicts (e.g., moral development, decision-making, actualization, etc.). Levinson's stage theory, originally published in 1978, is unique because it blends a complete life-cycle theory from infancy to old age, includes both genders, and involves many aspects of adult social-emotional development, including decision-making, dream (goal) seeking, and self-esteem, self-mastery issues. Because of the thorough, encompassing, and integrative nature of Levinson's developmental stage theory, the current study will be considered within his theoretical framework. As Levinson suggests, a "developmental approach is needed in the study of adulthood" and since the subjects participating in this study are adults, it seems appropriate to take into consideration adult developmental stages (1978, pg. 3).

There are key elements that provide the foundation of Levinson's theory. The first is his concept of life course, or life cycle. According to Levinson, life course allows connection between various stages of life, including the patterning of relationships and events that are individually unique to the person and to his/her world. It is this dynamic, fluid relationship between self and environment that Levinson felt allowed the understanding of life. The standard sequences of developmental periods were called "life cycles" (Kittrell, 1998).

Levinson's original life cycle theory is composed of four eras, with four cross-era transitions that bridge each era. These eras and cross-era transitions overlap to indicate the progression of change, rather than imply a sudden termination of one era and the immediate beginning to another. Furthermore, the eras do not suggest a single aspect of life change; rather they connect developmental concerns within the life structure of the years defined. The first era is Childhood and Adolescence from age 0-22 and it begins in the Early Childhood Transition, age 0-3. The next era is Early Adulthood, age 17-45, beginning with the Early Adult Transition, age 17-22. The third era is Middle Adulthood, age 40-65, beginning with the Mid-Life Transition, age 40-45. The fourth and final era is Late Adulthood, age 60+, which begins with the Late Adult Transition, age 60-65 (Levinson, 1978).

Eight years later, in 1986, Levinson elaborated on his theory, adding developmental periods in the eras of Early and Middle Adulthood. The Early Adulthood begins with the Early Adulthood Transition (17-22), then progresses to Entry Life Structure for Early Adulthood (22-28), followed by Age 30 Transition (28-33), and ending in Culminating Life Structure for Early Adulthood (33-40). The Middle Adulthood era begins with the Mid-Life Transition (40-45), progresses to Entry Life Structure for Middle Adulthood (45-50), followed to Age 50 Transition (50-55), and ending in Culminating Life Structure for Middle Adulthood (55-60) (Levinson, 1986).

Levinson's original 1978 theory, entitled *The Seasons of a Man's Life* was published based on his interviews with 40 American men, ranging in ages from 35-45 years old. After much controversy from proponents of female development, *The Seasons of a Woman's Life* was published posthumously in 1996, two years after his death, from a completed manuscript. Prior to the female version's publication, the majority of the controversy centered around the question as to whether or not women proceed through the same developmental and transitional life cycles as men do and does it occur within the same age brackets.

When comparing the gender differences between Levinson's male and female theories, the most striking discrepancy lies in his concept of the "Dream." Levinson place repeated importance of a man having a Dream, claiming that is was essential to the process of entry into adulthood. The Dream takes form in the Early Adult Transition (17-23) and is established in the Novice Phase (age 17-33) but remains gradually integrated within all adult life cycles. Imperative to Dream formation was a relationship with an older adult or mentor who would provide guidance and help to make the Dream a reality. Dreams were also supposed to generate excitement and vitality, which provided personal enthusiasm and encouragement for its pursuit.

Therein lies the greatest difference between genders in Levinson's theory: while the women did transition through his proposed life cycles, most of the women Levinson studied failed to form a Dream or to find a mentor by the end of the Early Adult Transition. None of the women envisioned a long-term career nor were they committed to an occupational Dream, like the men were. Additionally, Dreams that were identified (e.g., marriage, children, homemaker, career oriented, etc.) were void of excitement and vitality.

Given the constructs of this study (family strength, coping, adaptation and cohesion, and self-mastery/self-esteem) and the influential demographics of age and gender, it seems relevant to analyze the study's more psychosocial variables within the constructs of Levinson's theoretical model. As for the psychosocial effects of Levinson's stages, he postulated that developmental change was too broad and involved too many variables to easily imply whether the change was considered to be successful; therefore, he felt that successful developmental change was marked by one's "satisfactoriness" of the change. During stable periods, a person attempts to build a situation that is satisfactory, whereas during a transition period, reappraisal and evaluation of the satisfaction of the current situation is impetus for change into another, more satisfactory situation (Levinson, 1978). Levinson stated that a "life structure is satisfactory to the extent that it is *viable in society* and *suitable for the self*" (1978, p. 53, italics original). Instead of judging whether or not one has succeeded in carrying out a specific chore or in adapting to a single, concrete situation, Levinson stated that clinicians should be more concerned with how well that person has met his/her basic life tasks and how what that person done with his/her life.

Etiology of MR/DD

The etiology, or cause, of a disability seems to be a predictive demographic variable in sibling literature. For example, if a sibling's caretaking needs are very involved due to type of disability, then child-care demands may increase on the nondisabled sibling, potentially leading to conflict, behavior problems, and maladjustment. Sibling interaction becomes less positive, less time is spent with friends, and there is less participation in out-of-home activities (Stoneman et al. 1988). The child with the disability may monopolize their parents' attention because of their deviant behavior or extreme personalities; therefore leaving the normally developing sibling feeling ignored or deprived of parental attention. Some research suggests that the most predictive factor of well-being for siblings of children with MR/DD are measures of the parent-child relationship, especially between the mother and child. Increased negative interaction with mother was reflective of increased conflict among the siblings and all other family members. Also associated with this finding were heightened levels of depression, self-esteem problems, and anxiety (McHale & Gamble, 1989). The degree to which these types of influential reactions occur were found to be dependent on the etiology of the MR/DD and the parents' distribution of chores, tasks, and responsibilities as placed on the older sibling (Stoneman, 1998).

Research shows that the type of MR/DD does in fact influence the relationships between siblings. Research on typical versus atypical sibling relationships has studied temperament, personality, competence, health problems, and secondary disabilities (Stoneman, 1998). Within the temperament domain, Stoneman found that different forms of MR/DD are associated with specific child personalities and temperament. Even for children without any form of MR/DD, their behavior (related to personality and temperament) influences their relationships with siblings. Highly active temperaments and high emotionality can raise the level of sibling conflict. Adaptability appears to be related to the level of sibling interaction, suggesting that if the relationship between siblings is decreased or charged with emotion, the psychological stability of both siblings can be unpredictable.

When taking into account specific forms of MR/DD, this emotional variation is observed. For example, boys with Fragile X rank low in sociability and show extremely high active and emotional temperaments, which lends itself to the idea that their relationships with their siblings would be one of high conflict and agony (Stoneman, 1998). Children with fetal alcohol syndrome show a similar personality and temperamental characteristic, increasing their risk for sibling conflict. Children with Down syndrome, however, have very few highly deviant personality or temperamental characteristics. Their temperamental styles usually are "easy" and most are socially active, but these children display large variation in temperament (Stoneman, 1998). Within-group variability does exist but as a group, Stoneman feels that "interactions involving children with Down syndrome and their siblings would be expected to be effectively similar to those of typical siblings" (672). Therefore, different forms of MR/DD vary in regards to personality and temperament, which in turn, influences the sibling relationship.

Research has shown that trajectories of cognitive and adaptive development of children with MR/DD differ across etiological groups (Hodapp & Dykens, as cited in Stoneman, 1998). For example, children with Fragile X syndrome develop social, cognitive, and emotional skills steadily until late childhood whereas development in children with Down syndrome can be characterized by periods of rapid development separated by a long developmental hiatus. Stoneman feels that in order to maximize predictive relational assumptions of age upon the sibling relationship, individual differences characteristic of siblings cannot be overlooked. Once these differences are considered under the assumption of change over time, patterns of development may predict future relationships and social roles for children whose siblings have a form of MR/DD.

According to Stoneman, health problems associated with disability type affect the sibling relationship. Birnbaum and Cohen (1993) reported that children with severe forms of MR/DD are hospitalized up to 8 times more often than the national rate, forcing families to cope with repeated hospitalizations, surgeries, medical procedures, and emergency room visits (as cited in Stoneman, 1998). Other health-related issues may include feeding complications, ventilator dependency, shunt monitoring, uncontrolled seizures, and an increased risk of infection. While some conditions are relatively stable over one's life span, other conditions are life threatening and vary over time. Of paramount importance is the sibling's understanding of the various aspects of their brother's or sister's disability from a realistic perspective. Limited understanding of the disability may lead to strain, frustration, and even guilt felt by the sibling without the disability, causing the sibling relationship full of negative affect and possible resentment. Therefore, sibling relationship can also be influenced by other health problems in addition to the degree of MR/DD (Stoneman, 1998).

Secondary problems, such as psychopathology traits, autism, cerebral palsy, or other disabilities, may also strain the sibling relationship. Approximately 30% of individuals with MR/DD have cerebral palsy, 15-30% have epilepsy, and 10-20% have sensory loss (McLauren & Bryson, 1987, as cited in Stoneman, 1998). Autism occurs at a rate of 1:250 live births (Autism Society of America, 2005, ¶ 3); however, this disability is now more frequently being diagnosed as its own entity, separate from mental retardation. According to Stoneman, further exploratory research is needed to elucidate the potential effects of the secondary disabilities on sibling relationships.

OBJECTIVES

Based on the current literature and on the measures reviewed for this study, the following theory is presented. Hastings and Taunt (2002) have suggested two possibilities for developing a theoretical understanding of families with disabilities: (a) remain within the preexisting traditional approach that views the child with the disability as a stressor, or (b) develop a new theory that accounts for the family's positive perceptions. They further suggest that research on family disability and its influences should measure not only the positive and negative dimensions but also the psychological processes leading to these perceptions. Positive perceptions, according to Taylor (1983), likely serve as a coping mechanism that assists in dealing with a child's disability. Taylor further postulates that positive perceptions transform threatening events into scenarios in which one searches for meaning, tries to gain self-mastery, and enhances themselves. Negative elements, however, such as stress, maladaptive coping, and strained family cohesion are real concerns not to be ignored by positive focuses. But, focusing too intently on positive elements suggests an absence of stress, which is not psychologically healthy or realistically appropriate. It is more likely that a family who has a member with disability experiences both positive and negative feelings related to the disability. Focusing on the positive fails to capture the interplay or existence of the negative.

After conducting a review of previous sibling studies, Cohen et al. (1994) recommended that sibling adjustment research should focus on three components: (a) it should be conducted within a competency- or coping-based framework; (b) researchers should look within sibling groups to explore variables (e.g., coping resources) that influence coping and adaptation; and (c) researchers should consider siblings and families within various ecological contexts, including developmental stage.

The strength in this model for the present research is three-fold: (1) it combines the ideas of Taylor's focus on positive and negative elements with Cohen's suggestions of future sibling research and (2) the target population is adult siblings, which has not been assessed using this study's measures and (3) the findings will be framed within existing developmental adult stage theory. This model allows for both positive and negative perceptions to exist within various family process constructs, namely family strengths, adaptation and cohesion, coping, and self-mastery. Family strength will serve as the baseline measure for predicting adaptation, cohesion, coping, and overall self-mastery. Strong families are more likely to use effective coping strategies that build on their family strengths, therefore facilitating adaptation (Judge, 1998), cohesion, and feelings of self-mastery by the individual sibling.

METHODS AND DESIGN

Participants

Inclusion criteria specified for the project include that the participant must (a) be at least 19 years of age or older, and (b) have at least one sibling, either older or younger. Subjects were assigned to the two methodological groups, either disability (n=83) or nondisability (n=108), depending on whether or not their sibling had a disability. Participants were recruited from UAB's Introduction to Psychology courses PY101 (spring and summer terms, 2005), from an internet-based sibling support group (SibNet), from fliers hanging at various locations on campus, and from a sibling pool used in the investigator's previous research (Partridge, 2004). Demographic information for both groups is featured in the Results section.

Procedure

Upon completion of the IRB approval process, participants were recruited and informed of the study's intents and purpose. For those participants whose survey packets were mailed (e.g., the SibNet participants), two copies of the IRB consent form was mailed to them and signed to ensure that a record of informed consent remained in their possession. Once consent forms were signed, participants completed the study's chosen measures. Both groups were administered the same packets, which took about 45-60 minutes to complete.

Questionnaires

Demographics. This section of the survey packet included the following participant demographics: date, name, age, permanent residence, gender, race/ethnicity, religious affiliation, occupation, education level, marital status, parent's marital status, sibling's age, sibling's gender, sibling relational status (biological vs. stepsibling), sibling's diagnosis (if applicable), total number of siblings in immediate family, total number of immediate family members, participant's birth order, average hours per week of caregiving for sibling, preexisting medical or psychological conditions of the participant, sibling's living arrangements (e.g., in the home or not), attending a sibling support group, belonged to a sibling support list serve, receiving mental health services currently or in the past, and currently care giving for the sibling.

Family Strength. Family strength was measured using the 82-item American Family Strengths Inventory - AFSI (DeFrain & Stinnett, 2005). Collecting data from over 21,000 families from all fifty states and twenty-four countries found that American families generally fit into six categories pertaining to strength. Those categories are: (1) enjoyable time together (e.g., prepare meals, ride bikes, read together), (2) appreciation and affection for each other (e.g., say thank you, I love you, etc.), (3) communicating effectively (e.g., avoid interrupting each other, asking each other open-ended questions, etc.), (4) valuing each other and demonstrating commitment (e.g., work together to solve problems, discover and encourage activities, etc.), (5) spiritual well-being (e.g., discuss and participate in spirituality), and (6) managing stress and crisis effectively (e.g., discuss lessons learned, modeling healthy coping styles, etc.). Four additional items were added to the end of the assessment as global measures of family strength. According to DeFrain and Stinnet (2005), these same six characteristics remain salient across cultures, marital status (single-parent families vs. married families), and socioeconomic status. These six qualities emerge through deliberate intention and practice. The measure is scored by putting an "S" for strength beside the qualities that the participant feels that their family has achieved and a "G" for growth beside those qualities that are an area of potential growth. If the participant feels that a particular characteristic does not apply to their family or is not a characteristic of importance then an "NA" is recorded for not applicable. The total scores are summed for each category (e.g., the higher the number of "S", the stronger the family is considered to be). Reliability and validity information was not available for this measure. For the purposes of this study, the participants' AFSI subscale scores were added together and then converted in to z-scores to ensure properties of normal distribution.

Adaptability & Cohesion. Family adaptability and cohesion were assessed using the Family Adaptability and Cohesion Evaluation Scale - FACES-III (Olson, Portner, & Lavee, 1985). This scale consists of 20 items assessing two subscales, cohesion and adaptability, represented with 10 questions each. FACES III is based on a normative sample of 2,453 adults spanning the life cycle, including 412 adolescents. Items are answered based on a 5-point Likert scale (1 = almost never to 5 = almost always) based on how frequently the observed behavior occurs in their family. Family satisfaction is measured by having subjects complete FACES III twice. For the first completion, participants are told to answer the questions according to how they perceive their family. The second administration is answered based on how they would like their families to be ideally. Internal consistency reliabilities for cohesion are .77, for adaptability .62, and for the total score, .69. A four to five-week test-retest correlation of .83 was found for cohesion, and .80 for adaptability. The wording of a few items on the FACES III has been changed for this study to better compliment the use of siblings as the participants.

Coping. Coping was measured using the Ways of Coping Questionnaire – WAYS (Folkman & Lazarus, 1988). The WAYS consists of 50 items answered on a 4-point Likert scale (0 = does not apply; 1 = used somewhat; 2 = used quite a bit; 3 = used a great deal) and are in 8 categories (Confrontive Coping, Distancing, Self-Controlling, Seeking Social Support, Accepting Responsibility, Escape-Avoidance, Planful Problem Solving, Positive Reappraisal). For this study, those categories were then formed into two coping styles: emotion-focused coping (Distancing, Escape-Avoidance, Positive Reappraisal, Self-Controlling) and problem-focused coping (Confrontive, Seeking Social Support, Planful Problem Solving, and Accepting Responsibility). According to Lazarus and Folkman, coping processes are variable by definition, and therefore, reliability of the WAYS is difficult to capture because traditional test-retest estimates are inappropriate. However, the reliability, or alpha coefficients for the eight-factor structure, is higher than alphas reported for other measures of coping. The WAYS has face validity since the individuals are instructed to answer the items based on the recall of a stressful situation. Construct validity for this measure is grounded in its consistency with theoretical predictions, namely, that: (1) coping consists of both problem-focused and emotion-focused strategies, and (2) coping is a process.

Self-Mastery and Self-Esteem. Self-esteem and self-mastery were assessed using the Pearlin Self-Mastery Scale. The self-esteem scale is comprised of 6 items answered on a 7-point continuum (1 = Strongly disagree, 4 = Not sure, 7 = Strongly agree). Self-mastery is defined as "the extent to which one regards one's life-chances as being under one's own control in contrast to being fatalistically ruled" (p. 5). The self-mastery scale is comprised of 7 items that is also answered on a Likert scale. Higher scores on both constructs indicate more positive attitudes towards oneself or greater sense of self-mastery, respectively. The mastery scale has an internal consistency of .71 -. 81 while the esteem scale was formed from items in the Rosenburg scale, subsequently factor analyzed and shown to load on the same scale (Pearlin & Schooler, 1978). For the purposes of this study, the participants' esteem and mastery scores were added together and then converted in to z-scores to ensure properties of normal distribution.

Hypotheses

The hypotheses of this study are:

1) Having a strong family will predict cohesion, adaptability, perceived coping, and self-mastery/self-esteem.

2) Family cohesion and family adaptability will be related to coping, as well as to self-mastery/self-esteem.

3) Variations in coping will be mediated by subjective assessment of a strong family and of adaptability and cohesion.

4) Self-mastery/self-esteem is an overall function of one's assessment of his/her family strength, adaptability & cohesion, and coping.

Hypothesized Theoretical Model. Figure 1 is the hypothesized model, indicating the exogenous variables and their direct effects. This model was used to test the four hypotheses. Considering where adult sibling and family relationship literature remains sparse, this hypothesized model attempts to integrate perception of family functioning, the emotional constructs of coping, adaptation, and cohesion, and how those variables relate to self-mastery/self-esteem development. Family strength is proposed to be positively related to adaptation and cohesion, coping, and to self-mastery/self-esteem (as indicated by the + signs). A strong positive relationship is also expected to exist between adaptation and cohesion and coping. And finally, adaptation and cohesion, family strength, and coping are all expected to positively related to self-mastery/self-esteem.

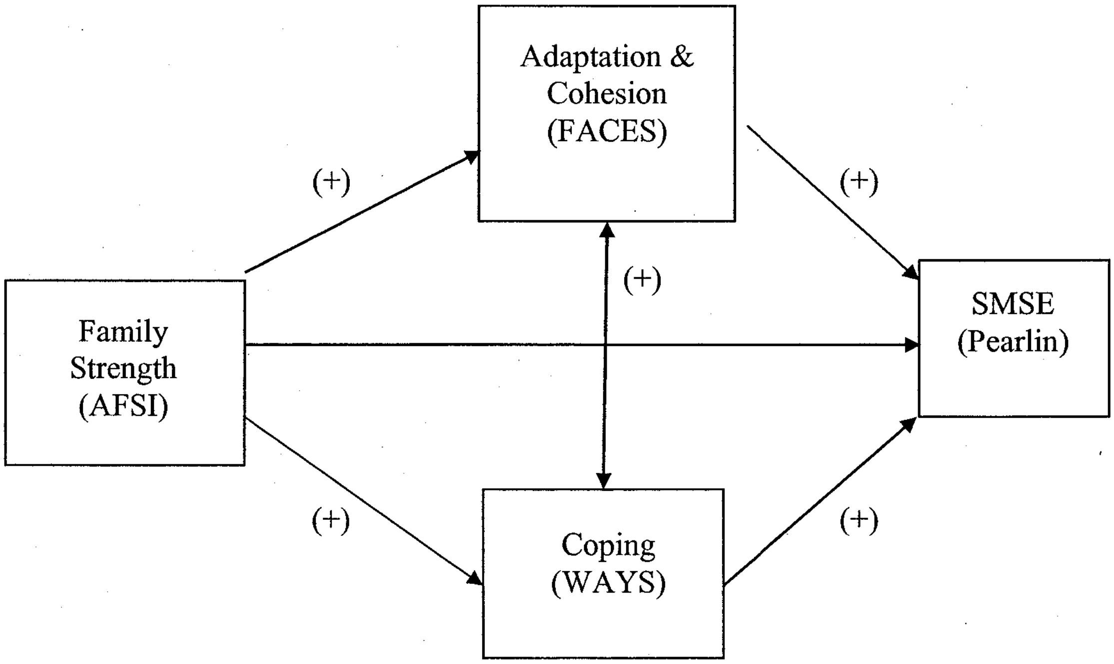

Figure 1. Hypothesized model indicating the relationship trend of each pathway.

RESULTS

The results of the analyses are discussed in four sections. The first section covers basic descriptive statistic of the study, focusing primarily on the participants' demographics by group. The second section explores mean differences by group on each of the measures used. The third section explores the statistical assumptions of each of the measures and incorporates correlation matrices to look at the relationships between measured variables. The fourth and final section tests the overall theoretical model, which is the main focus of the study. This section will specifically address the study's objectives through the use of structural equation modeling.

Participant, Sibling, and Family Descriptive Statistics

A total of 191 participants were included in the analysis, 83 in the disability group and 108 in the nondisability group. Demographic characteristics of the participants include age, gender, race, region of country in which they live, religiosity, education, occupation, marital status, and their parents' marital status. Ages of both participants and siblings can be seen in Table 1. The disability group's participants and siblings are approximately ten years older than the nondisability group's participants and siblings. Additionally, while the participant's age ranges were quite vast by group (46 years vs. 27 years), the age ranges within the sibling group were similar across disability/nondisability category (56 years vs. 53 years).

Table 1

Participant and Sibling Age Characteristics (in years)

Variable	M (SD)		Range (total)	
Group	Disability	Nondisability	Disability	Nondisability
Participants	31.24 (12.82)	20.82 (3.94)	19-65 (46)	19-46 (27)
Siblings	30.47 (13.50)	20.31 (7.87)	11-67 (56)	2-55 (53)

Table 2 includes specific sibling relationships variables, such as target siblings' age, the target siblings' gender, total number of siblings, participant's birth order, and the number of hours spent caregiving per week. Participants in the disability group were predominately Christian, Caucasian females who live either in the North or South regions of the country, in either rural or suburban communities. All of the participants in the disability group had completed high school and many had either a college or graduate degree. More of the participants in the disability group were employed rather than students and approximately two-thirds were single. In the nondisability group, gender was more evenly distributed (49 males vs. 59 females), as was race, and the overwhelming majority reported living in the South region of the country. Approximately two-thirds of the nondisability participants were from suburban communities and were either Christian or Baptist. The majority of the participants in the nondisability group were high school graduates working towards their college degrees and therefore, they were full-time students. Only six individuals in this group reported being married.

Table 2

Participant Demographics by Group (N=191)

	Disability		Nondisability		
Demographic	*f*	%	*f*	%	Total %
Participant Gender					
Male	16	8	49	26	34
Female	67	35	59	31	66
Race					
Caucasian	66	35	52	27	62
Black	13	7	53	28	34
Hispanic	2	1	1	.5	2
Asian	1	.5	1	.5	1
Indian	1	.5	1	.5	1
Region					
South	39	20	106	55	76
North	23	12	1	.5	13
West	11	6	0	0	6
East	8	4	0	0	4
Other	2	1	1	.5	2
Community Type					
Rural	18	9	29	15	24
Urban	23	12	26	14	26
Suburban	42	22	53	28	50
Religion					
Baptist	9	5	45	24	28
Christian	11	6	30	16	21
Catholic	19	10	5	3	13
Jewish	7	4	1	.5	4
Methodist	4	2	6	3	5
ND	4	2	3	2	3
None	13	7	7	4	10
Other	10	5	10	5	10
Protestant	6	3	1	.5	3
Education					
High school	32	17	94	49	68
Some college	6	3	8	4	7
College degree	21	11	3	2	12
Graduate degree	24	13	3	2	14

Occupation					
Student	37	19	99	52	71
Other	46	24	9	5	29
Marital Status					
Single	54	28	102	53	82
Married	29	15	6	3	18

Note. ND = Nondenominational

Table 3 includes specific family structure variables that influence the quality of sibling relationships, such as sibling gender, total number of siblings, birth order, hours of caregiving per week, type of genetic relationship, number of family members, and parent's marital status. The majority of the disability group responded on the quality of their relationship with their biological brother. Most had between one and five siblings, were typically either first- or second-born and had married parents. The majority of the disability group reported caretaking for their sibling between zero and five hours per week, and having between one to eight family members. The nondisability group was more evenly distributed in their responses about their relationships with their biological brothers or sisters. The majority of the nondisability group had one to two siblings, were the first- or second-born, and spent zero hours caregiving per week for their sibling. Their parents were typically married and they had between one and eight family members.

Table 3

Sibling Relationship Quality Variables (N=191)

	Disability		Nondisability		
Variable	*f*	%	*f*	%	Total
Sibling Gender					
Male	54	28	59	31	59
Female	29	15	49	26	41
Total Siblings					
0-2	49	26	80	42	68
3-5	30	16	27	14	30
6-8	4	2	1	.5	2

Birth order					
1st	36	19	50	26	45
2nd	32	17	37	19	36
3rd	12	6	14	7	14
4th	3	1	5	3	4
5th	0	0	2	1	1
Caregiving Hours Per Week					
0	45	24	72	38	61
1-5	18	9	24	13	22
6-10	8	4	3	2	6
11-15	2	1	1	.5	2
16-20	3	2	1	.5	2
21+	7	3	7	3	7
Relationship					
Biological	79	41	104	54	96
Step	3	2	3	2	3
Adopted	1	.5	0	0	.5
Half-sibling	0	0	1	.5	.5
Family members					
1-4	42	22	47	25	47
5-8	41	21	60	31	52
9+	1	.5	1	.5	1
Parent's Marital					
Married	61	32	71	37	69
Divorced	13	7	15	8	15
Mom remarried	3	2	6	3	5
Dad remarried	4	2	4	2	4
Both remarried	1	.5	7	4	4
Single	1	.5	3	2	2
Mom widowed	0	0	2	1	1

Table 4 shows disability diagnosis both between and within groups. The participants were asked to give their sibling's primary diagnosis as well as any diagnosis they themselves have. Because this table includes both participants and their siblings, the total *N* is 382. By definition of inclusion within the nondisability group, none of the siblings within that group have a reported disability; however, eight of the participants reported having a diagnosed disability and were not excluded from the study. Two reported having Attention-Deficit/Hyperactivity Disorder (AD/HD), two reported having depression or anxiety, three reported having a medical condition, and one reported having a seizure disorder. While it was expected that the siblings in the disability group would have a disability, surprisingly, 35% of the disability group participants reported having a diagnosed disability and were not excluded from the study. The majority of the diagnosis of the participants within the disability group was depression and/or anxiety, followed by AD/HD, medical condition, Aspergers, sensory impairment, mental illness, Post-Traumatic Stress Disorder (PTSD), and Muscular Dystrophy. The majority of the diagnoses of the siblings of the participants in the disability group are AD/HD, Autism/Aspergers, Cerebral Palsy, Down syndrome, multiple/severe disabilities, and mental retardation.

Two 2x2 Chi-square analysis (sibling and participants by group) were run on each diagnosis to determine if significant differences existed in the number of diagnoses within each group. Within the participant group, the following chi-squares results were found in each diagnostic category: has a diagnosis, $\chi^2(1, N = 191) = 24.32, p < .001$; ADHD. $\chi^2(1, N = 191) = 2.31, p = .128$; Autism, $\chi^2(1, N = 191) = 1.31, p = .253$; Cerebral Palsy, $\chi^2(1, N = 191) = 13.87, p < .001$; depression, $\chi^2(1, N = 191) = 13.87, p < .001$; medical condition, $\chi^2(1, N = 191) = 1.23, p < .267$; sensory impairment, $\chi^2(1, N = 191) = 1.31, p = .253$; and no diagnosis, $\chi^2(1, N = 191) = 186.98, p < .001$. A diagnosis of Cerebral Palsy, Down syndrome, multiple/severe handicaps, mental retardation, Williams syndrome, and Prader-Willi are by definition reasons for an individual to have intellectual impairment that would significantly impede completion of this study's protocols; therefore these disabilities are not found in the participant category; however, participants were not excluded for having the remaining categories of biological illness, learning disabilities, and/or diabetes but none of these diagnoses existed within the participant category (Table 4).

Table 4

Sibling & Participant Diagnosis by Group

	Nondisability (*n*=216)		Disability (*n*=166)		Total (*N*=382)
Group	Sibling	Participant	Sibling	Participant	
Diagnosis	*f*	*f*	*f*	*f*	*f*
None	108	100	0	53	261
AD/HD	0	2	18	5	25
Depression/anxiety	0	2	0	14	16
Autism/Aspergers	0	0	11	1	12
Cerebral Palsy	0	0	10	0	10
Down syndrome	0	0	8	0	8
Medical condition	0	3	0	5	8
Multiple/severe	0	0	7	0	7
Mental retardation	0	0	6	0	6
Sensory impairment	0	0	4	1	5
Mental illness	0	0	4	1	5
Williams syndrome	0	0	4	0	4
Seizure disorder	0	1	3	0	4
Biological Illness	0	0	3	0	3
Learning disability	0	0	2	0	2
Diabetes	0	0	2	0	2
Prader Willi	0	0	1	0	1
PTSD	0	0	0	1	1
Muscular dystrophy	0	0	0	1	1

Note. AD/HD = Attention-Deficit/Hyperactivity Disorder; PTSD = Post-Traumatic Stress Disorder

Table 5 shows the results of the chi-square tests that were run within the participant group to illustrate whether the presence of a diagnosis was higher than would be reported in the general population. If five or more participants reported having a diagnosis, a chi-square was conducted within that diagnostic category. Chi-square was found to be statistically significant in the participant diagnostic categories of having a diagnosis, depression, and no diagnosis. These results indicate that the participant in the disability group have significantly more diagnosis, specifically of depression, than would exist in the general population.

Table 5

Chi-square results on participant group by reported diagnosis (N=191, df=1)

Disability	χ^2	p
Has a diagnosis	24.32	.001*
AD/HD	2.31	.128
Depression	13.87	.001*
Medical condition	1.23	.267
No diagnosis	186.98	.001*

Note. AD/HD = Attention-Deficit/Hyperactivity Disorder

$* p \leq .001$

Within the sibling group, the following chi-square results were found in each diagnostic category: ADHD, $\chi^2(1, N = 191) = 25.86, p < .001$; autism, $\chi^2(1, N = 191) = 15.19, p < .001$; cerebral palsy, $\chi^2(1, N = 191) = 13.73, p < .001$; Down syndrome, $\chi^2(1, N = 191) = 10.87, p < .001$; multiple/severe, $\chi^2(1, N = 191) = 9.46, p = .002$; mental retardation, $\chi^2(1, N = 191) = 8.06, p = .005$; sensory impairment, $\chi^2(1, N = 191) = 1.65, p = .198$; mental illness, $\chi^2(1, N = 191) = 5.32, p = .021$; Williams syndrome, $\chi^2(1, N = 191) = 5.32, p = .021$; biological illness, $\chi^2(1, N = 191) = 3.97, p = .046$; seizure disorder, $\chi^2(1, N = 191) = 3.97, p < .046$; learning disability, $\chi^2(1, N = 191) = 2.63, p = .105$; and diabetes, $\chi^2(1, N = 191) = 2.63, p = .105$. Depression, medical condition, PTSD, and Muscular Dystrophy were not included in these analyses because no siblings had a diagnosis of these disorders (Table 6). The chi-squares that showed significance are indicative that these diagnoses are more prevalent in this surveyed population than are in the general population. These significances are not unexpected given the requirement of having to have a sibling with a disability to participate in the study.

Table 6

Chi-square results on sibling group by reported diagnosis (N=191, df=1)

Disability	χ^2	p
AD/HD	25.86	.000**
Autism	15.19	.000**
Cerebral palsy	13.73	.000**
Down syndrome	10.87	.001**
Multiple/severe	9.46	.002*
Mental retardation	8.06	.005*
Sensory impairment	1.65	.198
Mental illness	5.32	.021*
William's syndrome	5.32	.021*
Biological illness	3.97	.046*
Seizure disorder	3.97	.046*
Learning disability	2.63	.105
Diabetes	2.63	.105

Note. AD/HD = Attention-Deficit/Hyperactivity Disorder

* $p \leq .05$, ** $p \leq .001$

Six yes/no questions regarding sibling support groups and mental health services were also included on the demographic form to see if the siblings of brothers and sisters with disabilities are more likely to participate in sibling support groups, belong to an internet support group, receive mental health services, caretake for or live with their sibling. Table 7 illustrates the participants' responses by group.

Table 7

Participant Yes/No Questions

Response	Yes		No	
Group	Disability	Nondisability	Disability	Nondisability
Question	*f*	*f*	*f*	*f*
1. Attended a sibling support group?	14	3	69	105
2. Belong to an adult sibling listserve or chat room?	41	0	42	108
3. Currently receiving mental health services?	16	3	67	105
4. Received mental health services in the past?	34	3	49	105
5. Currently caregiving for your sibling?	16	9	67	99
6. Do you live with your sibling?	11	36	72	72

To evaluate whether the participants' yes/no responses were statistically significantly different by group, a Pearson chi-square analysis was performed on each of the six questions. These analyses revealed significant group differences on all 6 questions as follows: question 1, $\chi^2(1, N = 191) = 11.49, p \leq .001$; question 2, $\chi^2(1, N = 191) = 67.93$, $p \leq .000$; question 3, $\chi^2(1, N = 191) = 14.26, p \leq .000$; question 4, $\chi^2(1, N = 191) = 43.82$, $p \leq .000$; question 5, $\chi^2(1, N = 191) = 4.94, p < .05$; question 6, $\chi^2(1, N = 191) = 11.49, p < .001$. Table 8 summarizes the chi-square results for the yes/no response questions.

Table 8

Chi-square results on participant yes/no responses (N=191)

Question	χ^2	p
1. Sibling support group	11.49	.001**
2. Internet sibling support group	67.93	.000**
3. Current mental health services	14.26	.000**
4. Past mental health services	43.82	.000**
5. Currently caretaking for sibling	4.94	.026*
6. Currently living with sibling	10.20	.001**

* $p \leq .05$, ** $p \leq .001$

The significant chi-square for questions 1 and 2 were not unexpected. For question 1, it would be expected that more of the disability group participants would have attended a sibling support group given the nontypical relationship between themselves and their sibling with a disability. For question 2, because a large portion of the disability group was recruited via a sibling support internet group, significantly more of the participants in the disability group belonged to an internet sibling support group. The significant group differences between the two groups' answers for questions 3 and 4 are concerning. More participant siblings in the disability category are currently receiving or have received mental health services. Nineteen percent of the disability group compared to three percent of the nondisability group reported currently receiving mental health services. Forty-one percent of the disability group versus three percent of the nondisability group reported having receiving mental health services in the past. As for questions 5, nineteen percent of the disability group reported currently caregiving for their sibling while only eight percent of the nondisability group reported current caregiving. Twenty percent more participants in the nondisability group lived with their sibling than did the disability group (33% vs. 13%). This difference could be due to the fact that the nondisability group is ten years younger than the disability group and are mostly college students; therefore they are more likely to live at home with their families than are the disability group participants.

Group Mean Differences

Due to the continuous nature of some of the demographic variable, significant differences between the two groups (e.g., disability versus nondisability) were explored using ANOVA. The groups differed on education, number of siblings, and age: the disability group was more educated, F (1, 189) = 77.21, p = .000, had more siblings, F (1, 189) = 8.28, p = .000, and were approximately ten years older than the disability group, F (1, 189) = 63.53, p = .000. Table 6 illustrates these group mean differences.

Table 9

An ANOVA Comparing Demographic Measures by Group

Demographic	*n*	*df*	*f*	*p*
Education				
Disability	83	1,189	77.21	.000*
Nondisability	108			
Number of siblings				
Disability	83	1, 189	8.28	.004*
Nondisability	108			
Age				
Disability	83	1, 189	63.53	.000*
Nondisability	108			

* $p < .05$

Categorical demographic variable are analyzed using chi square. A chi-square analysis reveals that the groups differ on gender, race, age, and marital status, where the disability group contained significantly more females, $\chi^2(1, N = 191) = 14.23, p < .001$, were more Caucasian, $\chi^2(1, N = 191) = 19.56, p < .001$, approximately ten years older than the disability group, $\chi^2(1, N = 191) = 50.75, p < .001$ and more likely to be married, $\chi^2(1, N = 191) = 26.87, p < .001$ (Table 10).

Table 10

Pearson Chi-square (χ^2) Comparisons of Dichotomous Group Demographics (N=191)

Demographic	*n*	*df*	χ^2	*p*
Gender				
Disability	83	1	14.23	.000*
Nondisability	108			
Race				
Disability	83	1	19.56	.000*
Nondisability	108			
Occupation				
Disability	83	1	50.75	.000*
Nondisability	108			
Marital Status				
Disability	83	1	26.67	.000*
Nondisability	108			

$* p < .01$

The ANOVA and ANCOVA reveal that the two groups used in this study are statistically different from each other on specific variables that, according to the literature, matter in family relationships, sibling interactions, and developmental stage.

Participant responses on all five measures were statistically significant when compared by group using ANCOVA. Because of their significance, the demographic variables on the chi-square analysis above were held as covariates (age, gender, race, occupation, education, number of siblings, marital status). Even when covarying out the effects of those demographics, the total scores on each core measures were significantly different by group: AFSI, $F(8,182) = 6.784, p = .000$, FACES, $F(8, 182) = 4.065, p = .000$, EFC,

$F(8,182) = 4.636, p = .000$, and PFC, $F(8,182) = 3.613, p = .001$, and SMSE, $F(8, 182) = 3.075, p = .003$. Table 11 shows the results of the five significant ANCOVAs comparing the total scores on each of the measures used in the model.

Table 11

An ANCOVA Comparing Total Scores on Measures Used by Group

Measure	*n*	*df, error*	*F*	*p*
AFSI				
Disability	83	8, 182	6.784	.000**
Nondisability	108			
FACES				
Disability	83	8, 182	4.065	.000**
Nondisability	108			
EFC				
Disability	83	8, 182	4.636	.000**
Nondisability	108			
PFC				
Disability	83	8, 182	3.613	.001**
Nondisability	108			
SMSE				
Disability	83	8, 182	3.075	.003*
Nondisability	108			

Note. AFSI = American Family Strength Inventory; FACES = Family Adaptability and Cohesion Evaluations Scales; EFC = Emotion-Focused Coping; PFC = Problem-Focused Coping; SMSE = Self-Mastery/Self-Esteem

* $p<.05$ ** $p\leq .001$

Data Quality Statistics

While SEM is useful in demonstrating complex patterns of relationships between variables, it is quite sensitive to violations of assumptions of univariate and multivariate normality. If violations occur, transformations or alternative fit functions should be considered. This section addresses data quality issues, such as assumptions and transformations.

The total scores for each of the main measures (AFSI, FACES-III, EMC, PFC, SMSE) were checked for violations of normality. Violations were observed for almost each variable. These measures of normality are sensitive to slight variation. The distributions were either significantly skewed, kurtotic, or both. Violations of multivariate normality were explored using bivariate graphs and Mahalnobis distance. Although outliers were identified, none were more than four standard deviations from the mean. During the normalization process, z-scores were formed for each participant on the subscales of all measures, except for adaptability and cohesions (FACES). The FACES scores were highly correlated and were measured on the same scale; therefore z-scores were not necessary. For Pearlin's Self-Mastery and Self-Esteem Scales, the z-scores on those two subscales were combined to form an overall score (SMSE score).

Transformations are generally discouraged due to interpretability and to complicating the findings when comparing clinical significance to statistical significance. Therefore, taking into consideration the skewness and kurtotic nature of the data, maximum likelihood estimation was used because of its robustness to nonnormality. Maximum likelihood estimation chooses estimates that have the greatest chance of reproducing the observed data (Garson, 2006).

SEM is similar to multiple regression and uses a researcher's beliefs, based on theory and hypothesis, that specific variables form certain constructs and relationships (Schumaker & Lomax, 2004). Both multiple regression and SEM are an extension of the general linear model; however, SEM is more powerful because in takes into account the modeling of interactions, nonlinearities, correlated independents, measurement error, and correlated error terms and multiple latent independents each measured by multiple indicators (Garson, 2006). SEM is often preferred to the general linear model because it allows more flexibility with assumptions and interpretations (especially where there is multicollinearity), has graphical modeling interface, is able to test models overall rather than coefficients individually, can model mediating variables and error terms, can test coefficients across multiple between-subjects groups, and can handle tricky data (e.g.non-normal, time correlated, etc.) (Garson, 2006).

Correlation Matrices

To estimate a model, SEM uses either a correlation or a covariance matrix. Possible relationships are demonstrated by the *p* values in both matrices. The following correlation matrices were generated by SPSS version 9.0 (SPSS Inc., Chicago IL) using Pearson's product correlation computations, meaning that the variables were continuous on continuous correlation calculations. Information is extracted from the specified variables to create a linear composite that best explains the variance and covariance of the matrix. The specified variables, called parameters, and their relationships are the statistical model. Each correlation in the matrix is called an element. A model can not have more parameters than elements; this is referred to as an underidentified model. A model that has more elements than parameters is an overidentified model. If the number of elements and parameters is equal, the model is referred to as a just-identified or saturated model (Hoyle, 1995; Kelloway,1998.)

Table 12, generated by Preparatory Linear Structure Relations (PRELIS), is the observed matrix that can be used in a LISREL analysis. Based on this matrix, different types of correlations are generated depending upon whether the variable is continuous, dichotomous, or ordinal. Taking these types of variables into consideration, corrective statistical procedures yield estimated polychoric (continuous variables that underlie two indicators that are both ordinal), tetrachoric (both dichotomous), or polyserial (one continuous, one ordinal) correlations (Kline, 1998). Correlations from PRELIS are slightly higher than those from SPSS because of the sensitivity of the mathematics (Jöreskog & Sörbom, 1993). This correlation matrix was used with LISREL command language to propose and to test the statistical models in this study and includes the total number of participants.

Table 12

Polychoric Correlation Matrix on Measures Used with Corresponding P Values from SPSS (N=191)

	1	2	3	4	5	6
R	Group	AFSI	FACES	EFC	PFC	SMSE
(p value)	(o)	(c)	(c)	(c)	(c)	(c)
1	1.00					
	(NA)					
2	.160*	1.00				
	(.027)	(NA)				
3	.135	.676**	1.00			
	(.062)	(.000)	(NA)			
4	.240**	.173*	.168*	1.00		
	(.001)	(.016)	(.020)	(NA)		
5	.195**	.240**	.270**	.767**	1.00	
	(.007)	(.001)	(.000)	.000	(NA)	
6	.124	.339**	.288**	-.087	.020	1.00
	.088	(.000)	(.000)	.230	.783	(NA)

Note. c = continuous data, o = ordinal data, * *p*<.05, ** *p*<.01

The statistical model represents a covariance structure for the observable random variables in the correlation matrix. A vector of the parameters (the specifications) in the statistical model is proposed, which allows for testing of the model. The statistical model is used to create an alternative correlation matrix that is then compared to the observed random variables in the correlation matrix. From these data, a sample correlation matrix is computed, and it is this matrix that is used to fit the model to the data and to test the model. The model is fitted by minimizing a fit function that is nonnegative and zero only if there is a perfect fit, in which case the proposed sample correlation matrix equals the observed correlation matrix. A correlation matrix was also produced using PRELIS because it contains both the variance and the scale of measurement information, and is thus preferred when working with longitudinal data and groups. To ensure thoroughness, these analyses were also run using a covariance matrix. The models did not appear to fit the data any better or worse, the same pathways remained statistically significant, and no new paths emerged as statistically significant. Any standardized solution values that changed did so by only a tenth of a point.

Table 13 is the Pearson's correlation matrixes that was used to run the SEM model on the nondisability group (n=108). Significant correlations at the p<.05 level were found between PFC and FACES, while significant correlations at the p<.01 level were found between FACES and AFSI, SMSE and AFSI, and PFC and EFC. All significant correlations were positive.

Table 13

Pearson's Correlation Matrix on Measures Used with Corresponding P Values from SPSS (n=108)

	1	2	3	4	5
R	AFSI	FACES	EFC	PFC	SMSE
(p value)	(c)	(c)	(c)	(c)	(c)
1	1.00				
	(NA)				
2	.586**	1.00			
	.000	(NA)			
3	.089	.062	1.00		
	.359	.523	(NA)		
4	.175	.194*	.786**	1.00	
	.069	.044	.000	(NA)	
5	.260**	.243	-.070	-.025	1.00
	.006	.011	.474	.801	(NA)

Note. c = continuous data, * $p<.05$, ** $p<.01$

Table 14 is the Pearson's correlation matrixes that was used to run the SEM model on the disability group (n=83). Significant correlations at the $p<.05$ level were found between EFC and FACES, and EFC and AFSI, while significant correlations at the $p<.01$ level were found between FACES and AFSI, PFC and FACES, PFC and EFC, and SMSE and AFSI. All significant correlations were positive.

Table 14

Pearson's Correlation Matrix on Measures Used with Corresponding P Values from SPSS (n=83)

	1	2	3	4	5
R	AFSI	FACES	EFC	PFC	SMSE
(p value)	(c)	(c)	(c)	(c)	(c)
1	1.00				
	(NA)				
2	.726**	1.00			
	.000	(NA)			
3	.173	.225*	1.00		
	.117	.040	(NA)		
4	.241*	.306**	.706**	1.00	
	.028	.005	.000	(NA)	
5	.369**	.298**	-.202	.008	1.00
	.001	.006	.067	.945	(NA)

Note. c = continuous data, * $p<.05$, ** $p<.01$

Structural Equation Modeling

SEM is often viewed as a confirmatory rather than an exploratory procedure using one of three approaches: strictly confirmatory, alternative model, or model development. The approach used in this study is the strictly confirmatory approach, meaning that a model was tested using goodness-of-fit tests to determine if the pattern of variances and covariances in the data was consistent with the specified structural path model. Kline (1998) suggests a two-step approach when using SEM. First, the pure measurement model underlying the full structural equation model should be tested. If the fit of the measurement model is found acceptable, then the fit of that structural model should be compared to fits of different structural models done through a process called trimming.

Fit functions are used to generate the fit indices for the model. Certain measures of fit are ignored based on what the researcher deems as most valuable to the proposed model, either good fit or parsimony. Parsimony measures yield a lower fit value when more paths are added.

There are several families of fit functions, and while the chi-square statistic is the most commonly used fit index to measure how well a model fits the observed model, it is extremely sensitive to sample size. LISREL provides 32 evaluation criteria of model fit information. Given their relevance, six measures of fit will be reported. The absolute fit indices used are goodness-if-fit index, adjusted goodness-of-fit index, and parsimony goodness-of-fit index. The comparative fit indices used are normed fit index, parsimony normed fit index, and relative fit index. A score above 0.90 on these six measures are considered an excellent fit. The standardized root mean square was used and a score less than 0.05 is considered an excellent fit. The root mean square error of approximation was also used, and a score less than 0.10 is considered an excellent fit.

SEM Models by Group

The original hypothesized model in Figure 1 (page 43) was attempted and would not converge in PRELIS or LISREL; therefore, the original model was modified so that the data would converge. Figure 2 is the modified model that represents how the data converged. It differs from the original model because the construct of coping was divided into emotion-focused (EFC) and problem-focused coping (PFC). The rectangles represent measured-observed variables. This model was saturated, indicating a perfect fit with no latent variables; therefore fit indices and standardized solutions will not be reported.

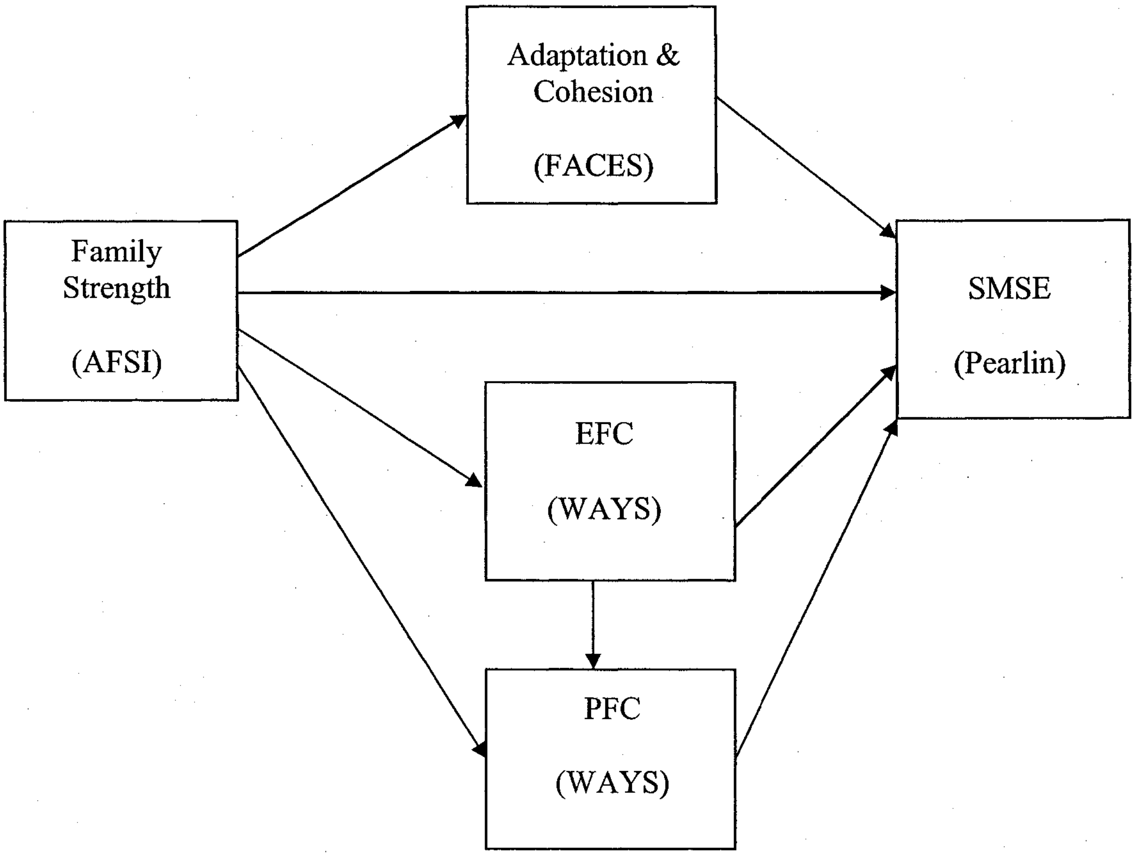

Figure 2. Modified model with coping as two constructs.

Figure 3 shows the model with the standardized solutions on each pathway for the total number of participants (*N*=191). Maximum likelihood was employed to estimate this model which demonstrated excellent fit (Table 15); however not all pathways remained from the original model, specifically between adaptation and cohesion and types of coping. A solid line indicated a significant path; a broken line indicates a nonsignificant path. Bentler and Chou (1987) suggested that the ratio of sample size to estimated parameters be between 5:1 to 10:1. The ratio between sample size and parameters of this modified model is appropriate at approximately 10:1.

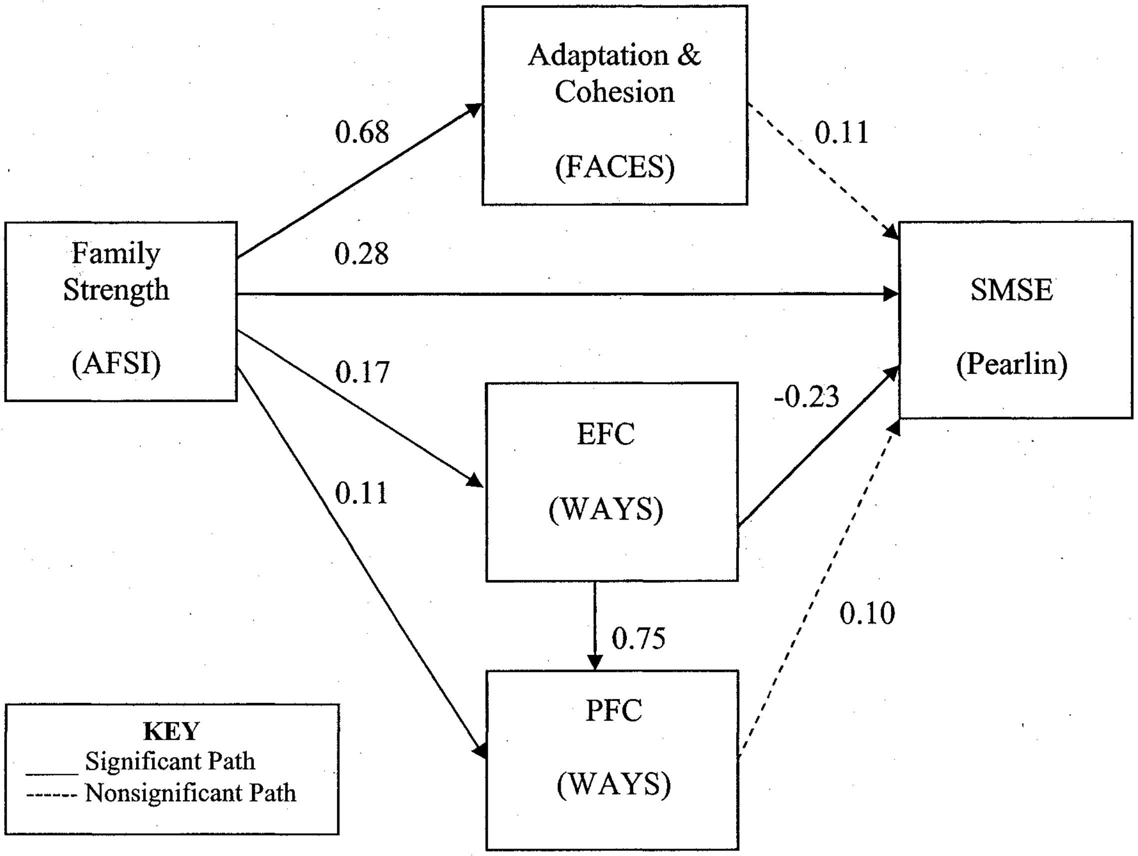

Figure 3. Full model for all participants (*N*=191).

The pathway between FACES and EFC, between PFC and SMSE, and between FACES and SMSE did not remain significant one the model was trimmed. The chi-square for the hypothesized model was not rejected, $\chi^2(2, N=191)=5.18, p=0.075$. The hypothesized model which tests that all variables are uncorrelated was not rejected, $\chi^2(4, N=191)=8.21, p=0.084$. A chi-square difference test did not indicate a significant improvement in fit between the hypothesized model and the trimmed model, $\chi^2_{\text{diff}}(2, N=191)=3.03, p<0.25$. Figure 4 shows the trimmed model with the nonsignificant pathways removed.

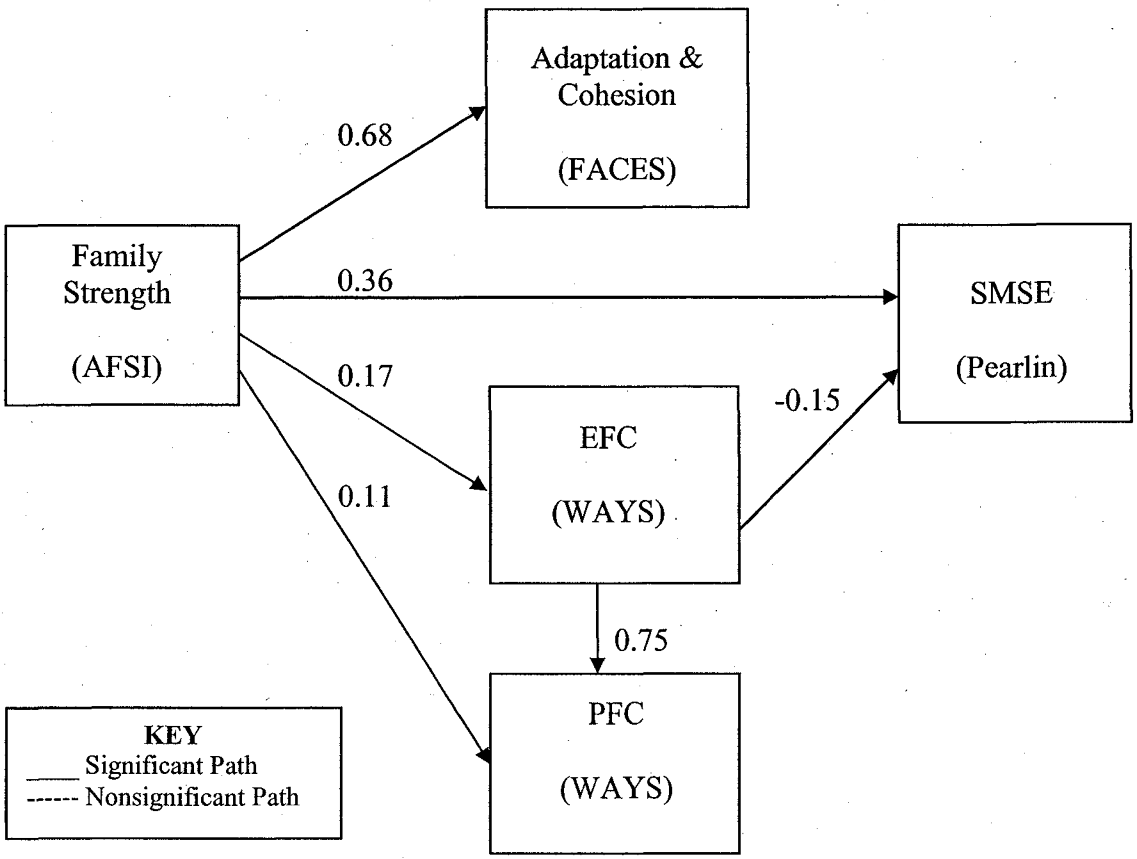

Figure 4. Trimmed model for all participants (*N*=191).

A comparison between the full model for the total participants and the trimmed model is seen in Table 15. The overall goodness-of-fit index (GFI) changed by -.009, supporting the chi-square finding the trimmed model was not a better fitting model that the hypothesized model, even though two pathways were removed.

Table 15

Fit Measures of Overall and Trimmed Model 1, N=191

	χ^2(df)	GFI	AGFI	PGFI	RMR	RMSEA	NFI	PNFI	RFI
Figure 3 Full Model 1	5.248(2)	.989	.919	.132	.031	.0914	.984	.197	.921
Figure 4 Trimmed Model 1	7.93(4)	.980	.940	.260	.036	.074	.980	.390	.940

Figure 5 shows the hypothesized model with the standardized solutions for the nondisability group ($n = 108$). Maximum likelihood was employed to estimate this model which demonstrated excellent fit; however many pathways dropped from the original model. The ratio between sample size and parameters of this modified model is appropriate at approximately 6:1.

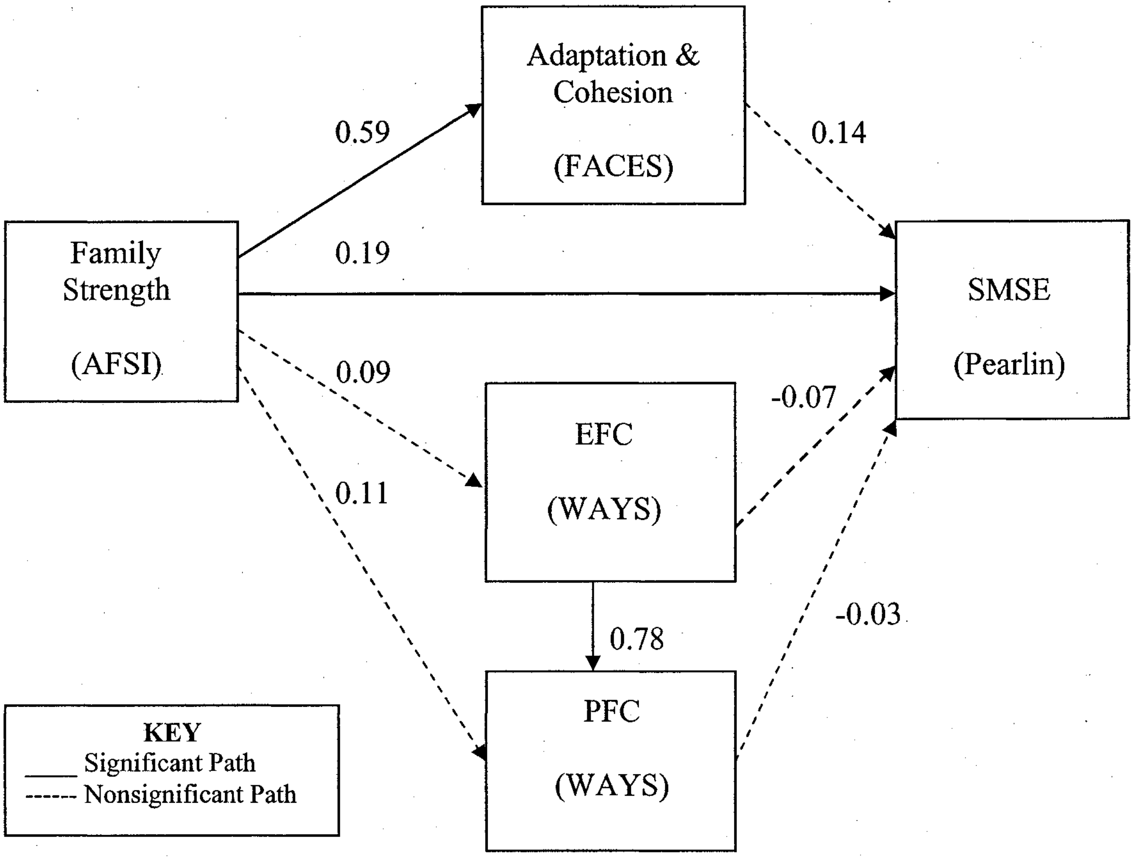

Figure 5. Full model for the nondisability group (n=108).

The pathways between AFSI and EFC, AFSI and PFC, PFC and SMSE, FACES and SMSE, and did not remain significant once the model was trimmed. Figure 6 shows the remaining pathways in the trimmed model. The chi-square for the hypothesized model was not rejected, $\chi^2(2, n = 108) = 3.100, p = 0.212$. The trimmed model which tests that all variables are uncorrelated was not rejected, $\chi^2(7, n = 108) = 9.37, p = 0.23$. A chi-square difference test did not indicate a significant improvement in fit between the hypothesized model and the trimmed model, $\chi^2_{\text{diff}}(5, n = 108) = 6.27, p > 0.25$.

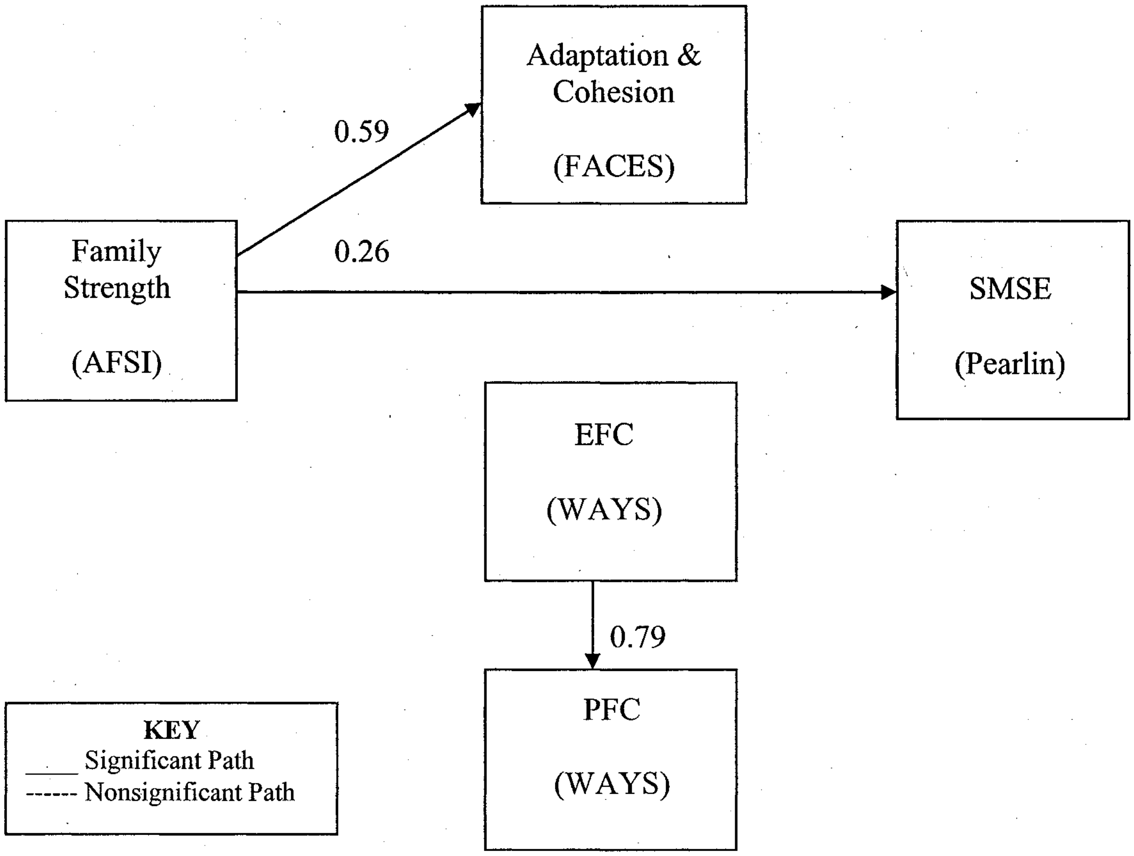

Figure 6. Trimmed model for the nondisability group (*n*=108).

A comparison between the full model for the nondisability group and the trimmed model is seen in Table 16. The overall goodness-of-fit index (GFI) changed by -.019, supporting the chi-square finding the trimmed model was not a better fitting model that the hypothesized model, even though five pathways were removed and the pathway from AFSI to SMSE increased by .07.

Table 16

Fit Measures of Nondisability Hypothesized and Trimmed Model 2, n =108

	χ^2(df)	GFI	AGFI	PGFI	RMR	RMSEA	NFI	PNFI	RFI
Figure 5 Full Model 2	3.146(2)	.989	.914	.132	.240	.0717	.981	.196	.905
Figure 6 Trimmed Model 2	9.69(7)	.970	.930	.450	.079	.056	.940	.660	.920

Figure 7 shows the trimmed model with the standardized solutions for the disability group (*n*=83). Maximum likelihood was employed to estimate this model which demonstrated excellent fit (Table 17); however not all pathways remained from the original model. The ratio between sample size and parameters of this model is appropriate at approximately 4.6:1.

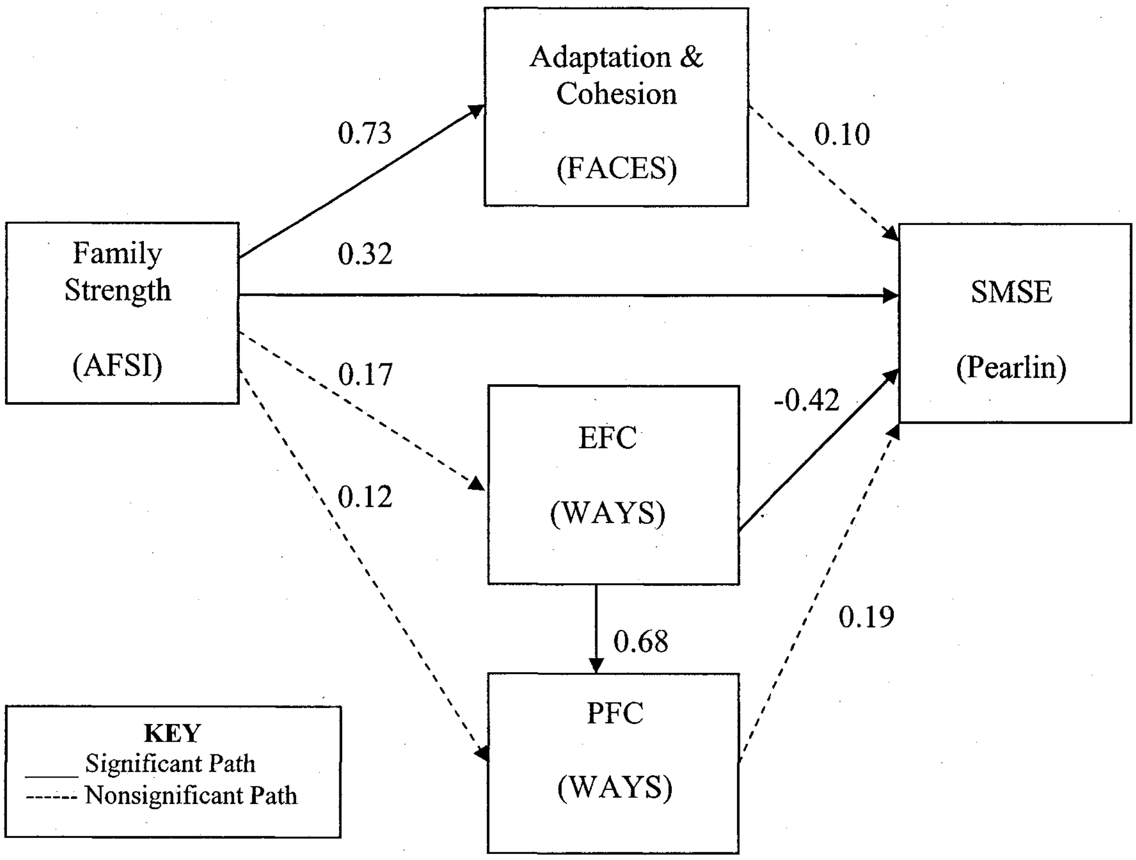

Figure 7. Full model for the disability group (*n*=83).

The pathway between FACES and EFC, between PFC and SMSE, and between FACES and SMSE did not remain significant therefore the model was trimmed. The chi-square for the hypothesized model was not rejected, $\chi^2(2, n=83) = 3.178, p = 0.204$. The trimmed model which tests that all variables are uncorrelated was not rejected, $\chi^2(6, n=83) = 10.59, p = 0.10$. A chi-square difference test did not indicate a significant improvement in fit between the hypothesized model and the trimmed model, $\chi^2_{\text{diff}}(4, n = 83) = 7.412, p < .15$. Figure 8 shows the trimmed model.

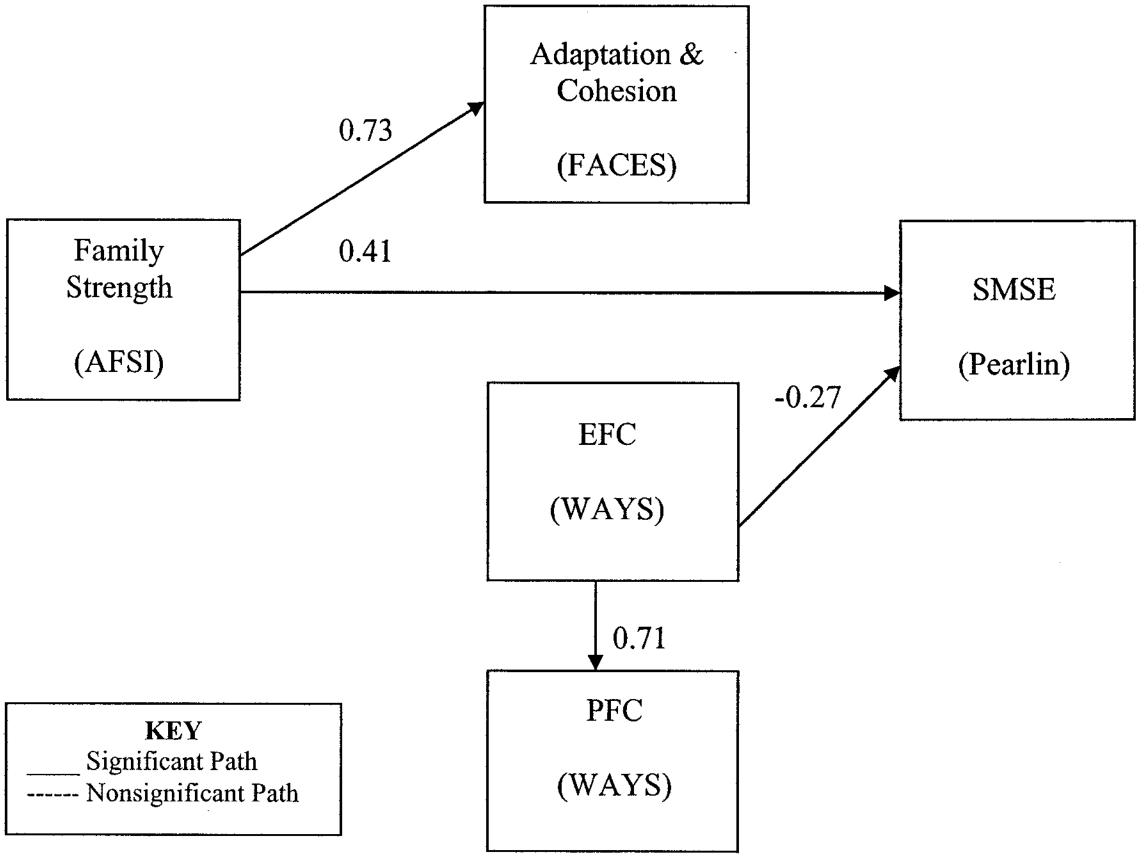

Figure 8. Trimmed model for the disability group (*n*=83).

Comparisons of fit measures are seen in Table 18. The fit measures indicate good fit for each of the models and, once trimmed, represent better parsimony. The overall goodness-of-fit index (GFI) changed by -.035, supporting the chi-square finding the trimmed model was not a better fitting model that the hypothesized model, even though four pathways were removed and the remaining pathways strengthened.

Table 17

Fit Measures of Disability Hypothesized and Trimmed Model 3, n=83

	χ^2(df)	GFI	AGFI	PGFI	RMR	RMSEA	NFI	PNFI	RFI
Figure 7 Full Model 3	3.241(2)	.985	.886	.131	.0429	.0847	.978	.196	.891
Figure 8 Trimmed Model 3	10.82(6)	.950	.880	.380	.140	.097	.930	.560	.880

As seen in Table 18, fit indices for all of the models are comparable. None of the trimmed models showed overall significant improvement in fit indices when compared using the chi-square difference test. While some of the pathway values improved, the overall proposed model, according to the statistics, was theoretically appropriate. The variables of family strength, coping, adaptation and cohesion, and self-mastery/self-esteem represented the data well.

Table 18

Comparison of Fit Measures of All Models

	χ^2(df)	GFI	AGFI	PGFI	RMR	RMSEA	NFI	PNFI	RFI
Figure 3 (*N*=191) Full Model 1	5.248(2)	.989	.919	.132	.031	.0914	.984	.197	.921
Figure 4 (*N*=191) Trimmed Model 1	7.93(4)	.980	.940	.260	.036	.074	.980	.390	.940
Figure 5 (*n*=108) Full Model 2	3.146(2)	.989	.914	.132	.240	.0717	.981	.196	.905
Figure 6 (*n*=108) Trimmed Model 2	9.69(7)	.970	.930	.450	.079	.0560	.940	.660	.920

Figure 7 (*n*=83) Full Model 3	3.241(2)	.985	.886	.131	.0429	.0847	.978	.196	.891
Figure 8 (*n*=83) Trimmed Model 3	10.82(6)	.950	.880	.380	.140	.097	.930	.560	.880

For all three groups (total, nondisability, disability), three pathways remained significant in each of the trimmed models: the pathway from AFSI to FACES, from AFSI to SMSE, and from EFC to PFC (Table 19). These findings suggest that family strength (AFSI) is related to and is a good predictor of adaptability and cohesion (FACES) and individual self-mastery/self-esteem (SMSE), especially within the disability group. The standardized solutions for the disability group with the highest on the pathways between AFSI and FACES and between AFSI and SMSE, indicating that having a strong family in the presence of a disability is important for adaptation and cohesion and for self-mastery/self-esteem of the sibling who does not have a disability. The strong relationship between EFC and PFC was not unexpected nor was the direction of the relationship between the two variables. It appears that everyone in the study coped emotionally first, followed by problem-focused coping. The assumption can be made that it is the emotion of a situation that causes a stressful appraisal and then initiates problem-focused coping to soothe the situation. The most interesting finding is the relationship of the pathway between EFC and SMSE for the disability group. The negative value indicates that this group is coping emotionally, and that the more this style of coping is used, the less self-mastery/self-esteem these individuals feel. This finding will be discussed further in the discussion section.

Table 19

Significant Paths Across Trimmed Models (in Standardized Solutions)

Group	AFSI-FACES	AFSI-EFC	AFSI-PFC	AFSI-SMSE	EFC-PFC	EFC-SMSE	PFC-SMSE
Figure 4 *N*=191	.68	.17	.11	.36	.75	-.15	*ns*
Figure 6 *n*=108	.59	*ns*	*ns*	.26	.79	*ns*	*ns*
Figure 8 *n*=83	.73	*ns*	*ns*	.41	.71	-.27	*ns*

Note. ns = nonsignificant

Post hoc model modifications were conducted (e.g., full model to trimmed model); therefore, a correlation was calculated between the full model estimates and the trimmed model estimates (Ullman, 1996). A high correlation was observed ($r = 0.98$) indicating that the parameter estimates for the remaining statistically significant paths were unchanged after deleting several nonsignificant paths from the models.

DISCUSSION

The current study explored the relationship between two groups of adult siblings: a group whose sibling had a disability and a group whose sibling did not have a disability. Based on a literature review, a theoretical model was constructed to elucidate the relationships of the participants' perceptions of their family's strengths in relation to coping and experiencing feelings of self-mastery/self-esteem. Overall the findings supported the assumption that family strength can be a good predictor of family adaptability and cohesion, coping, and self-mastery/self-esteem, with an additional positive relationship between emotion- and problem-focused coping. A negative relationship between emotion-focused coping and self-mastery/self-esteem was also supported, where the higher the emotion-focused coping, the lower the self-esteem/self-mastery. When the models were separated into groups (disability versus nondisability), pathways no longer existed between family strengths and coping but did remain on adaptation and cohesion, as well as on self-mastery/self-esteem. The most interesting finding revealed that while the nondisability group showed no relationship between coping styles and self-mastery/self-esteem, the disability group maintained the negative relationship between emotion-focused coping and self-mastery/self-esteem as seen in the overall model. These findings suggest that, independent of family strength, adaptability, and cohesion, the coping style of a sibling of a person with a disability may affect overall self-mastery/self-esteem; however, the results must be considered within adult lifespan development theory to adequately explain the different findings between the two groups, mostly due to age, gender, and developmental stage. The remainder of the discussion of the results will first explore each hypothesis by group, and how the results supported or failed to support the a priori assumptions. Each hypothesis will address each of the three group SEM models, beginning with the full model ($N = 191$), then the nondisability model ($n = 108$), and finally the disability model ($n = 83$). Next, the models will be compared to Levinson's theory on adult development, and finally, theoretical suggestions and ideas for future research will be presented in an effort to further elaborate the model. This section will conclude by discussing the current study's limitations.

A few caveats regarding group demographics must be stated to ensure that the reader understands some fundamental differences between the disability and the nondisability groups. As proposed, age and gender seem to be influential factors in this study. For instance, the mean age of the participants in the disability group is 30.24 years, whereas the mean age in the nondisability group for the participants is 20.82 years, a 10 year age difference between the groups. As for gender, within the disability group, there are 67 females and 16 males, which is statistically significantly different. The nondisability group shows a more equal gender distribution, with 59 females and 49 males. The groups as a whole were 66% female and 34% male. The implications of age and gender differences will be discussed in greater detail in the Levinson section below.

Analysis of Hypotheses and SEM Models by Group

Hypothesis 1: Having a strong family will predict cohesion, adaptability, perceived coping, and self-mastery.

Full Model: This model supported hypothesis 1 for the combined groups (*N*=191). Family strength was a solid predictor of family cohesion, adaptability, coping (both problem- and emotion-focused coping), and self-mastery. Additional paths emerged upon analysis between problem- and emotion-focused coping and between emotion-focused coping and self-mastery/self-esteem. The relationship between the types of coping was not surprising, given that the two types of coping came from the same instrument. Further, Lazarus and Folkman suggest that both types of coping can be used while experiencing one stressful event. However, an unexpected path in a negative relationship emerged between emotion-focused coping and self-mastery/self-esteem. This path suggests that the more a participant used emotion-focused coping, the lower his/her assessment of personal self-mastery/self-esteem. According to Majer, self-mastery is perceived control over situational outcomes while self-efficacy is the confidence in one's ability to effectively engage in situations toward a desired goal (2003). Emotion-focused coping, as defined by Lazarus and Folkman (1984) "refers to effort directed at regulating the emotion" associated with the demands that require coping. With the participants in this study emotion-focused coping tended to reduce self-mastery/self-esteem. A similar finding occurred in the disability model as well and an explanation of this finding will be discussed in that subsection below. Because coping is a major factor in stressful events and adaptational outcomes, how one copes with having a sibling with a disability may be related to higher perceived stress and lower levels of adaptation, especially if emotion-focused coping is the preferred method. Emotion-focused coping includes detaching from a situation, attempting to control an emotional response, wishing the problem would go away, and blaming oneself for the stressor, all of which are positively related to reports of depression (Aldwin & Revenson, 1987; Cronkite & Moos, 1984, Folkman & Lazarus, 1986). Consequently, it seems reasonable that high levels of emotion-focused coping would lead to lower levels of self-mastery/self-esteem.

Nondisability Model: Within the nondisability group, family strength was predictive of adaptability and cohesion, and also self-mastery and self-esteem, but the model's pathways dropped out between family strength and coping styles. This finding seems puzzling, given that it implies that family strength does not influence coping styles. Some researchers would disagree, arguing that various types of strengths that families possess reflect the way in which families cope and grow (Dunst et. al., 1988). The pathway between family strength and self-mastery/self-esteem is not an unexpected finding given previous research that supports the idea that family strength is a significant predictor of self-esteem for brothers and sisters of children with disabilities (Hannah & Midlarsky, 1999). Similarly, because of the large role that the family plays in sibling relationships, the assumption is made that the stronger the family, the more adaptive and cohesive the siblings would be (Stoneman, 1998). The existing pathway between family strength and adaptability and cohesion supported Stoneman's theory. Also, the pathway between types of coping is not unexpected, since they are closely related in theory and construct.

Disability Model: Within the disability model, having a strong family was predictive of adaptability and cohesion, as well as self-esteem/self-mastery, but not coping styles (similar to the nondisability model). It can be argued that family strength and coping styles are not related because coping involves an individual's cognitive appraisal and initiation of effort, whereas families exist and are not a choice. There is not an element of individuality and choice. Additionally, temperament may play a mediational role between family strength and coping, specifically where certain temperament characteristics either impair or facilitate types of coping (Folkman, et. al, 1986).

In conclusion, when looking at the overall model, hypothesis 1 was supported. The hypothesis also was supported in both group models on the variables of adaptability and cohesion, and self-mastery/self-esteem. Given that adaptability and cohesion are important variables within family systems (Olson, McCubbin, Barnes, Larsen, Muxen, & Wilson, 1983) and that self-mastery/self-esteem are often modeled on family members (Grissom & Borkowski, 2002), these findings were not surprising. On the other hand, when examining the models by group, family strength was not a significant predictor of coping style for either the disability or nondisability group. One is led to believe that coping stands alone, independent of assessment of family strength. Perhaps this effect would have been better explained by adding a measure of temperament and provides grounds for future research.

Hypothesis 2: Family cohesion and family adaptability will be related to coping, as well as to self-mastery/self-esteem.

Full Model: Hypothesis 2 was not supported by the full model. Participant assessment of family adaptability and cohesion were not related to the coping outcomes or to self-mastery/self-esteem once the model was trimmed.

Nondisability Model: Hypothesis 2 was also not supported by the nondisability model. Ratings of adult siblings of individuals without disabilities' perception of their families' levels of adaptability and cohesion were not related to coping or to self-mastery/self-esteem once the model was trimmed.

Disability Model: Hypothesis 2 was not supported by the disability model either. Scores on the measure of family adaptability and cohesion among adult siblings of individuals with disabilities had no relation to coping or to self-mastery/self-esteem outcomes in this model.

In this study family adaptation and cohesion, as well as coping types, specifically emotion-focused and problem-focused coping, were not related to self-mastery/self-esteem. In a study of adolescent siblings, opinions on family interaction (e.g., adaptation and cohesion) were ambivalent and many siblings had unexpressed emotions regarding their family situation. Perhaps the lack of relationship between adaptation and cohesion and coping is due to ambivalence. Additionally, adolescents of a sibling with a disability who were able to identify a supportive, attentive parent or caregiver were more likely to cope effectively (Opperman & Alant, 2003). This finding suggests that while the participants in this study do have strong families, family adaptability and cohesion does not directly predict coping or self-mastery/self-esteem.

Hypothesis 3: Variations in coping will be mediated by subjective assessment of a strong family and of adaptability and cohesion.

Full Model: A relationship was found between family strength and types of coping when looking at the full model, although those relationships were weak. A strong positive relationship existed between emotion-focused coping and problem-focused coping such that if the individual used emotion-focused coping, then he/she was highly likely to use problem-focused coping as well. Coping types were not related to adaptability and cohesion.

Nondisability Model: Within the nondisability group, both coping types stood alone, unrelated to family strength and to adaptability and cohesion. This finding was quite surprising and may be explained by mean age of the nondisability group. The nondisability group was mostly Southern, college-age, unmarried, full-time students, living away from their families. They are likely coping with many environmental variables outside of home and family influences, and are likely attempting to define themselves as independent and self-sufficient in regard to their birth families.

Disability Model: As proposed, siblings who have a brother or sister with a disability employed more emotion-focused coping resulting in lower self-mastery/self-esteem. This finding was expected given that these individuals are more prone to have threats to their well-being than the nondisabled population and are less amenable to change due to their siblings' disability. Appraising an event as threatening with little or no change may cause heightened stress and lower feelings of self-mastery/self-esteem. This finding in the coping variable occurred independently from assessment of a strong family and of adaptability and cohesion, suggesting that a temperament component may be operating on a separate dimension from family functioning and may be influencing coping strategy.

Hypothesis 4: Self-mastery/self-esteem is an overall function of one's assessment of his/her family strength, adaptability & cohesion, and coping.

Full Model: Self-mastery/self-esteem was related to family strength and emotion-focused coping in the full model; however, it was not related to adaptability and cohesion or to problem-focused coping.

Nondisability Model: Self-mastery/self-esteem was statistically only related to family strength in the nondisability model.

Disability Model: Self-mastery/self-esteem was related to, as in the full model, family strength and emotion-focused coping; however, there was a negative relationship between self-mastery/self-esteem and emotion-focused coping, such that the more emotion-focused coping the participant engaged in, the lower his/her self-mastery/self-esteem. This finding suggests that increased emotionality decreases feelings of self-mastery/self-esteem.

In conclusion, self-mastery/self-esteem was a valid outcome of family strength but not of adaptation and cohesion, or of problem-focused coping. Lazarus and Folkman (1984) defined two types of cognitive appraisal when coping: primary and secondary. Primary appraisal occurs when a situation is categorized in terms of meaning and significance for an individual's well-being. Three types of appraisal are considered primary: harm/loss, threat, and challenge. Secondary appraisal is the assessment of what might be and can be done when an individual concludes that either a threat or an opportunity exists. Feelings of self-efficacy/self-mastery influence primary and secondary appraisal. High self-efficacy/self-mastery may lead a primary appraisal of a situation as benign, positive, or as irrelevant, but not as stressful. If the event is perceived as stressful, then self-efficacy becomes the major component of secondary appraisal. Perhaps in the full model and in the disability group, the pathway between emotion-focused coping and self-mastery/self-esteem is being created due to the subjects' secondary appraisal. The negative association between emotion-focused coping and self-mastery/self-esteem also makes sense within this context. If an individual is coping more emotionally because of the situation's primary appraisal as stressful, his/her stress level is higher and therefore self-mastery/self-esteem is lowered (DeVellis & DeVellis, 2001).

Levinson's Theory of Adult Development and the Current Study

When framing the findings of this study within Levinson's theory on adult development, the data appears to fit it well, in so far as age and developmental stage. This section will discuss how the characteristics of each group fit within Levinson's developmental theory and help to explain findings between the variables used in this study. When determining why pathways between family strength and coping were nonexistent in the nondisability model but were present in the overall model, specific group demographics should be considered.

The mean age of the participants in the disability group is 31.24 years and the mean age of their sibling is 30.47 years; however, the mean age of the nondisability participants is 20.82 years and their siblings' average age is 20.31 years. The average age of the disability group is almost 10 full years older then the nondisability group and according to Levinson's theory, this age difference may account for the discrepancy in relationships between the variables due to the stage at which these individuals are progressing through their adult life.

Disability Group

A further analysis of age within the disability group reveals that 52 subjects (63% of the total disability group) were over the age 22 (end of Levinson's Early Adult

Transition), and that group is 69% female, with an average age of 39.13 years. Only 6 males comprised this group with a mean age of 35.16 years. Since the majority of the participants (63%) in the disability group are in their mid to late thirties, and educated (89% obtained more than a high school diploma), they are in, what Levinson referred to as the Settling Down Period of Early Adulthood, occurring after the Age 30 Transition. During the Settling Down Period, individuals attempt to achieve two tasks. The first is establishing a niche in society by becoming more secure within the world and within a chosen profession. The second task is working towards advancement to fit into the niche. The main objective is to become a full-fledged adult with a defined direction or path. Levinson introduced the concept of ladder at this period to reflect the drive for advancement and affirmation in all areas of life. "The ladder has both objective and subjective aspects: it reflects the realities of the external social world, but it is defined by the person in terms of his [her] own meanings and strivings" (1978, p. 59). Through the rungs of the ladder, a person moves from a junior member to a senior member in the world, and a sense of well-being during this period is fostered by self and other's evaluation of progress on the ladder. At the end of the Settling Down period, is the Becoming One's Own Man [Woman] phase, with the major developmental tasks of this phase being to accomplish goals of the Settling Down period, "to speak more strongly with one's own voice, and to have a greater measure of authority" (1978, p.60).

When considering the disability group within these adult developmental milestones, the missing link between family strength and coping and the existing negatively related link between emotion-focused coping and self-mastery/self-esteem might be due to the participants' own issues with becoming their own selves and with feeling like they have defined and advanced towards their niche. No longer does this group feel the necessity of strongly identifying with their birth families, but rather are focused on themselves individually and their current achievements or status within the world. The evidence that their self-mastery/self-esteem is related to their levels of emotion-focused coping indicates that this group might be struggling to cope with questioning of whether they have reached their adult goals. These data suggest that perhaps they have not reached their goals and therefore are coping emotionally, which is lowering their overall self-mastery/self-esteem.

The fact that the majority of the participants in the disability group are female implies that they might be emotionally unsettled according to Levinson. He proposed that females, while they do progress through the same stages as males, get waylaid from their goals that should form during Early Adult Transition phase in an effort to give precedence to marriage and family, even when clear career paths were chosen. Again, 89% of the females in the disability group over the age of 22 obtained either a college degree or more and reported their occupations. All 6 of the males in the disability group over the age of 24 had either a college degree or more. The majority had occupational goals that were either ongoing or that had been achieved prior to retirement. Levinson states that even when women have clear career aspirations, they have difficulty forming Dreams, which are vital in determining adult developmental success. Perhaps the females in the disability group struggled with Dream development in their late teens and early twenties and consequently missed the excitement and vitality Levinson claimed to come from Dream formation. Such a conclusion would further explain the link between coping style and self-mastery/self-esteem. This finding begs the question as to whether having a sibling with a disability affects the typical sibling's Dream formation and accomplishment, which likely affects self-mastery/self-esteem in adulthood.

Nondisability Group

The mean age in the nondisability group was 20.82. Out of the 108 participants in that group, only 9 females (8%) and 6 males (6%) were over the age of 21; therefore 86% of the nondisability group was 21 or younger. This group is in the Early Adult Transition period, in which it is divided between the preadulthood coming to an end and the early adulthood era beginning. Levinson states that "a new step of individuation is taken as the budding adult modifies his or her relationships with family and other components of the preadult world and begins to form a place as an adult in the adult world" (1986, p.5). This transition phase is marked by great energy but is also filled with great stress. The stress results from being driven by passion and ambition from within while trying to develop a family, a community, and a society from without. Levinson claims that the rewards from this era are enormous but that without "reasonably favorable conditions…the costs often equal or even exceed the benefits" (1986, p. 5).

The participants in the nondisability group are going through an adult developmental phase largely driven by the need of individuation. This need includes breaking away from one's own birth family and establishing a set of rules and goals that are personally gratifying and developed. Termination or a shifting of previously meaningful relationships occurs as the individual modifies his/her place in the world and tests initial adult identity (Levinson, 1978). Since the majority of the nondisability group was college students, they are in the process of separating from their parents. They are likely in the process of modifying their relationship with their parents such as rejecting certain qualities of the bond in order to embrace new qualities made possible through adjustments during college. That being said, it is not surprising that for the nondisability group, their coping styles are not predicted by family strength. If they are in the process of separating from their families, then they are likely coping as individuals and not as members of their birth family. Additionally, there were no pathways between coping styles and self-mastery/self-esteem, which leads to the assumption that coping does not threaten their self-mastery/self-esteem. Because this group is in the heart of Dream formation and individuation, they are not experiencing emotionally threatening thoughts to their self-mastery/self-esteem at this point. Their Dreams have not had a chance to be tested or to fail therefore their self-mastery/self-esteem is still very much intact. Furthermore, their family dynamics (e.g., do not have a sibling with a disability) may not threaten their individuation or Dream development.

Limitations

A number of studies cite the importance and the need for additional research to aid in explaining the intricate relationships between siblings, both dyads with and without disabilities. While this study attempts to add to the existing literature, a few limitations prohibit the application of these findings to the majority of sibling relationships. First, the data collected for this study was cross-sectional, retrospective, self-report meaning that each subject was asked to reflect on his/her past sibling and family experiences at a certain point in time. Fortunately, many of the participants were still living with or caregiving for their siblings; therefore memory recall was perhaps more precise.

Second, this study is limited by its small sample size for a number of reasons. The dynamics of sibling relationships are extremely complex and multifaceted; therefore sampling a small group of this population may not provide an accurate reflection or representation of these complicated, interwoven relationships. Similarly, the measures cover numerous internal and external variables, which could all be separately analyzed; however, SEM allowed for the theoretical constructs and variables to be analyzed together. But, SEM, like most statistical procedures performs better with larger sample sizes, the findings are more robust and having false positives are minimized.

Third, to truly compare the effects of having a sibling with a disability, equal numbers of each disability within the disability group would be ideal. Such a sample would enable comparisons of family relationships between different types of disabilities. If significant differences were found, mental health professionals would know more specifically which disability types may be more or less stressful for families and/or siblings.

A fourth limitation was the lack of a temperament or personality measure and the inability to analyze career satisfaction with self-mastery/self-esteem, as suggested by Levinson (1978). A temperament/personality measure may have accounted for relationship differences between Family Strength and coping style. The coping literature indicated the importance of exploring personality traits of individuals that may serve as predictor variables in coping outcomes. Such traits include positive versus negative affect (Folkman & Midlarsky, 2000), favorable attitudes towards one's self (Pearlin & Schooler, 1978) and optimism versus pessimism. A temperament measure may have captured such personality traits and consequently explained some of the variance between the groups.

Fifth, the participants of this study, especially the disability group, must be taken into consideration when interpreting the results. While these results show that the participants in the disability group reported having significantly more medical conditions, including depression and anxiety, than did the nondisability group, this disability group represents a very small fraction of the population of adult siblings of individuals who have a disability. The finding that this study's disability group appears to cope more emotionally, therefore lessening their self-mastery and self-esteem can not be generalized to this population as a whole. If the majority of these siblings were recruited from a sibling support website, then there is likely a reason they sought out and joined the SibNet to begin with, perhaps due to certain emotional predispositions and support needs.

Finally, this study would have been strengthened by including all sibling and parental responses on all of the measures. Such responses could have provided more statistical power as well as invaluable information regarding how parents and siblings within the same family perceive family strength, coping, adaptation and cohesion, and self-mastery/self-esteem. According to Stinnett (1981), it is parents who model the positive behaviors of inner strength, stable identity, positive self-concept, unconditional acceptance, and love, all attributes that would be helpful in structuring a positive relationship with siblings, family members, and any loved one. While this study's intent was to focus specifically on adult siblings, family studies must not underestimate the emotional, social, and psychological impact that each family member has upon one another.

Summary and Future Research

Group differences were found to exist between the disability and nondisability groups, most strikingly the pathway between emotion focused coping and self-mastery/self-esteem, indicating that perhaps siblings who have a brother or sister with a disability are engaging in more emotion-focused coping which is therefore lowering their overall self-mastery/self-esteem. This finding, however, cannot be generalized to the all individuals who have a sibling with disability. The characteristics of the participants must be taken into consideration and placed within an adult lifespan developmental framework, such as Levinson's theory. The disability group in this study was comprised mostly of women over the age of 30. According to Levinson, women specifically struggle with Dream development thereby limiting their personal potential and causing doubts of self-mastery that may lead to decreased self-esteem. Furthermore, this study suggests that these females are also engaging in increased emotion-focused coping. While this study may imply negative implications of having a sibling with a disability, specifically for typical female siblings, one must proceed with caution in making such a conclusion. To further explore whether female siblings of brothers and sisters with disabilities are engaging in increased emotion-focused coping and decreased self-mastery/self-esteem, future research needs to be longitudinal to capture developmental change over time and to include more family members, a measure of temperament, and career/life satisfaction information. Such findings can be of great importance in providing clinical support services to families that include individuals with disabilities.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD EXPEDITED RENEWAL

UAB THE UNIVERSITY OF
ALABAMA AT BIRMINGHAM

Institutional Review Board for Human Use

Form 4: IRB Approval Form
Identification and Certification of Research
Projects Involving Human Subjects

UAB's Institutional Review Boards for Human Use (IRBs) have an approved Federalwide Assurance with the Office for Human Research Protections (OHRP). The UAB IRBs are also in compliance with 21 CFR Parts 50 and 56 and ICH GCP Guidelines. The Assurance became effective on November 24, 2003 and expires on October 7, 2008. The Assurance number is FWA00005960.

Principal Investigator: PARTRIDGE, KAMERON
Co-Investigator(s):
Protocol Number: **X050131006**
Protocol Title: *Adult Siblings: Does Disability Influence Family Cohesion, Coping, and Self-Mastery?*

The IRB reviewed and approved the above named project on 02-08-06. The review was conducted in accordance with UAB's Assurance of Compliance approved by the Department of Health and Human Services. This Project will be subject to Annual continuing review as provided in that Assurance.

This project received EXPEDITED review.

IRB Approval Date: 2-08-06

Date IRB Approval Issued: 02-09-06

Marilyn Doss
Marilyn Doss, M.A.
Vice Chair of the Institutional Review
Board for Human Use (IRB)

Investigators please note:

The IRB approved consent form used in the study must contain the IRB approval date and expiration date.

IRB approval is given for one year unless otherwise noted. For projects subject to annual review research activities may not continue past the one year anniversary of the IRB approval date.

Any modifications in the study methodology, protocol and/or consent form must be submitted for review and approval to the IRB prior to implementation.

Adverse Events and/or unanticipated risks to subjects or others at UAB or other participating institutions must be reported promptly to the IRB.

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APPENDIX B

INSTITUTIONAL REVIEW BOARD EXPEDITED REVIEW

UAB THE UNIVERSITY OF
ALABAMA AT BIRMINGHAM
Institutional Review Board for Human Use

Form 4: IRB Approval Form
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Principal Investigator: PARTRIDGE, KAMERON
Co-Investigator(s):
Protocol Number: **X050131006**
Protocol Title: *Adult Siblings: Does Disability Influence Family Cohesion, Coping, and Self-Mastery?*

The IRB reviewed and approved the above named project on 02/10/05. The review was conducted in accordance with UAB's Assurance of Compliance approved by the Department of Health and Human Services. This Project will be subject to Annual continuing review as provided in that Assurance.

This project received EXPEDITED review.

IRB Approval Date: 2-10-05

Date IRB Approval Issued: 02/10/05

Marilyn Doss

Marilyn Doss, M.A.
Vice Chair of the Institutional Review
Board for Human Use (IRB)

Investigators please note:

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DISSERTATION APPROVAL FORM
DOCTOR OF PHILOSOPHY

Name of Candidate Kameron B. Partridge

Graduate Program Psychology

Title of Dissertation Adult Siblings: Does Disability Influence Family Cohesion, Coping, and Overall Self-Mastery?

I certify that I have read this document and examined the student regarding its content. In my opinion, this dissertation conforms to acceptable standards of scholarly presentation and is adequate in scope and quality, and the attainments of this student are such that she may be recommended for the degree of Doctor of Philosophy.

Dissertation Committee:

Name		**Signature**
Fred J. Biasini	, **Chair**	Fred J. B
Kirstin J. Bailey		Kirstin J Bailey
Timothy R. Elliott		
Anne Turner-Henson		Anne Turner-Henson
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Date JUN 16 2006