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## The Effects of Acquired Hearing Loss on Spouses' Perceived Marital Adjustment

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FLORIDA STATE UNIVERSITY  
COLLEGE OF HUMAN SCIENCES

THE EFFECTS OF ACQUIRED HEARING LOSS ON SPOUSES'  
PERCEIVED MARITAL ADJUSTMENT

By

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## **ABSTRACT**

Acquired hearing loss occurs when one loses their hearing postlingually. Such loss is increasingly common as the world's population ages, and it is increasing among younger adults as well. Little quantitative research is available on how hearing loss affects spouses' or partners' intimate relationships. Thus, the focus of this study was to explore how hearing loss affects spouses' marital adjustment, and a conceptual model of the linkages between hearing loss, spouse's personality, perceived social support, and marital adjustment was assessed. Survey data were obtained from 82 couples where partners individually completed the surveys; only data from spouses was used in the analysis. Hearing loss was measured with pure tone audiometry, word discrimination, and suddenness of loss. Also, the use of assistive technology was included as a moderator of the relationship between the degree of hearing loss and spouses' marital adjustment. Perceived social support was assessed as a mediator of the relationships between degree of hearing loss, suddenness of loss, spouses' personality, and marital adjustment. Results from a series of stepwise multiple regression analyses showed that perceived social support was the strongest predictor of spouses' marital adjustment, such that more social support was linked with higher levels of marital adjustment. Other predictors included presence of children in the home and use of assistive technology. Presence of children was associated with lower levels of marital adjustment, and the use of assistive technology was associated with higher levels of marital adjustment. Use of assistive technology did not moderate the relationship between degree of hearing loss and spouses' marital adjustment. Perceived social support mediated the relationships between two indicators of

personality (openness and conscientiousness) and marital adjustment, but social support did not mediate other relationships (between the degree of hearing loss, sudden versus gradual loss, agreeableness, emotional stability, extraversion, and marital adjustment). Recommendations for future research and implications for clinical practice are presented.

## CHAPTER 1

### INTRODUCTION

Acquired hearing loss occurs when a person loses his/her hearing following the acquisition of speech and language skills (Aguayo & Coady, 2001). The incidence of acquired hearing loss (AHL) in adults has almost doubled in the past 30 years (Wallhagen, Strawbridge, Shema, & Kaplan, 2004), including adults of all ages. In fact, Kochkin (2005) estimated that a total of 31.5 million people have experienced hearing loss in the U.S., adding that “Within a generation, we can expect the hearing loss population to grow by one-third and top 40 million people” (p. 19).

Research has examined the causes of hearing loss. For example, Boone and Scherich (1995) queried members of the Association of Late-Deafened Adults about these causes. Of the 348 members participating, 40% reported medical reasons (e.g., meningitis, otitis media, reactions to medications, viral infections), 13% reported surgical reasons (e.g., trauma, tumor removal), 5% reported various traumatic injuries (e.g., automobile accidents, combat injuries, explosions), and 42% reported unexplained progressive hearing loss.

Research also has examined how experiencing a hearing loss affects the individual and his/her interpersonal relationships (Barlow, Turner, Hammond, & Gailey, 2007; Hallberg, 1996, 1999; Hallberg, Hallberg, & Kramer, 2008). For example, results document psychosocial effects, including irritability, anxiety, aggression, decreased self-esteem, feelings of personal inadequacy, suspiciousness, and depression. Because hearing is an interactive process, such loss affects an individual’s interpersonal and intimate relationships (Hallberg, 1996, 1999; Hetu, Jones, & Getty, 1993; Wallhagen et

al., 2004) such that spouses/partners report decreases in communication overall, changes in communication patterns that result in more misunderstandings, and discussions of only the most pressing matters (Jones, Kyle, & Wood, 1987; Scarinci, Worrall, & Hickson, 2008).

Important to the current study are findings that AHL increases prevalence of divorce (Glass & Elliott, 1992), as one measure of relational outcomes. Further, findings from a longitudinal study (Wallhagen et al., 2004) showed that five years after initial assessments there were significant decreases in spouses' physical, psychological, and social well-being following a mates' hearing loss. They concluded that these negative effects are least dramatic for the spouse with the hearing loss and most dramatic for his/her partner. Thus, the focus of the current study is on how AHL affects spouses' perceptions of marital adjustment. Importantly, Hallberg (1999) suggested that personality may influence the coping strategies adopted following hearing loss. Thus, gaining knowledge about how personality affects hearing loss outcomes extends the current literature on the effects on spouses.

Stress process theory (see Pearlin, Lieberman, Menaghan, & Mullan, 1981) is used to frame the study described here addressing spouse/partners' perceptions of relationship adjustment following an AHL. Theoretically, individuals and families experience stressors from various sources, such as those associated with hearing loss. Experiencing hearing loss can create problems for the individual with the loss and his/her significant others. Research shows that social support, coping strategies, personal resources, and the use of assistive technology (i.e., hearing aids, cochlear

implants) facilitate adjustment following hearing loss (Hallberg, 1999; Hampton, 1999; Kochkin, 2009).

There is a dearth of research on the effects of AHL on couples, and, in particular, spouses of those with a hearing loss (Hampton, 1999; Hetu et al., 1993; Wallhagen et al., 2004). In fact, only one study was found addressing these effects on the impaired member's spouses (see Wallhagen et al.). Further, no study included the effects of assessment of the suddenness of the loss or personality as predictors of adjustment among these couples. Thus, this study examines the effects of the degree of hearing loss, suddenness of the loss, spouses' personality, and spouses' perceived social support on their reported marital adjustment.

### **Purpose**

The purpose of this study was to extend the scant literature on the effects of AHL on spouses'/partners' marital adjustment. For purposes of clarity and brevity, spouse is used as a general term to refer to the mate or partner of the individual with the hearing loss, regardless of actual marital status. Specifically, I test a model stemming from stress process theory (see Figure 1). This model suggests that spouses' perceived social support mediates the effects of AHL on marital adjustment, and that assistive technology (i.e., hearing aids, cochlear implants) moderates this relationship. Also, the model suggests that spouses' personality is linked to marital adjustment through perceived social support.

Three questions guided the study.

1: How does the degree of hearing loss, suddenness of onset, and spouses' personality affect spouses' perceived marital adjustment?

2: How does the use of assistive technology (i.e., hearing aids, cochlear implants) affect the relationship between the degree of hearing loss and spouses' marital adjustment?

3: How does spouses' perceived social support affect their perceived marital adjustment, and does perceived social support mediate the effect of degree of hearing loss, sudden versus gradual loss, and spouses' personality on their marital adjustment?

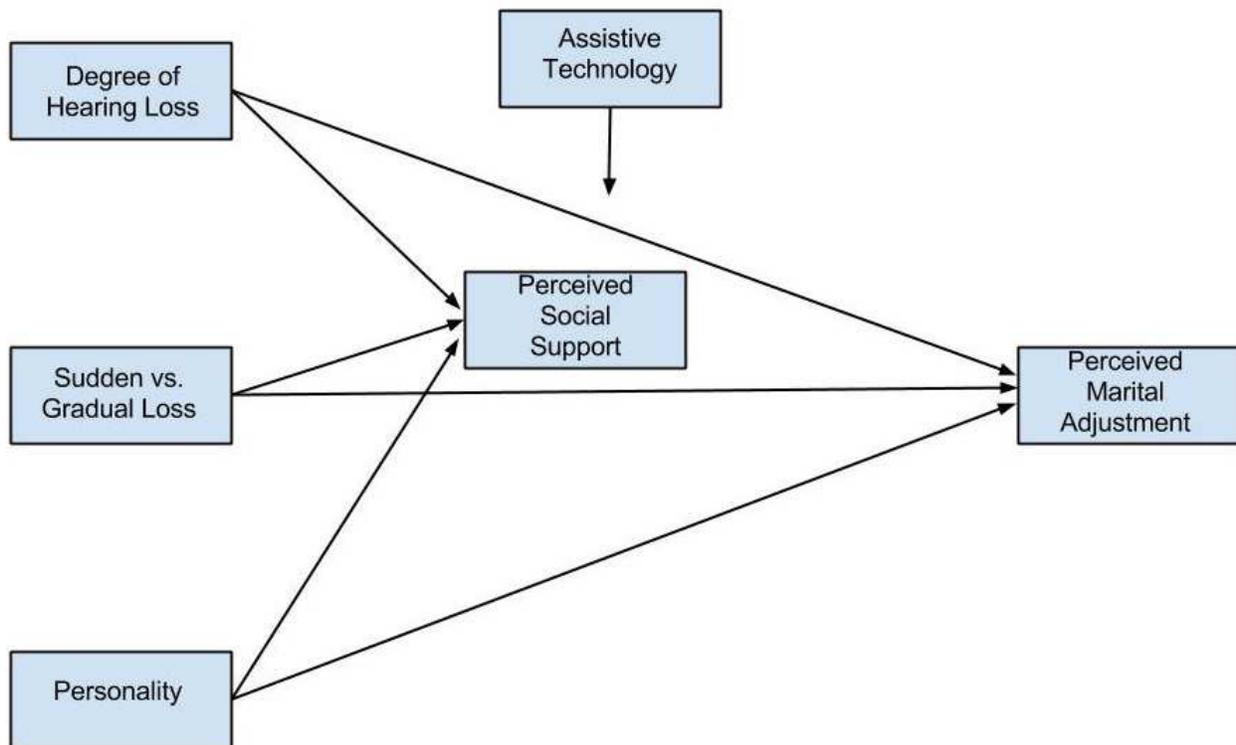


Figure 1.  
Conceptual Model of Acquired Hearing Loss

## CHAPTER 2

### THEORETICAL OVERVIEW

Stress process theory focuses on how stress affects people and the resulting outcomes of stress (Pearlin et al., 1981). In this process, coping resources, coping strategies, and social support act as mediators or moderators of the links between stress and the outcomes of stress. Stress is defined as an organism's attempt to reestablish a balance between internal and external forces after a change occurs (Selye, 1956). Maintaining a state of balance (homeostasis) or regaining one's balance following a stressor event is influenced by the coping strategy employed (Lazarus & Folkman, 1984).

One may be exposed to stressors at the societal, neighborhood, or individual level (Pearlin, 1999). Stressors are events and experiences that have the potential to create stress. For example, a societal stressor might be being labeled as handicapped due to hearing loss, whereas a neighborhood stressor might include being stigmatized and avoided because of difficulties in conversing. Because stress does not occur in isolation, primary stressors may produce secondary stress, resulting in a process referred to as stress proliferation. For example, a primary stressor might be leaving work tired from a day of dealing with hearing loss issues, whereas a secondary stressor might be returning home tired and arguing with one's spouse. Further, stressors may accumulate or overtax individual coping resources and strategies, resulting in poor physical and mental health (Thoits, 1995).

Sociologists commonly classify stressors as event stressors or chronic stressors (Pearlin, 1989), and those who study the stress process focus on how life events cause

stress (Pearlin et al., 1981; Thoits, 1981). In fact, Thoits found that scheduled, desirable, or voluntary events were less stressful than were those unscheduled, undesirable, or involuntary events. Applied to the current study, the loss of one's hearing is typically an unscheduled, undesirable, and involuntary event. Because sensorineural hearing loss is usually irreversible, once such loss occurs, the event becomes a chronic or persistent stressor. Chronic stressors include status strains, role strains, ambient strains, or daily strains (Pearlin; Pearlin et al.). Status strains are created by one's place in the social structure. They also occur when an individual or couple assumes a status that is devalued, labeled, or stigmatized by society, such as being labeled as handicapped due to hearing loss. Research indicates that for both the individual and couples a predominant goal following a loss of hearing is to maintain a "normal" identity (Hallberg, 1999; Hetu et al., 1993). The efforts and adjustments individuals and couples make to do this can produce status strains, as these efforts can become a daily struggle.

Role strains also occur as a result of hearing loss. For example, the primary breadwinner may lose his/her job as a result of the condition, requiring the partner to take on more breadwinning responsibilities. Further, if the hearing loss is severe, the person experiencing the loss may be unable to communicate effectively and comes to depend on his/her spouse to communicate on his/her behalf especially in public situations. As a result, individual roles and couple dynamics change due to role strains.

Ambient strains and daily strains also can occur. Ambient strains originate in one's local environment (Pearlin, 1989). Related to hearing loss, ambient strains may occur when an individual or couple seeks assistance for dealing with this loss and find

no resources available locally to ameliorate the strain. Daily strains are ongoing for both the individual and the couple. Examples are traffic delays, being spoken to harshly by a cashier, or perceiving an audiologist as uncaring. Because stressors can mount daily, over time they escalate and spillover from one area of life to another. For example, a man has a stressful day at work and arrives home needing quiet time to relax. If he is engaged immediately by his spouse and asked to discuss an emotional topic, the spillover of stress from his work day erupts into an argument with his spouse.

### **The Role of Coping and Social Support**

Stress process theory posits that coping resources, coping strategies, and social support mediate the links between the stressors and stress outcomes (Pearlin, 1989; Pearlin et al., 1981). Thoits (2010) identified three coping resources that help to buffer or modify the effects of stress: (a) “control or mastery over life, (b) high self-esteem, and (c) social support” (p. S46). Scholars have extensively studied coping resources and find that one’s coping resources influences their choice of coping strategies (Thoits, 1995). Coping strategies consist of cognitive and behavioral efforts to alter, manage, or adjust to stress (Lazarus & Folkman, 1984). Menaghan (1982) found that individuals with high control over life and high self-esteem tend to adopt problem-focused coping strategies, whereas those with low control over life and low self-esteem tend to use emotionally-focused coping strategies. In relation to hearing loss, problem-focused coping strategies include being active and taking control of stressful conversational situations (Hallberg, 1996). Emotionally-focused coping strategies include withdrawal, pretending to hear, guessing at what was said, or avoiding stressful conversational situations. However, findings as to which coping strategy is best are not conclusive.

Menaghan also found problem-solving coping strategies have either no effect or may increase the negative psychological effects of stress. Other research (Epping-Jordan, Compas, & Howell, 1994) found cancer patients who avoided their diagnosis declined in health more quickly than those who took control and acknowledged the diagnosis. Regarding hearing impairments, Hallberg et al. (2008) found “pretending to hear, guessing at what was said, and avoiding interactions, significantly contributes to a lowered quality of life” (p. 210).

Regardless of the situation, Pearlin and Schooler (1978) suggested that coping strategies function to (a) actively intervene to extinguish a potential stressor, (b) manage stress, or (c) to change one’s perspective of the stressor. The predominant goal for the person or couple experiencing hearing loss is to maintain a normal social identity (Hallberg, 1996, 1999; Hetu et al., 1993). As such, research shows that these individuals and couples adopt coping strategies designed to avoid difficult social situations or to control social situations. Specifically, four coping styles were identified by spouses of men with a hearing loss (Hallberg, 1999; Hallberg & Barrenas, 1993): co-acting, minimizing, mediating, and distancing. Spouses employing the co-acting style share in denying the existence of a hearing loss. Those that minimize the loss are aware of the problem, but they choose to avoid drawing attention to it and say the problem is not disruptive. Spouses that become mediators choose to accompany their partner in public and speak and interpret for them. The mediating spouse works to avoid challenging social situations, control unavoidable social situations, and advise his/her partner when needed privately (Hallberg, 1996). Distancing spouses engage

less with their impaired partners and do not accompany their partners in public, often frequenting restaurants or cinemas alone or with friends.

Since Cobb's (1976) seminal review discussing the role of social support as a buffer of life stress, social support includes any combination of information leading one to believe he/she is cared for and loved, is esteemed and valued, and belongs to a network of communication and mutual obligation. Social support also includes efforts by significant others (e.g., spouse, partner, children, siblings, friends) to assist an individual. House and Kahn (1985) found that social support included acts done, information provided, or emotional support provided someone. Others (Wethington & Kessler, 1986) found that perceiving the availability of support is more important than the actual receiving of support. Importantly, their finding influenced much of the subsequent research focusing on the role of perceived social support on physical and mental health outcomes (Thoits, 1995). For example, McDowell and Serovich (2007) studying perceived support versus actual or received support (i.e., acts done on behalf of another, providing someone with a meal, carrying a sick person to the doctor, doing another's laundry) in gay males, women living with HIV/AIDS, and straight and bisexual males found that perceived support was predictive of mental health indicators for all groups, and actual support predicted only depression and loneliness in gay males.

Reviews of the social support literature identify three common findings (Cohen & Wills, 1985; McDowell & Serovich, 2007; Nurullah, 2012): (a) social support is positively related to physical and mental health outcomes; (b) one's perception of available social support is positively related to physical and mental health outcomes; and (c) being involved in an intimate, caring relationship mediates or reduces the negative effects of

stressors on physical and mental health outcomes. In fact related to hearing loss, Frankel and Turner (1983) found that social support was the most significant predictor of an individual's psychological adjustment to hearing loss. Thus, spouses' perceptions of social support are expected to be significantly related to spouses' marital adjustment directly and indirectly.

### **Conceptual Model Integrating Theory and Research**

Drawing upon stress process theory and the extant literature, the conceptual model tested in the current study depicts the relationships between stressors (i.e., hearing loss, personality), coping strategies (i.e., assistive technology), perceived social support, and spouses' perceived marital adjustment (stress outcome) in the context of a spouse with AHL (see Figure 1, p. 4).

**Stressors.** Research identifies different stressors affecting the person experiencing the hearing loss, his/her spouse, and intimate relationships including degree of hearing loss, suddenness of the loss, and personality. Early on, Ramsdell (1968) found that the degree of hearing loss and nature of onset (i.e., sudden, gradual) affected one's psychological adjustment. Later, Hetu, et al. (1993) found time was an essential element affecting psychosocial adjustment, such that the passage of time after an AHL was associated with better adjustment.

**Degree of hearing loss.** As shown in the model, the outcome of stress (marital adjustment) following the loss of one's hearing is influenced by the degree of the loss (Myklebust, 1964; Ramsdell, 1968). Because stressors accumulate, and stress proliferation occurs (Pearlin, 1989; Pearlin et al., 1981; Thoits, 1995), stress in one area of an individual's life may spillover into other areas. This spillover impacts the

relationships of both the person experiencing the hearing loss and his/her significant others (e.g., spouse, partner, children, siblings, friends) (Armero, 2001). In a study assessing the effects of husbands' hearing loss on their wives, findings show the "effect is predominantly on the wife rather than a husband" (Wallhagen et al., 2004, p. 194). Using data from 426 couples, spouses' physical, psychological, and social well-being were assessed five years after the initial assessments, and they reported poorer physical, psychological, and social well-being. In an earlier study using the same data, Wallhagen, Strawbridge, and Kaplan (2001) found that increases in the degree of hearing loss were linked only with increases in the probability of poorer mental health and well-being for those impaired. Unfortunately, these studies included only self-reported hearing loss, so no objective assessment was included.

In a seminal study investigating the effects of AHL on mental health, employment, personal well-being, and family life, Thomas and Herbst (1980) objectively assessed hearing loss using pure-tone audiometry (PTA) and word discrimination testing. They found no relationship between PTA scores or word recognition scores and mental health. However, when high pure-tone loss was combined with low word recognition scores, this was associated with poorer mental health. Much later Hallberg, et al. (2008) studied the effects of AHL on older patient's using PTA and communication strategies utilized on their psychological general well-being (quality of life). Psychological well-being was assessed by the Psychological General Well-being index (PGWB) (Dupuy, 1984). Findings showed that the degree of hearing loss measured by PTA was significant only in relation to age indicating hearing loss increases with age. Other important findings were that maladaptive behaviors (i.e., pretending to hear,

guessing at what was said, avoiding conversation) were significantly associated with a lower quality of life.

Although there is some contradictory evidence, the majority of studies report that degree of hearing loss is linked with poorer outcomes as suggested by stress process theory (Pearlin et al., 1981). That is, increases in hearing loss, adversely affect outcomes, so it is expected that those with higher levels of hearing loss, assessed objectively using both PTA and word discrimination scores, will be linked with poorer marital adjustment.

***Sudden versus gradual loss.*** A study of World War II veterans with hearing loss determined that the timing and severity of the hearing loss were critical factors influencing adjustment (Ramsdell, 1968). Sudden, severe hearing loss resulted in the most negative adjustment in this population (i.e., denial, anger, depression; Hetu et al., 1993). However, progressive hearing loss, presbycusis, is usually associated with aging, and in contrast to sudden, severe hearing loss, a progressive loss is less disruptive. Hetu, et al., stated that in progressive hearing loss “the partners are tacitly involved in a process of coping with hearing difficulties while they are becoming aware of them” (p. 367). Partners’ interpretation of this coping process was that unnoticed adjustments occurred before there are consequences to the relationship. Because progressive hearing loss occurs over time, any adjustment that follows also occurs gradually (Armero, 2000), so the inclusion of a measure of sudden versus gradual onset is important.

The loss of one’s hearing is an event stressor that becomes a chronic stressor, because sensorineural hearing loss usually does not reverse or correct itself (Martin &

Clark, 2000). Stress process theory suggests that with higher anxiety, confusion, and disruption in the relationships involving sudden loss, spouses' will report lower marital adjustment. Thus, determining whether the loss was sudden or gradual is expected to influence spouses' perceived marital adjustment because sudden losses create more anxiety, confusion, depression, and disruption to normal communication patterns that can result in poorer marital adjustment (Ramsdell, 1968).

***Personality.*** Early research addressing hearing loss attempted to link personality, psychiatric disturbance, and hearing loss (Thomas & Herbst, 1980). For example, Myklebust (1964) examined the effects of hearing loss and found onset at a young age and the degree of hearing loss affected individual development. The most successful adjustment occurred when the loss was after one's personality had formed or the hearing loss was less severe.

Personality has been used in numerous studies to predict marital outcomes (Claxton, O'Rourke, Smith, & DeLongis, 2011; Donnellan, Conger, & Bryant, 2004; Karney & Bradbury, 1995). Karney and Bradbury's vulnerability-stress-adaptation model states that enduring vulnerabilities (e.g., personality traits) are individual characteristics people bring to marriage. Coupled with the couple's adaptive resources, these vulnerabilities determine how a couple responds to stressful events that influence their marriage.

Personality research has progressed to include five dimensions referred to as the Five Factor Model (FFM; Costa & McCrae, 1992): extroversion, agreeableness, conscientiousness, neuroticism, and openness. Each dimension reflects a continuum between less or more of that quality (e.g., introversion vs. extroversion, neuroticism vs.

emotional stability, closed vs. openness). Two recent studies used the FFM as predictors of intimate relationships (Claxton et al., 2011; Donnellan et al., 2004). In both studies, personality research linking neuroticism with reduced relationship satisfaction and marital instability was cited (see Karney & Bradbury, 1995; Kelly & Conley, 1987). Less is known about how the other four dimensions affect relationship outcomes. In the Claxton, et al. study, all five dimensions were associated with marital satisfaction. They recruited 125 long-wed, heterosexual couples and found that conscientiousness was the best predictor of marital satisfaction, explaining 29% and 24% of the variance for husbands and wives, respectively. Donnellan, et al. also explored how the dimensions of the FFM predicted marital satisfaction in long-wed couples, using data from 418 couples in the Iowa Youth and Family Project (Conger, Rueter, & Elder, 1999). Important to the current study, wives' self-reports of marital quality were positively correlated with husbands' reports of conscientiousness and negatively correlated with neuroticism. Together the findings from these studies are less relevant to the current study, because the majority of the research examining the relationship between personality and relationship satisfaction used responses from young adult participants, and young adults are less likely to experience hearing loss.

However, stress process theory suggests that spouses' who are more introverted, neurotic, and closed to new experiences are less likely to successfully adjust to living with a hearing loss resulting in decreased marital adjustment. Thus, spouses' personality may influence their perceived marital adjustment as noted in the conceptual model proposed here.

**Mediator of stress: Social support.** Theoretically, the effects of stressors (i.e.,

degree of hearing loss, sudden vs. gradual loss, personality) on adjustment are mediated by perceived social support. Because evidence shows that perceived social support influences physical and mental health outcomes to a greater degree than actual or received support (House, 1981; Wethington & Kessler, 1986, McDowell & Serovich, 2007). Also, social support buffers or mediates the effects of stress (Den Oudsten, Van Heck, Van der Steeg, Roukema, & De Vries, 2010; Pearlin et al., 1981; Thoits, 1995). Although the conceptualization of social support varies (e.g., social support, social engagement, social integration, social activities) (Mendes de Leon, 2005), Cobb (1976) conceptualized social support as information leading one to believe that he/she is loved, is esteemed and valued, and belongs to a network of communication and mutual obligation. These three types of information or any combination of them has become the standard for conceptualizing social support.

Overall, from the literature reviews addressing social support, three common findings are noted: higher levels of social support are associated with better physical and mental health, higher levels of perceived or emotional support are associated with better physical and mental health, and perceived social support buffers the negative effects of acute and chronic stressors on outcomes (Berkman, 1984; Cohen & Wills, 1985; Den Oudsten et al., 2010; House, 1981; Wethington & Kessler, 1986). Further, both House and Wethington and Kessler found that perceived support exerted more influence on psychological distress than did actual or received support (i.e., acts done on behalf of another, providing someone with a meal, carrying a person to the doctor, doing another's laundry).

Regarding social support within the context of AHL, only two studies were found.

Frankel and Turner (1983) examined the role of social support and marital status on the psychological adjustment of 420 people with AHL recruited from audiology clinics in Southwestern Ontario. All had experienced hearing loss after the age of 15, and the losses were classified as mild to moderately severe as measured by pure-tone audiometry and speech recognition. Perceived social support was assessed in three ways (e.g., reflections of self-esteem, reflections of love, story vignettes). Psychological adjustment included measures of depression, anxiety, and paranoia. Findings were that perceptions of higher social support were associated with less depression, anxiety, and paranoia. Another study (Hoover-Steinwart, English, & Hanley, 2001) investigated the influence of the initial involvement by significant others (indicator of social support) on the perceived benefit of hearing aid use. Results indicated that the hearing impaired members whose partner was present during the examination reported more perceived benefit from the use of the hearing aid. Thus, social support is included in this model as a mediator of the stress caused by hearing loss.

**Moderator of stress: Assistive technology.** Use of assistive technology is expected to influence the relationship between the degree of hearing loss, sudden vs. gradual loss, personality, and spouses' perceived marital adjustment. Studies find that the use of hearing aids benefits both persons with hearing loss and their families (Carmen, 2009; Seniors Research Group, 1999). Because this loss reflects an interactional problem, such loss also affects both the person with the loss and his/her significant others (e.g., spouse, partner, children) (Hampton, 1999; Hetu et al., 1993; Scarinci et al., 2008; Wallhagen et al., 2004). Specifically, hearing loss affects communication between spouses which, in turn, negatively affects the marriage.

However, these negative effects are likely to be reduced when assistive technology is used.

Today, assistive technology refers to the use of hearing aids, cochlear implants, and other assistive devices (e.g., amplified telephones, Bluetooth devices, home alerting devices, conference telephones). Kochkin (2009) estimated that 90% of persons with hearing impairment could be helped by assistive technology; however, only 20% actually seek such help (Carmen, 2005, 2009). Some of those that do not seek help deny their hearing problem (Hetu et al., 1993). Other research (Anderson & Noble, 2005) found that happier spousal relationships were linked with the hearing impaired mates acknowledging the loss and assuming primary responsibility for outcomes (e.g., scheduling a hearing assessment, following the audiologist's recommendations).

Early findings showed that use of assistive devices reduced the negative psychosocial effects of hearing loss (Knutson, Hinrichs, & Tyler, 1991; Ramsdell, 1968). Later findings from a large study comparing people who did and did not use hearing aids found users and their families had a better quality of life than did non-users and their families (Seniors Research Group, 1999). Specifically, users with mild losses were 20% more likely to engage in social activities than non-users. In the more severe hearing loss group, users were 24% more likely to engage in social activities than non-users. Further, in the more severe group, non-users reported feeling insecure, irritable, and fearful 17% of the time compared to 11% for the users. Importantly to the current study, family members of users reported more benefits than did the users regarding relationships at home, life overall, mental health, relationships with children or

grandchildren, independence, social life, physical health, relationships at work, dependence on others, and sex life.

Applied here assistive technology is conceptualized as a moderator influencing the link between a degree of hearing loss and his/her spouse's marital adjustment. Stress process theory suggests that an individual adjusting to an acquired hearing loss and using assistive technology the majority of the time will experience less life stress (e.g., fatigue, frustration, anger) than will a non-user, and there is some research supporting this assumption (Knutson et al., 1991; Seniors Research Group, 1999). Thus, spouses of users are expected to report higher marital adjustment.

**Correlates of positive stress outcomes (marital adjustment).** Several covariates of marital adjustment are included in this study. Research shows that the presence of children in the home and financial hardship negatively affect intimate relationships. Spanier and Cole (1974) stated marital adjustment is a process dependent upon the number of troublesome marital differences, level of interpersonal tension, marital satisfaction, couple unity, and consensus on issues important to the marriage. Twenge, Campbell, and Foster (2003) found that parents reported lower marital satisfaction than nonparents, and marital satisfaction is especially vulnerable during the transition to parenthood (Belsky & Pensky, 1988) and when coparenting adolescent children (Cui & Donnellan, 2009). Further, marital satisfaction was lower for couples with more children compared to couples with fewer children (Twenge, et al.). Thus, the presence of children in the home is expected to impact marital adjustment.

Economic hardship or difficulty in supplying the basics needs of life (i.e., food, clothing, shelter) has been found to negatively impact family relationships in general

(Conger & Elder, 1994; Conger, Ge, Elder, Lorenz, & Simons, 1994). Couple's discussions about financial matters often are left unresolved (Papp, Cummings, & Goeke-Morey, 2009) and linked with increased risks for marital conflict and depression. Because perceived economic hardship is consistently related to marital satisfaction (Conger & Elder; Conger et al.), it also was included here.

Wallhagen, et al., (2004) examined the effects of AHL on spouses' later physical, psychological, and social well-being in a sample of older adults. The hearing loss of husbands'/wives'/partners' increased the probability of spouses' reporting poorer physical, psychological, and social well-being five years later. When comparing husbands' hearing loss on wives to wives' hearing loss on husbands, all predictors (i.e., physical disability, depression, not happy, negative affect, do not enjoy free time, hard to feel close to others) were significant for the wives but not husbands. This study included spouses' hearing loss as a covariate, thus, spouses' hearing loss is being included here.

### **The Current Study**

Given the noted lack of empirical findings on the effects of AHL spouses and significant others (Aguayo & Coady, 2001; Hampton, 1999; Wallhagen et al., 2004) and the increasing prevalence of hearing loss among the general population, the purpose of this study was to examine the effects of hearing loss on dyadic relationships.

Specifically, I explored spouses' perceptions of their marriage, using marital adjustment as the proposed stress outcome. I tested the conceptual model presented in Figure 1 (p. 4) which focuses on the effects of degree of hearing loss, sudden versus gradual onset, and personality on spouse's perceived marital adjustment as mediated by

perceived social support. The moderating effect of the use of assistive technology on the relationship between degree of hearing loss and spouse's perceived marital adjustment was also examined.

**Hypotheses.** Guided by the literature and theoretical framework used several research questions and associate hypotheses were examined. Because the research findings are mixed, Research Question One stems from stress process theory (Pearlin et al., 1981). Research Question 1: *How does the degree of hearing loss, sudden versus gradual loss, and spouses' personality affect spouses' perceived marital adjustment?*

Hypothesis 1: *After controlling for factors known to affect marital adjustment, increased hearing loss will be associated with decreases in perceived marital adjustment.*

Hypothesis 2: *After controlling for factors known to affect marital adjustment, a gradual onset of hearing loss will be associated with increases in spouses' perceived marital adjustment.*

Hypothesis 3: *After controlling for factors known to affect marital adjustment, spouses' personalities that are more extroverted, open, and emotionally stable will be associated with increased perceived marital adjustment*

Research Question 2: *How does the use of assistive technology (i.e., hearing aids, cochlear implants) affect the relationship between the degree of hearing loss and spouses' perceived marital adjustment?*

Hypothesis 4: *After controlling for factors known to affect marital adjustment, the strength of the negative relationship between the degree of hearing loss and spouses'*

*perceived marital adjustment will be reduced for those using assistive technology.*

Research Question 3: *How does spouses' perceived social support affect their perceived marital adjustment and does perceived social support mediate the degree of hearing loss, sudden versus gradual loss, and spouses' personality on marital adjustment?*

Hypothesis 5: *After controlling for factors known to affect marital adjustment, spouses' perceived social support will be directly related to their marital adjustment.*

Hypothesis 6: *After controlling for factors known to affect marital adjustment, spouses' perceived social support will mediate the degree of hearing loss, sudden versus gradual loss, and spouses' personality on their marital adjustment.*

## **Summary**

The proposed study contributes to the extant literature in several ways. No study was found that used degree of hearing loss, sudden versus gradual onset, and spouses' personality to explain spouses' marital adjustment. In fact, sudden versus gradual onset was not included in any study reviewed. Thus, the proposed study extends the limited findings on the effects of AHL on spouses (Armero, 2001; Hampton, 1999; Hetu et al., 1993; Scarinci et al., 2008; Wallhagen et al., 2004; Wie, Pripp, & Tvette, 2010) with a focus on marital adjustment.

## CHAPTER 3

### METHODS

The methods of the study are outlined in this chapter. Included in the discussion are a summary of procedures (including those to protect participant's rights), and a description of the participants, measures, variables, and data analysis plan.

#### **Procedures**

This study used a quantitative, cross-sectional design. Obtaining a probability sample was not possible, so a non-probability sampling technique was used. As a result, the findings cannot be generalized to the broader population. The sample was limited to those who were 18 years of age or older, involved in an intimate relationship, and resided with their spouse/ partner. Couples whose members had comorbid health conditions known to affect hearing (e.g., aphasia, dementia, stroke, traumatic brain injury) were excluded (S. Snowden, personal communication, June 2, 2011). Also, couples in which both members were under an audiologists' care were excluded, recognizing that the target sample excluded a large majority of those with hearing loss who deny the loss.

Data were collected from three audiology clinics in the Southeastern U. S. One clinic was associated with a university-based speech and hearing department; the second was a private audiology clinic; and the third was associated with a university speech and hearing department known for a cochlear implant program. The clinics had different fee structures and foci of services provided. These differences potentially allowed for a more diverse sample. Specifically, one clinic used a sliding fee scale which adjusts the fee according to ability to pay (i.e., gross income, number of

dependents). The fee structure of the private audiology clinic is not known, but it is likely comparable to other private audiology clinics in the region. The fee structure of the third clinic is based on ability to pay and accepts all insurance plans (i.e., Medicaid, Medicare, private).

Data collection mirrored a procedure commonly used by hearing aid manufacturers who collect data from institutional and private audiology clinics (S. Snowden, personal communication, June 2, 2011). Clients were introduced to the study by their audiologist. Clients with hearing impairment and their spouses agreeing to participate were asked to read and sign informed consent forms (Appendix A). Following completion of their examination, audiologists asked clients and spouses/partners to complete the questionnaire and demographic information (Appendix G). If clients lacked sufficient time to complete the survey, audiologists marked the files as needing to be completed and requested that the clients schedule sufficient time to complete the survey at their next appointment. Data collection began September 6, 2011 and proceeded until the desired sample size was achieved.

Completed informed consent forms and surveys were collected by the audiologist who then assigned a prearranged case number and recorded test results (PTA and word recognition scores for each ear) on the back of the client's survey. Then the audiologist recorded the same case number on the spouses' survey and securely stored these documents for retrieval by the researcher.

The use of case numbers ensured participant privacy and confidentiality, as client names cannot be linked with the questionnaires and audiology results. The study received prior approval from the Institutional Review Board (Appendix B).

## Participants

The sample included useable data from 82 clients and their spouses/partners with an acquired hearing loss who sought professional help at the clinics. However, only data from spouses/partners were used in the analysis, due to the focus of the study. The sample is best described as older adults (age range 26 - 97,  $M = 69.32$ ,  $SD = 12.06$ ), and 69.5% of the spouses were female (see Table 1). Regarding race/ethnicity, overwhelmingly most spouses/partners were White, well-educated (62.2% having at least a bachelor's degree), and retired (65.9%).

Ninety-nine percent of the spouses reported their mate as having assistive technology. Of this number, 75.6% reported using it *most of the time* or *all the time*. All participants were under the care of an audiologist, and 69.5% of the couples had been under an audiologist's care for over 12 months. The results of the hearing loss assessments (i.e., PTA, word discrimination testing) show that 73.2% had at least moderate loss, and 74.4% had at least moderate difficulty with word discrimination.

Table 1  
*Demographic Characteristics of Spouses/Partners (N = 164)*

Characteristic	Client ( $n = 82$ )		Spouse/Partner ( $n = 82$ )	
	<i>M/f</i>	<i>SD/%</i>	<i>M/f</i>	<i>SD/%</i>
Age (in years)	70.5	12.1	68.2	12.1
Gender				
Males	57.0	69.5	25.0	30.5
Females	25.0	30.5	57.0	69.5
Ethnicity				
Caucasian	80	97.6	78	95.1
African American	2	2.4	3	3.7
Hispanic			1	1.2

Table 1 (continued)

Characteristic	Client ( <i>n</i> = 82)		Spouse/Partner ( <i>n</i> = 82)	
	<i>M/f</i>	<i>SD/%</i>	<i>M/f</i>	<i>SD/%</i>
Children in Home				
No			74	90.2
Yes			8	9.8
Education				
Some high school	3	3.7	1	1.2
High school diploma/GED	14	17.1	10	12.2
Some college	18	22.0	26	31.7
Bachelor's degree	16	19.5	14	17.1
Some graduate study	8	9.8	9	11.0
Graduate degree	23	28.0	22	26.8
Degree Loss: PTA				
Normal	13	15.9		
Mild	22	26.8		
Moderate	25	30.5		
Moderately severe	14	17.1		
Severe	7	8.5		
Profound	1	1.2		
Degree Loss: WD				
Normal	19	23.2		
Slightly difficult	27	32.9		
Moderate difficulty	15	18.3		
Poor recognition	5	6.1		
Very poor recognition	16	19.5		
Spouses' Hearing Loss				
No			69	84.1
Yes			13	15.9
Use Assistive Technology				
Don't have			5	6.1
Have but don't use			1	1.2
Have use some of time			14	17.1
Have use most of time			32	39.0
Have use all the time			30	36.6

## Measures

The participants were asked to complete questionnaires including measures of personality, perceived social support, economic hardship, and marital adjustment, as well as answering several questions that provided demographic information. Recall that only spouses' responses were used.

## Variables

**Degree of hearing loss.** Hearing requires the ability to detect sound and interpret or discriminate sound correctly (Martin & Clark, 2000). Acquired hearing loss is a sensorineural hearing loss that occurs from damage to the inner ear resulting in any combination of sensitivity and discrimination problems. Martin and Clark suggest that both sensitivity and discrimination testing are needed for accurate hearing evaluations. In this study, pure-tone audiometry (PTA) was used to assess the degree of sensitivity hearing loss and word-recognition testing to assess discrimination hearing loss.

The accuracy of the objective results of a hearing evaluation using PTA is dependent upon the quality of the audiology equipment and the expertise of the audiologist (Martin & Clark, 2000). The frequency levels commonly used to test are 500 hertz (Hz), 1,000 Hz, and 2,000 Hz, and these frequency levels were used here. Audiologists calibrate the test equipment to produce ever-increasing sounds beginning with low levels at each frequency and progressing to higher levels until the individual acknowledges the sound is heard. The PTA score is an average of the determined minimal hearing threshold at the three frequencies for each ear. The scale commonly used to classify sensitivity hearing disability appears in Table 2 (Davis, 1964).

Table 2  
*Classification of Sensitivity Hearing Disability*

Decibel Loss	Classification of Hearing Disability
0 – 25 dB	Normal
26 – 40 dB	Mild
41 – 55 dB	Moderate
56 – 70 dB	Moderately Severe
71 – 90 dB	Severe
> 90 dB	Profound

Often men’s test results reflect only mild hearing losses at lower frequencies, but at the higher frequencies of sound the losses are more severe (Hallberg & Barrenas, 1993). Higher frequency hearing loss is associated with high-pitched consonant sounds (f, s, v, sh, th, ch, p, k, z, and t). After sensitivity testing, the individual receives a score representing the hearing threshold for each ear (e.g., PTA Right Ear 35, Left Ear 65). The approximation of sensitivity degree of hearing loss is the average of the PTA scores for each ear (Frankel & Turner, 1983).

Discrimination testing is accomplished by the use of word-recognition tests. The audiologist reads or instructs the client to listen to a recording of 50 recorded one-syllable words being read to them. The client is asked to state each word as the word is heard. This procedure is followed for each ear. Individual words are more difficult to interpret than hearing words spoken in phrases or sentences. The score is calculated by determining the number of words correctly identified from the total number of words used in the test (e.g., Word-recognition Right Ear 80%, Left Ear 60%). The

approximation of discrimination degree of hearing loss is the average of word-recognition scores for each ear (Frankel & Turner, 1983). A scale commonly used to classify word-recognition ability appears in Table 3 (Martin & Clark, 2000).

Table 3  
*Classification of Discrimination Hearing Disability*

Ability Levels	Classification of Hearing Disability
90 – 100%	Normal
75 – 90%	Slight difficulty
60 – 75%	Moderate difficulty
50 – 60%	Poor recognition; marked difficulty in following conversation
< 50%	Very poor recognition; probably unable to follow running speech

For the current study, degree of hearing loss was measured by combining scores from assessments of sensitivity and discrimination losses. WD scores are reverse scored and added to the PTA loss scores to create a composite score ranging from 0 to 200, such that higher scores reflect more profound hearing loss.

**Sudden versus gradual loss.** Sudden versus gradual loss was measured by a question asking, “How quickly did you notice the hearing loss?” Participants were asked to record if the clients’ hearing loss occurred within hours, days, or a few weeks or if the loss occurred over a time longer than a few weeks. For this study a few weeks was defined as not more than three weeks. From this categorical information a dummy

variable was created for this analysis with *hours, days, or a few weeks* being (0); *longer than a few weeks* (1), so higher scores reflect more gradual loss over a longer period.

**Personality.** The personality of participants was measured using the Ten-Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003). The TIPI has a 7-point Likert-type response scale, ranging from *strongly disagree* (1) to *strongly agree* (7). The TIPI was developed as a brief measure of personality based on the FFM (Costa & McCrae, 1992) and portrays personality as being composed of five broad dimensions: openness, conscientiousness, extraversion, agreeableness, and emotional stability (neuroticism). Two questions are used to assess each dimension. Items 2, 4, 6, 8, and 10 are reversed scored, and the scores are derived by summing the items and dividing by two. Possible scores for each dimension range from 1 to 7, so a 7 denotes a personality that is open, whereas 1 on the same dimension denotes a personality that is closed.

This measure is both reliable and valid. The test-retest reliability over a 6-week period was .72 (Rammstedt & Oliver, 2007). The average convergent validity with the Narcissism, Extraversion, Openness-Personality Inventory-Revised (NEO-PI-R) (Costa & McCrae, 1992) was .63. Measurement of the discriminate validity averaged .20 for the intercorrelations between TIPI dimension scales and the Extraversion and Openness scales averaged .36 (Rammstedt & Oliver).

Cronbach's alpha is sensitive to the number of items involved in a computation (Gliner & Morgan, 2000). Gliner and Morgan suggest a threshold of .70 as being the minimal acceptable Cronbach's alpha. While the Cronbach's alpha values for all the personality dimensions except emotional stability are below the accepted threshold, the

values are comparable to recent studies that used the TIPI (Gosling et al., 2003; Holmes, 2010) (see Table 4).

**Perceived social support.** Perceived social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Powell, Farley,

Table 4  
*Cronbach's Alpha for Studies using TIPI*

Dimensions	Holmes (2010) ( <i>N</i> = 81)	Gosling et al. (2003) ( <i>N</i> = 1,813)	Current study (2014) ( <i>N</i> = 82)
Openness	.46	.45	.37
Conscientiousness	.36	.50	.40
Extraversion	.73	.68	.41
Agreeableness	.37	.40	.45
Emotional Stability	.68	.73	.71

Werkman, & Berkoff, 1990; Canty-Mitchell, & Zimet, 2000). The MSPSS has 12 items with a 7-point Likert-type response scale, ranging from *disagree strongly* (1) to *agree strongly* (7). A composite score was calculated and higher scores reflect more social support. The MSPSS measures perceived social support received from three sources: family, friends, and significant other.

Canty-Mitchell and Zimet (2000) reported Cronbach's alpha for family as .91, friends as .89, and significant other as .91. Findings from other research (Zimet et al., 1990) shows similar alphas. The Cronbach's alpha for this study was .92. The MSPSS Family subscale was highly correlated ( $r = .76, p < .001$ ) with the Adolescent Family

Caring Scale (AFCS), demonstrating good discriminate validity for that subscale (Canty-Mitchell, 1996).

**Use of assistive technology.** Use of assistive technology was measured by asking, “Does the person with the hearing loss have a device to help with hearing?” Response choices were *no* (1) or *yes* (2). Another question asked, “How often does the person with the hearing loss use the device?” Responses ranged from *have but don't use* (1) to *use all of the time* (4). Responses to these questions were combined to reflect the degree of use: *don't have assistive technology* (1), *have but don't use* (2), *have and use some of the time* (3), *have and use most of the time* (4), and *have and use all the time* (5).

**Marital adjustment.** Marital adjustment was the dependent variable of interest. The Revised Dyadic Adjustment Scale (RDAS; Busby, Christensen, Crane, & Larson, 1995) conceptualizes marital adjustment in terms of consensus, satisfaction, and cohesion, and these concepts more closely approximate the adjustment process to a hearing loss than simply assessing relationship satisfaction or marital quality. The RDAS is a 14-item scale that uses Likert-type responses. Six items address relationship consensus and responses range from *always disagree* (0) to *always agree* (5). A sample item is: “Demonstrations of affection.” Four items address relationship satisfaction and responses range from *never* (0) to *all the time* (5). A sample item is: “How often do you and your mate quarrel?” The last four items address relationship cohesion, and one asks, “Do you and your mate engage in outside interests together?” with responses ranging from *never* (0) to *everyday* (5). Responses for the remaining 3 items range from *never* (0) to *more often than once a day* (5). A sample item is: “Work

together on a project.” Responses to the 14 items are summed, and higher scores represent higher levels of marital adjustment. The possible scores range from 0 to 69.

The RDAS has good internal consistency (Cronbach’s alpha) for each of the subscales, consensus = .81, satisfaction = .85, and cohesion = .80. The alpha for the total RDAS was .90. Busby and colleagues (1995) calculated correlation coefficients for the RDAS and DAS and the RDAS and the Locke-Wallace Marital Adjustment Test (Locke & Wallace, 1959) to determine construct validity, and the correlations were .97 and .68 respectively. The RDAS was as successful in discriminating between distressed and non-distressed couples as was the DAS. The Cronbach’s alpha for the composite score of this sample was .83.

**Covariates.** Three covariates were included with the analysis. Participants were asked about the presence of children in the home. Response choices were *yes* (1) or *no* (0) and this was used to create a dummy variable.

Perceived economic hardship was measured by the 3-item Economic Hardship measure (Conger & Elder, 1994) (Appendix E). Item 1 addressed “having enough money,” and responses ranged from (1 = *a great deal of difficulty* to 5 = *no difficulty at all*). Item 2 asked, “Compared to most other people who have the same education as you and your spouse, and who work as hard as you, would you say your income is,” and responses ranged from (1 = *much higher than their income* to 5 = *much lower than their income*). Item 3 addressed “making ends meet,” and responses ranged from (1 = *more than enough money left over* to 4 = *not enough to make ends meet*). A summed score is created, and possible scores range from 3 to 14 with higher scores reflecting greater perceived economic hardship. The Cronbach’s alpha for this sample was .71.

Newland, Crnic, Cox, and Mills-Koonce (2013) used a 6-item measure (Conger & Elder) that also focused on having enough money and making ends meet. Assessments were made at three time points from approximately 1,300 families living in rural poverty. The composite Cronbach's alpha for these assessments was .83.

Lastly, participants were asked, "Does your spouse or partner also have a hearing problem?" Responses were *yes* (1) and *no* (0) and a dummy variable was included in the analysis.

### **Data Analysis**

There is no consensus on what is an acceptable sample size for social sciences research (Howell, 2007). Results of a power analysis showed that 108 cases were needed to achieve statistical significance (Faul, Erdfelder, Buchner, & Lang, 2009). Unfortunately, the sample used did not meet this minimum, so findings must be interpreted with caution.

Stepwise multiple regression was conducted using SPSS 21.0. Multiple regression analysis is appropriate when the following assumptions can be made: (a) the independent and dependent variables are in a linear relationship, (b) data are normally distributed, (c) the variances of the residuals are constant for all values of  $X_i$ , and (d) the model is properly specified (Becker, 2007). These assumptions were tested with scatterplots, histograms, and skewness and kurtosis were examined. Model specification is assumed as a thorough literature review was conducted. The results indicated the assumptions were met for all variables except spouses' perceptions of social support. This variable was negatively skewed, although the skewness value was only slightly below the accepted lower threshold of -1 and could be considered

acceptable, creating confidence in the findings would result from transforming these data. Further analysis determined that squaring the variable created a more linear and normal distribution for these scores.

A bivariate correlation matrix was created and examined to determine the strength of the relationships between variables and check for the possibility of multicollinearity. Multicollinearity exists when independent variables are highly correlated (Becker, 2007) and, thus, contain overlapping information. A  $r > .60$  was used to designate multicollinearity. No multicollinearity problem was identified (see Table 5, p. 39).

Missing data were addressed using multiple imputation for all variables. Multiple imputation is a more accurate method for addressing missing values than traditional missing value approaches, increasing the accuracy of significance levels and standard errors (Acock, 2005; Finch, 2010).

**Multiple regression analysis.** The  $p$  value for significance testing was set at .05. Data analysis proceeded to answer the research questions testing direct effects first, then indirect effects, and lastly interaction effects. Results were examined through the strength of the coefficients, significance of the coefficients, and any changes in the explained model variance (adjusted  $R^2$ ).

The covariates and independent variables selected to be included in the proposed model were determined by the strength of their relationships with the outcome variable, marital adjustment. To answer the first research question spouses' perceptions of marital adjustment were regressed on the model covariates that were

significantly correlated with dependent variables. Next degree of hearing loss, sudden versus gradual loss, and spouses' personality were added to the model.

Moderation occurs when “the relationship between an independent variable and dependent variable changes as a function of a third variable (moderator)” (Howell, 2007, p. 531). From a stress process theory perspective (Pearlin et al., 1981; Pearlin, 1999; Thoits, 1995), the use of an assistive hearing device is expected to buffer the harmful effects of the degree of hearing loss, on spouses' perception of marital adjustment. Thus, to answer the second research question and test for the moderating effects of assistive technology on the relationship between the degree of hearing loss and marital adjustment, covariates were entered first, followed by the degree of hearing loss and use of assistive technology, each centered. The interaction term (hearing loss X assistive technology) was last (see Figure 3).

To answer research question 3, covariates were again added first followed by degree of hearing loss, sudden versus gradual loss, and spouses' personality. Perceived social support was added at the last step.

Baron and Kenny (1986) suggest a four step approach to test for indirect effects (mediation) where coefficient significance is examined at each step (see Figure 2). In Step 1, the relationship between X (degree of hearing loss) and Y (marital adjustment) (a) is examined. In Step 2, the relationship between X (degree of hearing loss) and M (social support) (b) is examined. In Step 3, the relationship between M (social support) and Y (marital adjustment) (c) is examined. If significance is not found at each step, or the significant relationship between X and Y is reduced when Steps 2 and 3 are significant, mediation is not indicated.

An alternative to the Baron and Kenny (1986) approach was presented by MacKinnon, Fairchild, and Fritz (2007). If Steps 2 and 3 are significant and no significance is found in Step 1, they suggest that full mediation is indicated. In the current study the alternative approach presented by MacKinnon et al. was used.

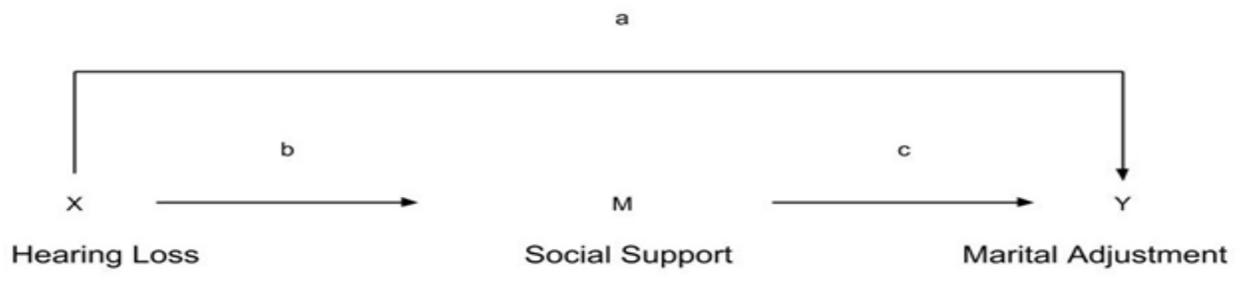


Figure 2.  
Baron and Kenny Model of Testing for Mediation

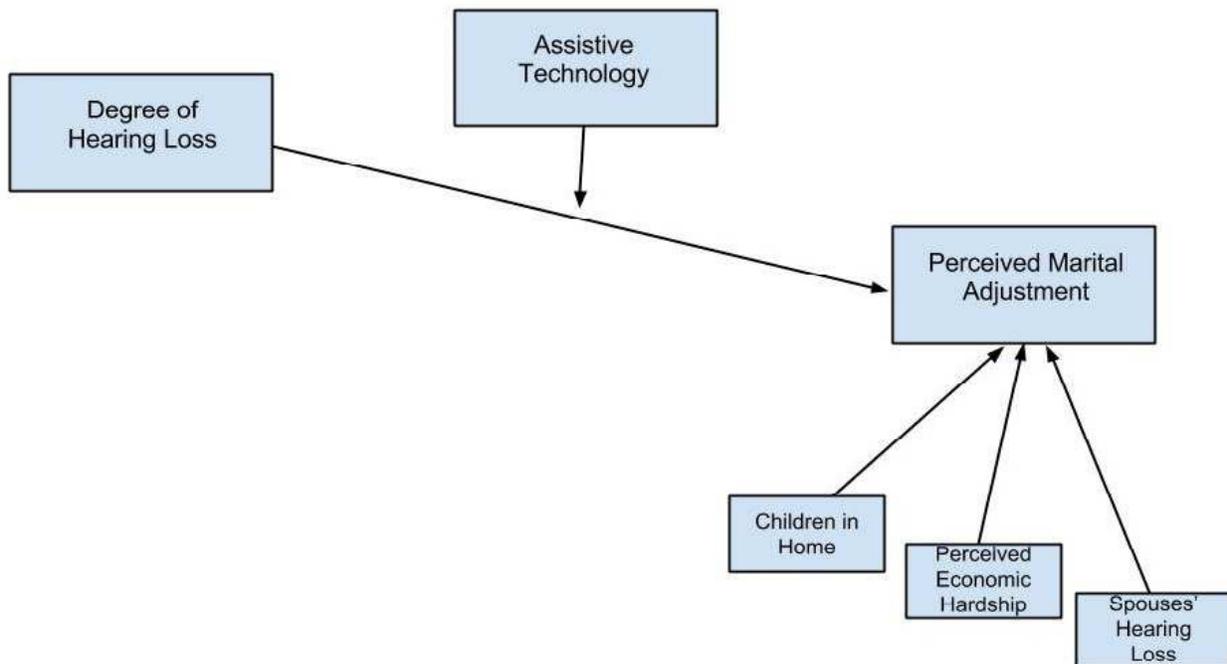


Figure 3.  
Moderation Model Including Assistive Technology

## CHAPTER 4

### FINDINGS AND DISCUSSION

This study explored the impact of AHL on intimate relationships by testing a conceptual model predicting the effects of such loss on spouse/partners' perceptions of marital adjustment and examining how social support mediates and the use of assistive technology moderates these effects. This chapter begins with a discussion of the results of the bivariate correlations, followed by a summary of the results that answer the research questions, and ends with a discussion of the findings.

#### **Bivariate Correlations**

A bivariate correlation matrix was computed to investigate the interrelationships among study variables with a focus on reducing the number of covariates included in the analyses and to those associated with spouses' marital adjustment; this allowed for the testing of a more parsimonious model. In addition, these results provide insight into the existence of multicollinearity among study variables.

Of the possible covariates, only children in the home was significantly correlated with marital adjustment ( $r = -.40; p < .01$ ). Neither perceived economic hardship nor spouses' hearing loss were significantly associated with spouses' marital adjustment and were excluded in further analyses. Regarding the personality variables, only agreeableness ( $r = .30, p < .01$ ), emotional stability ( $r = .22, p < .05$ ), and openness ( $r = .38, p < .01$ ) were positively correlated with marital adjustment. Both conscientiousness and extraversion were not significantly associated with marital adjustment, so they were excluded in further analyses. Also, perceived social support was positively correlated with marital adjustment ( $r = .53, p < .001$ ). These results suggest that children's

presence in the home was associated with lower levels of marital adjustment, whereas higher levels of agreeableness, emotional stability, openness, and social support were associated with higher levels of marital adjustment.

## **Research Questions**

**Research Question 1:** *How does the degree of hearing loss, sudden versus gradual loss, and spouses' personality affect spouses' perceived marital adjustment?*

Controlling for the effects of children in the home, results show that neither degree of hearing loss, sudden versus gradual loss, or spouses' personality were significant predictors of spouses' marital adjustment (see Table 6). Only children in the home was a significant predictor ( $\beta = .35, p < .01$ ) and the full model accounted for 20% of the variance in spouses' marital adjustment. According to Cohen (1988), this is a small effect. Given these results, no support was found for associated hypotheses predicting that increased (a) hearing loss, (b) gradual onset of loss, and (c) personalities characterized as more extroverted, open, and emotionally stable would be associated with higher levels of marital adjustment. Post hoc analyses were conducted and found that neither PTA loss nor WD loss individually were significant predictors of spouses' marital adjustment.

**Research Question 2:** *How does the use of assistive technology (i.e., hearing aids, cochlear implants) affect the relationship between the degree of hearing loss and spouses' perceived marital adjustment?*

The results of testing the moderating effects of use of assistive technology on the relationship between the degree of hearing loss and marital adjustment were not

Table 5  
*Correlations, Means, Standard Deviations, Ranges, and Cronbach's Alpha for All Study Variables (N = 82)*

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Children in home	—												
2 Perceived economic hardship	.30**	—											
3 Spouses' hearing loss	.08	.05	—										
4 Degree of hearing loss	-.02	.23	-.16	—									
5 Sudden vs. gradual loss	-.15	-.13	.05	-.11	—								
6 Agreeableness	-.08	-.20	-.19	-.16	-.05	—							
7 Conscientiousness	-.01	-.16	-.01	-.07	-.20	.28*	—						
8 Emotional stability	.03	-.20	-.01	-.14	.01	.48**	.32**	—					
9 Extraversion	-.06	-.06	-.20	.09	-.09	.05	.01	.08	—				
10 Openness	-.30**	-.22*	-.06	-.02	.11	.47**	.22	.31**	.21	—			
11 Perceived social support	-.20	-.25*	-.25*	-.07	.04	.17	.32**	.19	.17	.34**	—		
12 Use of assistive technology	.00	.03	-.22	.15	-.24*	.07	.12	.10	.01	.03	.20	—	
13 Perceived marital adjustment	-.40**	-.20	-.16	-.09	-.03	.30**	.15	.22*	.08	.38**	.53**	.26*	—
<i>M</i>		6.09		76.69		5.60	6.01	5.20	4.67	5.17	74.63	3.99	52.15
<i>SD</i>		2.00		38.38		1.18	1.14	1.38	1.43	1.20	9.00	1.07	6.87
Possible Range	0-1	0-14	0-1	0-200	0-1	1-7	1-7	1-7	1-7	1-7	0-84	1-5	0--69

Table 5 (continued)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Alpha</i>		.71				.45	.40	.71	.41	.37	.92		.83

\* $p < .05$ . \*\* $p < .01$ .

significant (see Table 7). Specifically, although children in the home ( $\beta = -.40, p < .001$ ) and the use of assistive technology ( $\beta = .28, p < .01$ ) were both associated with marital adjustment and explained 22% of the variance, inclusion of the interaction term (hearing loss X assistive technology;  $\beta = -.14, p > .05$ ) testing the moderating effects in Model 3 was not significant and did not explain additional variance. This indicates that the use of assistive technology did not affect the association between degree of hearing loss on marital adjustment. Again, according to Cohen (1988), this is a small effect. Thus, the associated hypothesis suggesting that the negative relationship between degree of hearing loss and spouses' marital adjustment would be reduced for those using assistive technology was not supported.

**Research Question 3:** *How does spouses' perceived social support affect their perceived marital adjustment and does perceived social support mediate the degree of hearing loss, sudden versus gradual loss, and spouses' personality on marital adjustment?*

Results testing the direct effects of perceived social support on spouses' marital adjustment appear in Table 8. These results show that perceived social support is a significant and strong predictor ( $\beta = .47, p < .001$ ) of marital adjustment, explaining an additional 19% of the variance above that explained by children in the home, ( $F(7,74) = 7.73, p < .001$ ). This means that spouse's perception of higher levels of social support is associated with higher levels of marital adjustment, and hypothesis 5 is supported. To determine whether perceived social support mediated the relationships between degree of hearing loss, sudden versus gradual loss, and spouses' personality a series of regression analyses were run. Results show that spouses' perceived social support

Table 6

*Summary of Regression Analysis of the Effects of Degree of Hearing Loss, Sudden vs. Gradual Loss, and Personality on Marital Adjustment (N = 82)*

Variables	Model 1			Model 2		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Child in home	-9.17	2.36	-0.40***	-8.07	2.44	-0.35**
Degree of hearing loss				-0.01	0.02	-0.07
Sudden vs. gradual loss				-1.71	1.82	-0.10
Agreeableness				0.60	0.73	0.10
Emotional stability				0.55	0.59	0.11
Openness				1.10	0.70	0.19
Conscientiousness				0.11	0.66	0.02
Extraversion				-0.01	0.49	-0.00
$\Delta R^2$		.15			.20	
<i>F</i> for change in $R^2$		15.09***			3.54***	

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

Table 7

*Summary of Moderating Effects of Assistive Technology on the Relationship between Degree of Hearing Loss and Marital Adjustment (N = 82)*

Variables	Model 1			Model 2			Model 3		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Child in home	-9.17	2.36	-0.40***	-9.25	2.27	-0.40***	-9.10	2.26	-0.40***
Centered degree of hearing loss				-0.03	0.02	-0.14	-0.02	0.02	-0.12
Centered assistive technology				1.79	0.64	0.28**	1.77	0.64	0.28**
Degree loss X assistive technology							-0.02	0.02	-0.14
$\Delta R^2$		.16			.22			.22	
<i>F</i> for change in $R^2$		15.09***			8.43***			6.86***	

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

did not mediate the relationship between degree of hearing loss (Table 9), sudden versus gradual loss (Table 10), agreeableness (Table 11), emotional stability (Table 12), extraversion (Table 15), and spouses' marital adjustment. However, social support did fully mediate the relationships between openness (Table 13), conscientiousness (Table 14), and marital adjustment. Regarding openness, the results suggest that higher levels of openness are associated with higher levels of social support, which in turn are associated with higher levels of marital adjustment explaining 36% of the variance. Similar findings are shown for the mediating effects of conscientiousness, explaining 34% of the variance. Overall, the associated hypothesis was partially supported for two personality characteristics (openness and conscientiousness).

## **Discussion**

Stress process theory posits that as one experiences stress their stress outcomes are more problematic and that their coping resources, coping strategies, and social support act as mediators or moderators of that stress (Pearlin & Schooler, 1978; Pearlin et al., 1981; Thoits, 1995). Thus, as stress increases due to increasing hearing loss, the theory suggests that more negative outcomes may follow. Contrary to expectations, the results of this study did not support this theoretical assumption. The lack of support for this theoretically driven hypothesis may reflect several issues inherent in the sample. In the current study the majority of the participants were older, likely had been married for many years, and reported high levels of marital adjustment; these characteristics coupled with having experienced gradual hearing loss and successful use of assistive technology may make the effects of hearing loss on their

Table 8

*Summary of Regression Analysis for Children in the Home and Perceived Social Support Predicting Marital Adjustment (N = 82)*

Variables	Model 1			Model 2		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Child in home	-9.17	2.36	-0.40***	-7.06	2.10	-0.31***
Perceived social support				2.35 <sup>+</sup>	0.00	0.47***
$\Delta R^2$		.16			.35	
<i>F</i> for change in $R^2$		15.09***			23.04***	

\*\*\*  $p < .001$ .

+ =  $2.35 \times 10^{-5}$

Table 9

*Summary of Regression Analysis of the Mediating Effects of Social Support on the Relationships between Degree of Hearing Loss and Marital Adjustment (N = 82)*

Variables	Step 1 (X > Y)			Step 2 (X > M)			Step 3 (M > Y)			Step 4 (X > Y; M > Y)		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Child in home	-9.21	2.36	-0.40***	-902.52 <sup>+</sup>	503.63 <sup>+</sup>	-0.20	-7.06	2.10	-0.31***	-7.11	2.11	-0.31***
Degree of hearing loss	-0.02	0.02	0.33	-262.50 <sup>+</sup>	391.36	-0.07				-0.01	0.02	-0.07
Social support							2.35 <sup>+</sup>	0.00	0.47***	2.32 <sup>++</sup>	0.00	0.46***
$\Delta R^2$		.15			.02			.35			.35	
<i>F</i> for change in $R^2$		8.03***			1.81			23.04***			15.46***	

\*\*\*  $p < .001$ .

+ = number x 100. ++ = number x 10<sup>-5</sup>.

Table 10

*Summary of Regression Analysis of the Mediating Effects of Social Support on the Relationships between Sudden vs. Gradual Loss and Marital Adjustment (N = 82)*

Variables	Step 1 (X > Y)			Step 2 (X > M)			Step 3 (M > Y)			Step 4 (X > Y; M > Y)		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Child in home	-9.46	2.39	-0.41***	-890.52 <sup>+</sup>	510.44 <sup>+</sup>	-0.20	-7.06	2.10	-0.31***	-7.37	2.12	-0.32***
Sudden vs. gradual	-1.50	1.79	-0.09	2516.53	381.36 <sup>+</sup>	0.01				-1.56	1.56	-0.09
Social support							2.35 <sup>++</sup>	0.00	0.47***	2.35 <sup>++</sup>	0.00	0.47***
$\Delta R^2$		.15			.01			.35			.35	
<i>F</i> for change in $R^2$		7.87***			1.58			23.04***			15.69***	

\*\*\*  $p < .001$ .

+ = number x 100. ++ = number x 10<sup>-5</sup>.

Table 11

*Summary of Regression Analysis of the Mediating Effects of Social Support on the Relationships between Agreeableness and Marital Adjustment (N = 82)*

Variables	Step 1 (X > Y)			Step 2 (X > M)			Step 3 (M > Y)			Step 4 (X > Y; M > Y)		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Child in home	-8.67	2.28	-0.38***	-837.10 <sup>+</sup>	499.33 <sup>+</sup>	-0.18	-7.06	2.10	-0.31***	-6.84	2.05	-0.30***
Agreeableness	1.54	0.58	0.27	181.29 <sup>+</sup>	125.18 <sup>+</sup>	0.16				1.14	0.52	0.20
Social support							2.35 <sup>++</sup>	0.00	0.47***	2.19 <sup>++</sup>	0.00	0.44***
$\Delta R^2$		.21			.04			.35			.38	
<i>F</i> for change in $R^2$		11.72***			2.66			23.04***			17.77***	

\*\*\*  $p < .001$ .

+ = number x 100. ++ = number x 10<sup>-5</sup>.

Table 12

*Summary of Regression Analysis of the Mediating Effects of Social Support on the Relationships between Emotional Stability and Marital Adjustment (N = 82)*

Variables	Step 1 (X > Y)			Step 2 (X > M)			Step 3 (M > Y)			Step 4 (X > Y; M > Y)		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Child in home	-9.32	2.30	-0.41***	-921.53 <sup>+</sup>	494.41 <sup>+</sup>	-0.20	-7.06	2.10	-0.31***	-7.29	2.08	-0.32***
Emotional stability	1.17	0.50	0.24	195.36 <sup>+</sup>	106.45 <sup>+</sup>	0.20				0.74	0.45	0.15
Social support							2.35 <sup>++</sup>	0.00	0.47***	2.20 <sup>++</sup>	0.00	0.44***
$\Delta R^2$		.19			.05			.35			.37	
<i>F</i> for change in $R^2$		10.74***			3.31*			23.04***			16.59***	

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

+ = number x 100. ++ = number x  $10^{-5}$ .

Table 13

*Summary of Regression Analysis of the Mediating Effects of Social Support on the Relationships between Openness and Marital Adjustment (N = 82)*

Variables	Step 1 (X > Y)			Step 2 (X > M)			Step 3 (M > Y)			Step 4 (X > Y; M > Y)		
	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$	B	SE B	$\beta$
Child in home	-7.20	2.38	-0.31**	-471.50 <sup>+</sup>	505.65 <sup>+</sup>	-0.10	-7.06	2.10	-0.31***	-6.19	2.15	-0.27**
Openness	1.60	0.59	0.28**	344.83 <sup>+</sup>	125.41 <sup>+</sup>	0.31**				0.87	0.55	0.15
Social support							2.35 <sup>++</sup>	0.00	0.47***	2.13 <sup>++</sup>	0.00	0.42***
$\Delta R^2$		.21			.10			.35			.36	
F for change in $R^2$		11.83***			5.54**			23.04***			16.45***	

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

+ = number x 100. ++ = number x  $10^{-5}$ .

Table 14

*Summary of Regression Analysis of the Mediating Effects of Social Support on the Relationships between Conscientiousness and Marital Adjustment (N = 82)*

Variables	Step 1 (X > Y)			Step 2 (X > M)			Step 3 (M > Y)			Step 4 (X > Y; M > Y)		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Child in home	-9.15	2.34	-0.40***	-890.03 <sup>+</sup>	477.05 <sup>+</sup>	-0.20	-7.06	2.10	-0.31***	-7.06	2.12	-0.31***
Conscientiousness	0.89	0.62	0.15	378.62 <sup>+</sup>	125.05 <sup>+</sup>	0.32**				0.01	0.58	0.01
Social support							2.35 <sup>++</sup>	0.00	0.47***	2.35 <sup>++</sup>	0.00	0.47***
$\Delta R^2$		.16			.12			.35			.34	
<i>F</i> for change in $R^2$		8.70***			6.29**			23.04***			15.16***	

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

+ = number x 100. ++ = number x  $10^{-5}$ .

Table 15

*Summary of Regression Analysis of the Mediating Effects of Social Support on the Relationships between Extraversion and Marital Adjustment (N = 82)*

Variables	Step 1 (X > Y)			Step 2 (X > M)			Step 3 (M > Y)			Step 4 (X > Y; M > Y)		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
Child in home	-9.09	2.38	-0.40***	-851.32 <sup>+</sup>	498.26 <sup>+</sup>	-0.19	-7.06	2.10	-0.31***	-7.08	2.11	-0.31***
Extraversion	0.25	0.49	0.05	151.72 <sup>+</sup>	103.52 <sup>+</sup>	0.16				-0.11	0.44	-0.02
Social support							2.35 <sup>++</sup>	0.00	0.47***	2.37 <sup>++</sup>	0.00	0.47***
$\Delta R^2$		.14			.04			.35			.35	
<i>F</i> for change in $R^2$		7.61***			2.69			23.04***			15.20***	

\*\*\*  $p < .001$ .

+ = number x 100. ++ = number x  $10^{-5}$ .

marriages less impactful than that reported in other studies (Hetu et al., 1993; Thomas & Herbst, 1980). As such the spouses in this study may have adjusted to the gradual loss, so the effect on their marital quality is not noticeable.

Other possible interpretations include that the effects of the hearing loss on marriage may be more impactful for the patient than their spouse as suggested by Oyer and Paolucci (1970). In addition, the use of a combined score to reflect hearing loss may fail to explicate any unique effects of different types of hearing loss (PTA versus word discrimination) and, thus, masks effects altogether. Moreover, it is possible that the small sample size and the associated lack of power in the analysis diminished the ability to find effects when they exist or to have confidence in results.

Stress process also theory suggests that lower levels of stress can result in more successful adjustment to that stress (Pearlin & Schooler, 1978; Pearlin et al., 1981; Thoits, 1995). Thus, from a theoretical perspective a gradual loss of hearing would be expected to result in more positive outcomes compared with sudden hearing loss. Findings from other studies support this assumption (Ramsdell, 1968; Hetu et al., 1993). The failure to find support for this hypothesis is likely the function of the sample consisting of mostly older people, so those experiencing a sudden loss many years earlier had ample time to adjust to the loss and the loss would not influence marital quality.

Regarding certain personality characteristics, findings did not support their effects on marital adjustment, contrary to prior research (e.g., Claxton et al., 2011; Donnellan et al., 2004; Karney & Bradbury, 1995) and suggestions by Hallberg that personality may play a significant role in coping with hearing loss outcomes. Again I

expected that the small sample size made it difficult to find significant effects, although several of the correlations between personality dimensions (see Table 5), (i.e., agreeableness, emotional stability, and openness) and marital adjustment were significant. Also, the significant correlations between several of the personality characteristics, (agreeableness, conscientiousness, emotional stability, and openness), suggests that when included in the same model, they explain some of the same variance in marital adjustment.

Regarding the moderating effects of the use of assistive technology on the strength of the relationship between degree of hearing loss and spouses' perceived marital adjustment the findings did not support the hypothesis. Stress process theory posits that coping strategies can buffer or lessen the negative effects of stress (i.e., hearing loss) on stress outcomes (Pearlin & Schooler, 1978; Pearlin et al., 1981; Thoits, 1995). Estimated are that 90-95% of those with hearing loss can be helped by hearing aids, yet only one in five seek such help (Carmen, 2009; Seniors Research Group, 1999).

Findings from the current study show that use of assistive technology was common among the study sample, and although significantly correlated with spouses' marital adjustment use did not moderate the effects of the degree of hearing loss on marital adjustment. Clearly, the sample is over-representative of spouses whose spouse both has and uses such technology, so there was limited variation in responses. This coupled with the small sample size makes it more difficult to identify moderation.

A consistent finding in social support research is that one's perception of the availability of social support is significantly associated with positive outcomes (McDowell

& Serovich, 2007; Wethington & Kessler, 1986). Specific to hearing loss, studies show that social support is helpful in adjusting to both AHL (Frankel & Turner, 1983; Hoover-Steinwart et al., 2001) and the use of assistive technology (Erber, Lamb, & Lind, 1996; Garsteki & Erler, 1998). As expected, findings reported here also reflect these early findings, as the bivariate correlation between perceived social support and spouses' marital adjustment was the strongest found ( $r = .53, p < .01$ ) in this sample of spouses with partners who have AHL. Also, in the regression models, social support was the strongest predictor of spouses' marital adjustment over all other predictors, explaining an additional 19% of the variance beyond that explained by the next most significant predictor (children in the home).

Stress process theory posits that social support acts as a mediator of stress (Pearlin et al., 1981; Thoits, 1995, 2010). Unfortunately, the results of this study do not support this theoretically driven assumption. Social support mediated only two of the relationships tested, and both were the effects of certain personality characteristics on marital adjustment. Specifically higher levels of openness and conscientiousness were linked with higher levels of social support, and in turn, higher levels of social support were associated with higher levels of marital adjustment. In all other models, social support was a significant predictor of marital adjustment, but was not a mediator. It may be the effects of personality on social support are more subtle. For example, those who are more agreeable, emotionally stable, and extraverted may have never had problems maintaining relationships, building new relationships, and having friends, so social support is an ongoing benefit for them and not necessarily a mechanism for buffering the effects of personality on marital quality in the context of AHL.

However, these findings support earlier findings from Frankel and Turner (1983) that social support is the single most important predictor of successful adjustment in the context of experiencing AHL. In the current study of spouses whose partner has AHL, the link between social support and marital quality is strong. Given that the majority of the participants were older, had been coping with AHL for many years, and had established social support systems, it may be that their social support was not needed as a buffer of the potential negative effects of AHL on marital quality.

## CHAPTER 5

### SUMMARY, CONCLUSIONS, LIMITATIONS, RECOMMENDATIONS FOR FUTURE RESEARCH, AND STUDY IMPLICATIONS

#### Summary

The purpose of this study was to test a conceptual model of the effects of acquired hearing loss (AHL) on spouses' marital adjustment. The model stemmed from stress process theory and the existing literature. Because few have focused on spouses in the content of AHL, they were the focus.

Data were obtained from three audiology clinics in the Southeastern U. S. and included responses from 82 couples, although only spouses' responses were used. According to hearing loss scholars (Dr. C. Jackson, personal communication, July 8, 2014), this is considered a large study sample of those who seek help for hearing loss. Data were collected through surveys that included measures of hearing loss and suddenness of loss, personality, perceived social support, and marital adjustment, as well as several covariates (children in the home, economic hardship, and spouses' hearing loss). Audiologist provided the hearing assessment scores (i.e., PTA and WD) used to measure AHL.

Stepwise multiple regression was used for the analysis. Findings indicated that hearing loss, suddenness of loss, and personality did not predict level of marital adjustment; however, social support did. In addition, the use of assistive technology did not moderate the effects of AHL on spouses' marital adjustment; instead, the use of technology was linked with higher levels of marital adjustment in general. Perceived social support fully mediated the relationships between openness and spouses' marital

adjustment and conscientiousness and spouses' marital adjustment, but failed to do so in the case of degree of hearing loss, sudden versus gradual loss, agreeableness, emotional stability, and extraversion.

## **Conclusions**

The current study contributes to the extant literature by addressing acquired hearing loss and the effects on intimate relationships. Specifically, this study addressed gaps in the literature, as it focused on quantitatively assessing the effects AHL on spouses' marital adjustment. No study was found that used objective assessment of hearing loss (i.e., PTA and WD loss), sudden versus gradual loss, and spouses' personality as independent variables to explain spouses' marital adjustment.

Four conclusions are drawn from this study. One conclusion is that social support was consistently the strongest predictor of spouses' marital adjustment in the sample of spouses' whose partners experience AHL. These findings were in agreement with Frankel and Turner (1983) who reported social support is the single most important influence on successful adjustment following a hearing loss. Social support was found to increase the explained variance in the full model by 19%. This increase resulted in an adjusted  $R^2$  of .35, which is a large explained variance in social science research.

Another conclusion is that children in the home was a strong significant predictor in all analyses and associated with lower marital adjustment, explaining between 14% and 21% of the variance. Post hoc analyses using independent t-tests found that even though there were only eight couples with children in the home compared with those without children in the home, the mean difference in marital adjustment was significant

( $p < .001$ ). Clearly, children's presence influences spouses' perceptions of marital adjustment in a negative way, likely representing a source of stress in older couples. Wang and Morin (2009) found one-in-ten adults ages 18 to 34 have recently moved back to their parent's home due to the recession. Thus, for retired parents, adult children moving back to live with them may increase daily stresses due to the impact on their fixed income. Cui and Donnellan (2009) reported conflicts over parenting adolescents was indirectly related to both mothers and fathers marital satisfaction. As parenting conflicts increased, marital satisfaction decreased, and as parenting conflicts decreased, marital satisfaction increased.

Still another conclusion is the need for studies with larger more diverse samples with respect to age, ethnicity, education, and income levels. As AHL is known to affect relationships with significant others, employment, retirement, and quality of life, more diverse samples are needed so findings may be generalizable to the hearing loss population.

Lastly, this study highlights the need to develop research designs that move from collecting data at one point to longitudinal designs where data are collected multiple times. As time is an important component in the adjustment process following hearing loss, collecting data at multiple points will more effectively capture the experience for both those with the loss and their significant others.

### **Limitations**

The study has several notable limitations. First, the study design was cross-sectional. The effects of AHL on marital adjustment are influenced by many factors (e.g., denial of hearing loss, type of hearing loss, use of assistive technology). Thus, a

cross-sectional design limits the ability to track trajectories of adjustment in a systematic way, because data reflect participants' perceptions at one point. Identifying trajectories of adjustment to AHL would better capture the experience of living with a hearing loss and allow for the identification of points of intervention.

The sample was a purposive, convenience sample. Participants were recruited from two university teaching clinics and one private audiology clinic. Although the two university clinics' had fee structures based on clients' ability to pay, the sample was not racially or educationally diverse and, thus, likely not representative of the general target population. Also, the sample lacked diversity in regards to participants' ages, having children in the home, perceived economic hardship, and employment status. Only 20% of the spouses were 60 years or younger, only 10% had children in the home, less than 10% of spouses reported difficulties paying bills, and 66% were retired. Thus, the sample lacked diversity in age, homes with children present, experiencing economic hardship, and employment status to fully explore how the relationships between hearing loss, sudden versus gradual loss, and spouses' personality, raising children, economic hardship, and careers impact spouses' perceptions of marital adjustment in the context of AHL.

Although efforts were made to capture the effects of a sudden versus gradual hearing loss on marital adjustment in this predominantly older sample, the majority reported a sudden loss that had been experienced many years in the past. Thus, these couples had sufficient time to make adjustments following the hearing loss, and as such, the "suddenness" was not an effective measure of what was intended and did not effectively capture the expected effects on marital adjustment.

Clearly, the sample size ( $N = 82$ ) used here was a limitation and failed to provide adequate power for the analyses. A larger sample would reduce the chance of Type I errors, add statistical power, and provide greater confidence in the findings. Also, it is likely that there are other unmeasured variables of importance that would add to explaining the effects of AHL on spouses' marital adjustment.

### **Recommendations for Future Research**

I offer several recommendations for future research. Future research focusing on intimate relationships should use more precise designs that capture the impact of a sudden hearing loss on the relationship. One possible design change is the use of reflective questions to assess spouses' marital satisfaction before and after the hearing loss. Another is to operationalize the construct of suddenness of hearing loss in such a way that experiences with suddenness reflects events occurring recently rather than in the past, so adjustment issues are not yet resolved (Hallberg et al., 2008).

The effects of AHL on significant others (Hampton, 1999; Wallhagen et al., 2004) is an understudied area, and the limited research literature is replete with qualitative studies (Aguayo & Coady, 2001; Barlow et al., 2007; Hallberg, 1996; Scarinci et al., 2008). However, there is a dearth of quantitative research addressing this topic. Of those studies, including the one reported here, few have used a longitudinal design (Wallhagen et al., 2001, 2004). Hearing loss requires adjustments by all affected and, as suggested by stress process theory, is an ongoing process. Thus, there is a need for more quantitative research in general, and more quantitative research using longitudinal designs to address spouses and their experience in the context of AHL.

The current study identified two other areas that should be explored in future research. A possible reason that degree of hearing loss was not associated with

spouses' marital adjustment was the combining of different audiology assessment scores (i.e., PTA and WD loss). Future research should examine differences in the predictive capabilities of sensory loss and discrimination loss on relationship outcomes. Also, given differences in marital adjustment in relation to hearing aid usage, future research might explore the threshold at which failure to use assistive technology when it is available is most problematic for marriages.

### **Study Implications**

The findings from this study have implications for audiologists and marriage and family therapists. First, the presence of children in the home was consistently found to be significantly associated with lower marital adjustment in spouses in the context of AHL. Thus, it is important for professionals working with these couples to normalize their situation and inform them that confusion, frustration, and conflict are common in their situation. Certainly for families in crisis or experiencing maladaptive adjustment patterns, professionals can help spouses, partners, and children to gain a better awareness of what the family member with hearing loss is experiencing. These efforts should be done with sensitivity to the children's developmental stage and can help reduce personal anxieties, reconnect lines of communication between family members, build family cohesion, and reduce the bulk of the adjustment burden from the spouse or partner to the whole family. In the case of families in the study, most had adult children who either have yet to live independently from the parents or who have returned to their parents' residence because of current life situations typically divorce, job loss, or other critical life events (Wang & Morin, 2009).

Also, findings from the study show that the use of assistive technology was associated with higher levels of spouses' marital adjustment. This is an important point to address in working with couples' in the context of AHL. Audiologists commonly see couples for diagnosis and treatment and often when the loss is observable to one or both spouses. They may notice that the patient has hearing aids but does not use them the majority of the time and proceed to explore technology usage patterns to determine whether the denial is a motivation for failure of use. Armero (2000) reported that those that deny a hearing loss tend to have moderate loss and are people with high levels of self-control. These factors can help professionals develop effective treatment plans that address denial of the hearing loss if that is determined.

Last and most importantly, professionals should be aware that social support has been found to be the single most important factor in adjusting to a hearing loss (Frankel & Turner, 1983), and, in this study, the most significant predictor of spouses' marital adjustment. Thus, these findings direct professionals to place a priority on joining successfully with these couples or families that are dealing with a hearing loss and that maintaining a strong therapeutic relationship will be crucial to successfully working with this population. In other words, using active listening skills and providing empathetic attunement, and social support are important. Treatment plans for cases should emphasize checking in regularly with couples or families and offering opportunities for them to discuss their concerns and case progress. These efforts should promote building and maintaining a strong therapeutic relationship.

This study contributes to the field by combining PTA loss and WD loss scores to objectively measure patients' degree of hearing loss. The effect of degree of hearing

loss either in the combined or individual analyses on spouse's marital adjustment was not significant. However, this might prove to be significant with a larger and more diverse sample. Also, this study failed to capture the effects of a sudden hearing loss on couple dynamics, and highlights the need to devise a more effective method to assess these effects. Given the increasing incidence of hearing loss (Wallhagen et al., 2004) including those at younger ages with the greatest growth in older minority adults (Hooyman & Kiyak, 2005; Kochkin, 2005), researchers, health care professionals, and policy makers should make AHL a greater priority.

**APPENDIX A**  
**INFORMED CONSENT**

Many people today experience hearing loss. We know that such a loss can be hard for the individual, but we know very little about the effects of hearing loss on their important relationships with a spouse or a partner. Only by asking those who are in relationships and dealing with hearing impairment can we learn more about their experiences and how better to provide assistance to them.

In our efforts to learn more, we are inviting you and your spouse/partner to participate in a study to better understand the effects of hearing loss on your relationship by completing a brief questionnaire that will take about 15 minutes. Only those who are at least 18 years of age and in a committed romantic relationship (married or living together) can participate. There are no known risks for you. The benefits are that the information may help others who experience hearing loss. If you would like a copy of the results, print your name and address on the yellow sheet which will be separated from the questionnaire itself.

Your participation is voluntary, and, if you choose not to participate or to withdraw from the study at any time, there will be no penalty. Let us assure you that no one but the project director will have access to your answers. No one will be able to tell who answered the questions because of the identification number we use, and only the clinic has access to your name and address. The information you provide will be kept

FSU Human Subjects Committee approved on 4/16/2014. Void after 4/14/2015.

HSC No. 2014.12575

confidential to extent permitted by law. The results may be published but no names or identifying information will be used.

We will be glad to answer any questions you have about the study. Please contact me (phone: xxx-xxx-xxxx, e-mail: xxxxxxxx), Dr. Kay Pasley (phone: 850-644-3217, e-mail: kpasley@fsu.edu) or the FSU Institutional Review Board (2010 Levy Street, Research Building B, Suite 276, Tallahassee, FL 23206-27423; phone: 850-644-7900; e-mail: humansubjects@magnet.fsu.edu).

Sincerely,

Lilbourne Mills  
Projector Director

---

Signature

---

Date

***FSU Human Subjects Committee approved on 4/16/2014. Void after 4/14/2015.  
HSC No. 2014.12575***

## APPENDIX B

### IRB APPROVAL

Approval Letter

<http://humansubjects.research.fsu.edu/print/printApprovalLetter.asp...>

The Florida State University  
Office of the Vice President For Research  
Human Subjects Committee  
Tallahassee, Florida 32306-2742  
(850) 644-8673, FAX (850) 644-4392

RE-APPROVAL MEMORANDUM Date: 4/16/2014

To: Lilbourne Mills [xxxxxxxxx]

Address: xxxxx xxxxxxx, xxxxxxx, xx xxxxx

Dept.: FAMILY & CHILD SCIENCE From: Thomas L. Jacobson, Chair

Re: Re-approval of Use of Human subjects in Research

The Effects of Acquired Hearing Loss on Spouses' Perceived Marital Adjustment

Your request to continue the research project listed above involving human subjects has been approved by the Human Subjects Committee. If your project has not been completed by 4/14/2015, you must request renewed approval by the Committee. If you submitted a proposed consent form with your renewal request, the approved stamped consent form is attached to this re-approval notice. Only the stamped version of the consent form may be used in recruiting of research subjects. You are reminded that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report in writing, any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major professor are reminded of their responsibility for being informed concerning research projects involving human subjects in their department. They are advised to review the protocols as often as necessary to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

Cc: []

HSC No. 2014.12575

4/16/2014 3:20 PM

Approval Letter  
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The Florida State University  
Office of the Vice President For Research  
Human Subjects Committee  
Tallahassee, Florida 32306-2742  
(850) 644-8673, FAX (850) 644-4392

RE-APPROVAL MEMORANDUM Date: 5/6/2013

To: Lilbourn Mills [xxxxxxx xxxxxxxx]

Address: xxxx xxxxxxxxxxx xxxxx

Dept.: FAMILY & CHILD SCIENCE From: Thomas L. Jacobson, Chair

Re: Re-approval of Use of Human subjects in Research

The Effects of Acquired Hearing Loss on Spouses' Perceived Marital Adjustment

Your request to continue the research project listed above involving human subjects has been approved by the Human Subjects Committee. If your project has not been completed by 5/5/2014, you must request renewed approval by the Committee. If you submitted a proposed consent form with your renewal request, the approved stamped consent form is attached to this re-approval notice. Only the stamped version of the consent form may be used in recruiting of research subjects. You are reminded that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report in writing, any unanticipated problems or adverse events involving risks to research subjects or others. By copy of this memorandum, the Chair of your department and/or your major professor are reminded of their responsibility for being informed concerning research projects involving human subjects in their department. They are advised to review the protocols as often as necessary to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

Cc: []

HSC No. 2013.10529

[http://humansubjects.research.fsu.edu/print/printApprovalLetter.aspx?appID=10529&letter ... 5/6/2013](http://humansubjects.research.fsu.edu/print/printApprovalLetter.aspx?appID=10529&letter...5/6/2013)

Approval Letter  
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The Florida State University  
Office of the Vice President For Research  
Human Subjects Committee  
Tallahassee, Florida 32306-2742  
(850) 644-8673, FAX (850) 644-4392

APPROVAL MEMORANDUM (for change in research protocol) Date: 11/6/2012  
To: Lilbourne Mills [xxxxx xxxxxx]  
Address: xxxx xxxxxxxxxxxxxxxx  
Dept.: FAMILY & CHILD SCIENCE From: Thomas L. Jacobson, Chair  
Re: Use of Human Subjects in Research (Approval for Change in Protocol)  
Project entitled: The Effects of Acquired Hearing Loss on Spouses' Perceived Marital Adjustment

The form that you submitted to this office in regard to the requested change/amendment to your research protocol for the above-referenced project has been reviewed and approved.

Please be reminded that if the project has not been completed by 6/27/2013, you must request renewed approval for continuation of the project.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is FWA00000\68/IRB number IRB00000446.

Cc: Beatrice Pasley, Advisor [kpasley@admin.fsu.cdu] HSC No. 2012.9263

[http://humansubjects.research.fsu.edu/print/printApprova\Letter.aspx?appID=9263&letter ...](http://humansubjects.research.fsu.edu/print/printApprova\Letter.aspx?appID=9263&letter...) 11/6/2012

Approval Letter  
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The Florida State University  
Office of the Vice President For Research  
Human Subjects Committee  
Tallahassee, Florida 32306-2742  
(850) 644-8673, FAX (850) 644-4392

RE-APPROVAL MEMORANDUM Date: 6/28/2012

To: Lilbourn Mills [xxxxxxxx xxx]

Address: xxx xxxxxx, xxxxxxxxx

Dept.: FAMILY & CHILD SCIENCE From: Thomas L. Jacobson, Chair

Re: Re-approval of Use of Human subjects in Research

The Effects of Acquired Hearing Loss on Spouses' Perceived Marital Adjustment

Your request to continue the research project listed above involving human subjects has been approved by the Human Subjects Committee. If your project has not been completed by 6/27/2013, you must request renewed approval by the Committee. If you submitted a proposed consent form with your renewal request, the approved stamped consent form is attached to this re-approval notice. Only the stamped version of the consent form may be used in recruiting of research subjects. You are reminded that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report in writing, any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major Professor are reminded of their responsibility for being informed concerning research Projects involving human subjects in their department. They are advised to review the protocols as often as necessary to insure that the project is being conducted in compliance with our institution and with DI-II-IS regulations.

Cc: Beatrice Pasley, Advisor [kpasley@admin.fsu.edu] HSC No. 2012.8474

[http://humansubjects.research.fsu.edu/orint/orintApprovalLetter.aspx?appJID=8474&letter ...](http://humansubjects.research.fsu.edu/orint/orintApprovalLetter.aspx?appJID=8474&letter...) 6/28/2012

Approval Letter  
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Office of the Vice President For Research  
Human Subjects Committee  
Tallahassee, Florida 32306-2742  
(850) 644-8673, FAX (850) 644-4392

APPROVAL MEMORANDUM (for change in research protocol) Date: 5/16/2012

To: Lilbourne Mills [xxxxxxxxxx xxxxxxxx]

Address: xxx xxxxxx xxxxxxxxxx

Dept.: FAMILY & CHILD SCIENCE From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research (Approval for Change in Protocol)

Project entitled: The Effects of Acquired Hearing Loss on Spouses' Perceived Marital Adjustment

The form that you submitted to this office in regard to the requested change/amendment to your research protocol for the above-referenced project has been reviewed and approved.

Please be reminded that if the project has not been completed by 8/16/2012, you must request renewed approval for continuation of the project.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is FWAOOOOO168/IRB number IRB00000446.

Cc: Beatrice Pasley, Advisor [kpasley@admin.fsu.edu] HSC No. 2012.8220

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Approval Letter  
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Office of the Vice President For Research  
Human Subjects Committee  
Tallahassee, Florida 32306-2742  
(850) 644-8673, FAX (850) 644-4392

APPROVAL MEMORANDUM Date: 8/19/20

To: Lilhourne Mills [xxxxxx xxxxxxxx]

Address: xxx xxxxxxxx xxxxxxxx

Dept.: FAMILY & CHILD SCIENCE From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research

The Effects of Acquired Hearing Loss on Spouses' Perceived Marital Adjustment

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and one member of the Human Subjects Committee. Your project is determined to be Expedited per 45 CFR § 46.11 0(7) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 8/16/2012 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is FWAOOOOO 168/IRB number IRB00000446.

Cc: Beatrice Pasley, Advisor

HSC No. 20 II .666 I

<http://humansubjects.research.fsu.edu/print/printApprovalLetter.aspx?app!D=6661&letter...8/19/2011>

## APPENDIX C

### TEN-ITEM PERSONALITY INVENTORY

Instructions: Please write the number next to each statement to indicate the extent to which *you agree or disagree with that statement*.

---

Disagree strongly	Disagree moderately	Disagree a little	Neither agree or disagree	Agree a little	Agree moderately	Agree strongly
1	2	3	4	5	6	7

---

1. \_\_\_\_\_ I see myself as Extraverted, enthusiastic.
2. \_\_\_\_\_ I see myself as Critical, quarrelsome.
3. \_\_\_\_\_ I see myself as Dependable, self-disciplined.
4. \_\_\_\_\_ I see myself as Anxious, easily upset.
5. \_\_\_\_\_ I see myself as Open to new experiences, complex.
6. \_\_\_\_\_ I see myself as Reserved, quiet.
7. \_\_\_\_\_ I see myself as Sympathetic, warm.
8. \_\_\_\_\_ I see myself as Disorganized, careless.
9. \_\_\_\_\_ I see myself as Calm, emotionally stable.
10. \_\_\_\_\_ I see myself as Conventional, uncreative.

## APPENDIX D

### MULTIDIMENSIONAL SCALE OF PERCEIVED SOCIAL SUPPORT

Instructions: I am interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement by circling one number.

Circle the "1" if you Very Strongly Disagree  
Circle the "2" if you Strongly Disagree  
Circle the "3" if you Mildly Disagree  
Circle the "4" if you are Neutral  
Circle the "5" if you Mildly Agree  
Circle the "6" if you Strongly Agree  
Circle the "7" if you Very Strongly Agree

- |                                                                         |   |   |   |   |   |   |   |
|-------------------------------------------------------------------------|---|---|---|---|---|---|---|
| 1. There is a special person who is around when I am in need.           | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2. There is a special person with whom I can share my joys and sorrows. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 3. My family really tries to help me.                                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 4. I get the emotional help and support I need from my family.          | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5. I have a special person who is a real source of comfort to me.       | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 6. My friends really try to help me.                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 7. I can count on my friends when things go wrong.                      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8. I can talk about my problems with my family.                         | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 9. I have friends with whom I can share my joys and sorrows.            | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 10. There is a special person in my life who cares about                | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 11. My family is willing to help me make decisions.                     | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 12. I can talk about my problems with my friends.                       | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

## APPENDIX E

### PERCEIVED ECONOMIC HARDSHIP

Please answer the questions about your family.

1. (Reverse) Thinking back over the past year, how much difficulty did you have with paying your bills. Would you say you had ... (Please circle a number)

1 = A great deal of difficulty

2 = Quite a bit of difficulty

3 = Some difficulty

4 = A little difficulty

5 = No difficulty at all

2. Compared to most other people who have the same education as you and your spouse, and who work as hard as you, would you say your income is ... (Please circle a number)

1 = Much higher than their income

2 = Somewhat higher than their income

3 = About the same as their income

4 = Somewhat lower than their income

5 = Much lower than their income

3. Think again over the last 12 months. Generally, at the end of each month do you end up with ... (Please circle a number)

1 = More than enough money left over

2 = Some money left over

3 = Just enough to make ends meet

4 = Not enough to make ends meet

## APPENDIX F

### REVISED DYADIC ADJUSTMENT SCALE

Instructions: Most persons have disagreements in their relationships. Please circle the approximate extent of agreement or disagreement between you and your partner for each of the following list.

	Always Agree	Almost Always Agree	Occa- sionally Agree	Fre- quently Disagree	Almost Always Disagree	Always Disagree
1. Religious matters	5	4	3	2	1	0
2. Demonstrations of affection	5	4	3	2	1	0
3. Making major decisions	5	4	3	2	1	0
4. Sex relations	5	4	3	2	1	0
5. Conventionality (correct or proper behavior)	5	4	3	2	1	0
6. Career decisions	5	4	3	2	1	0
	All the Time	Most of the Time	More Often Than Not	Occa- sionally	Rarely	Never
7. How often do you discuss or have you considered divorce, separation, or ending your relationship?	0	1	2	3	4	5
8. How often do you and your partner quarrel?	0	1	2	3	4	5
9. Do you ever regret that you married or live together?	0	1	2	3	4	5
10. How often do you and your mate "get on each other's nerves"	0	1	2	3	4	5
	Every Day	Almost Every Day	Occa- sionally	Rarely	Never	
11. Do you and your mate engage in outside interests together?	4	3	2	1	0	

How often would you say the following events occur between you and your mate?

	Never	Less than Once a Month	Once or Twice a Month	Once or Twice a Week	Once a Day	More Often
12. Have a stimulating exchange	0	1	2	3	4	5
13. Work together on a project	0	1	2	3	4	5
14. Calmly discuss something	0	1	2	3	4	5

## APPENDIX G

### DEMOGRAPHIC FORM

Please circle, fill in blank, or check the response that best fits for you.

- (1) Your sex: Male                  Female
- (2) Year in which you were born: \_\_\_\_\_
- (3) Your race or ethnic background:
- Caucasian
  - African American/Black
  - Hispanic
  - American Indian
  - Asian/Pacific Islander
  - Other (specify): \_\_\_\_\_
- (4) Your highest level of education:
- Some high school
  - High school diploma/GED
  - Some college
  - Bachelors degree
  - Some graduate study
  - Graduate degree
- (5) Your current employment
- Employed full-time
  - Employed part-time
  - Retired
  - Full-time student
- (6) Are children presently living in your home?
- No
  - Yes → -If YES, how many? \_\_\_\_\_
- (7) How quickly was the hearing loss noticed?
- Over hours, days, or a few weeks
  - Over a longer period of time than a few weeks. How long? \_\_\_\_\_
- (8) Does the person with the hearing loss have a device to help with hearing (e.g., hearing aid)?

- No
- Yes → - If YES, about how long has he/she had it? \_\_\_\_\_  
Years/months

→ - If YES, how often does the person with the hearing loss use the device?

- Never
- Some of the time
- Most of the time
- All of the time

(9) How long has the person with the hearing loss been under the care of an audiologist?

- Less than 3 months
- 3 months to 12 months
- More than 12 months

(10) Does the spouse or partner of person with the loss also have a hearing problem?

- No
- Yes

Is there anything you would like to tell us about your experiences with hearing loss?

Thank you for taking the time to answer these questions.

## REFERENCES

- Acock, A. C. (2005). Working with missing values. *Journal of Marriage and Family*, 67, 1012-1028.
- Aguayo, M. O., & Coady, N. F. (2001). The experience of deafened adults: Implications for rehabilitative services. *Health and Social Work*, 26, 269-276.
- Anderson, D. L., & Noble, W. (2005). Couples' attributions about behaviors modulated by hearing impairment: Links with relationship satisfaction. *International Journal of Audiology*, 44, 197-205.
- Armero, O. E. (2000). The six stages of grieving a hearing loss. *The Hearing Review*, 7(5), 28-33.
- Armero, O. E. (2001). Effects of denied hearing loss on the significant other. *The Hearing Journal*. 54(5), 44, 46-47.
- Barlow, J. H., Turner, A. P., Hammond, C. L., & Gailey, L. (2007). Living with late deafness: Insight from between worlds. *International Journal of Audiology*, 46, 442-448.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182.
- Becker, B. (2007). Multiple regression: Part 2. *General Linear Model*. Lecture presented at Florida State University, Tallahassee, FL.
- Belsky, J. & Pensky, E. (1988). Marital change across the transition to parenthood. *Marriage and Family Review*, 12, 133-156.
- Berkman, L. F. (1984). Assessing the physical health effects of social networks and social support. *Annual Review of Public Health*, 5, 413-432.
- Boone, S., & Scherich, D. (1995). Characteristics of ALDAnS: The ALDA member survey. *Association of Late-Deafened Adults News*, Oak Park, IL.
- Busby, D. M., Christensen, C., Crane, D. R., & Larson, J. H. (1995). A revision of the dyadic adjustment scale for use with distressed and nondistressed couples: Construct hierarchy and multidimensional scales. *Journal of Marital and Family Therapy*, 21, 289-308.
- Canty-Mitchell, J. L. (1996). The caring need of African-American male juvenile offenders. *Journal of Transcultural Nursing*, 8, 3-12.

- Canty-Mitchell, J., & Zimet, G. D. (2000). Psychometric properties of the multidimensional scale of perceived social support in urban adolescents. *American Journal of Community Psychology, 28*, 391-400.
- Carmen, R. E. (2005). Who are more resistant to hearing aid purchases ... women or men? *Audiology Today, 2*, 22-26.
- Carmen, R. E. (2009). The emotions of losing hearing and a bridge to healing. In R. E. Carmen (Ed.), *Hearing loss and hearing aids: A bridge to healing* (pp. 1-24). Sedona, AZ: Auricle Ink.
- Claxton, A., O'Rourke, N., Smith, J., & DeLongis, A. (2011). Personality traits and marital satisfaction within enduring relationships: An intra-couple discrepancy approach. *Journal of Social and Personal Relationships, 29*, 375-396.
- Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine, 38*, 300-314.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.) Hillsdale, NJ: Lawrence Erlbaum Associates.
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*, 310-357.
- Conger, R. D., & Elder, G. H. (1994). Families in troubled times: The Iowa Youth and Family Project. In R. D. Conger & G. H. Elder (Eds.), *Families in troubled times: Adapting to change in rural America* (pp. 3-19). Hawthorne, NY: Aldine de Gruyter.
- Conger, R. D., Rueter, M. A., & Elder, G. H. (1999). Couple resilience to economic pressure. *Journal of Personality and Social Psychology, 76*, 54-71.
- Conger, R. D., Ge, X., Elder, G. H., Lorenz, F. O., & Simons, R. L. (1994). Economic stress, coercive family process, and developmental problems of adolescents. *Child Development, 65*, 541-561.
- Costa, P. T., & McCrae, R. R. (1992). *Revised NEO personality inventory (NEO-PI-R) and NEO five-factor inventory (NEO-FFI) professional manual*. Odessa, FL: Psychological Assessment Resources.
- Cui, M., & Donnellan, M. B. (2009). Trajectories of conflict over raising adolescent children and marital satisfaction. *Journal of Marriage and Family, 71*, 478-494.
- Davis, H. (1964). *Guide for the classification and evaluation of hearing handicap*. New York: International Organization for Standardization.

- Den Oudsten, B. L., Van Heck, G. L., Van der Steeg, A. F., Roukema, J. A., & De Vries, J. (2010). Personality predicts availability of social support and satisfaction with social support in women with early stage breast cancer. *Support Care Cancer, 18*, 499-508.
- Donnellan, M. B., Conger, R. D., & Bryant, C. M. (2004). The Big Five and enduring marriages. *Journal of Research in Personality, 38*, 481-504.
- Dupuy, H. J. (1984). The Psychological Well-being Index. In N. K. Wenger, M. E. Mattson, C. F. Furberg, & Elinson, J. (Eds.). *Assessment of Quality of Life in Clinical Trials of Cardiovascular Therapies* (pp. 170-183). New York, NY: Le Jacq.
- Erber N. P., Lamb, N. L., & Lind, C. (1996). Factors that affect the use of hearing aids by older people: A new perspective. *American Journal of Audiology, 5*, 11-18.
- Epping-Jordan, J. A., Compas, B. E., & Howell, D. C. (1994). Predictors of cancer progression in young adult men and women: Avoidance, intrusive thoughts, and psychological symptoms. *Health Psychology, 13*, 539-547.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G\*Power 3.1: Tests for correlation and regression analysis. *Behavior Research Methods, 41*, 1149 – 1160.
- Finch, W. H., (2010). Imputation methods for missing categorical questionnaire data: A comparison of approaches. *Journal of Data Science, 8*, 361- 378.
- Frankel, B. G., & Turner, R. J. (1983). Psychological adjustment in chronic disability: The role of social support in the case of the hearing impaired. *Canadian Journal of Sociology, 8*, 273-291.
- Garstecki, D. C., & Erler, S. F. (1998). Hearing loss, control, and demographic factors influencing hearing aid use among older adults. *Journal of Speech-Language-Hearing Research, 41*, 527-537.
- Glass, L. E., & Elliott, H. H. (1992). The professional told me what it was, but that's not enough. *Self Help for the Hard of Hearing Journal, 1*, 26-28.
- Gliner, J. A., & Morgan, G. A. (2000). *Research methods in applied settings: An integrated approach to design and analysis*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality, 37*, 504-528.

- Hallberg, L. R.-M. (1996). Occupational hearing loss: Coping and family life. *Scandinavian Audiology, 25*, 25-33.
- Hallberg, L. R.-M. (1999). Hearing impairment, coping, and consequences on family life. *Journal of the Audiological Rehabilitative Association, 32*, 45-59.
- Hallberg, L. R.-M., & Barrenas, M. L. (1993). Living with a male with noise induced hearing loss: Experiences from the perspective of spouses. *British Journal of Audiology, 27*, 255-261.
- Hallberg, L. R.-M., Hallberg, U., & Kramer, S. E. (2008). Self reported hearing difficulties, communication strategies and psychological general well-being (quality of life) in patients with acquired hearing impairment. *Disability and Rehabilitation, 30*, 203-212.
- Hampton, D. (1999). The effects of hearing loss on intimate relationships. *The Hearing Review, 8*(9), 37-40.
- Hetu, R., Jones, L., & Getty, L. (1993). The impact of acquired hearing impairment on intimate relationships: Implications for rehabilitation. *Audiology, 32*, 363-381.
- Holmes, M. (2010). *A study to investigate the reliability and validity of the Ten-Item Personality Inventory, when compared with two robust inventories, within a British sample.* (Doctoral dissertation, York St. John University, Manchester, United Kingdom). Retrieved from [http://www.did.stu.mmu.ac.uk/mmu Psychology Dissertations UK/2010/RtoZ/YorkStJohn/Holmes%20York%20St%20John.pdf](http://www.did.stu.mmu.ac.uk/mmu%20Psychology%20Dissertations%20UK/2010/RtoZ/YorkStJohn/Holmes%20York%20St%20John.pdf)/ file view
- Hoover-Steinwart, L. M., English, K., & Hanley, J. E. (2001). Study probes the impact of hearing aid benefit of earlier involvement by significant other. *The Hearing Journal, 54*(11), 56-59.
- Hooymann, N. R., & Kiyak, H. A. (2005). *Social gerontology: A multidisciplinary perspective.* Boston, MA: Pearson.
- House, J. S. (1981). *Work stress and social support.* Reading, MA: Addison-Wesley.
- House, J. S., & Kahn, R. L. (1985). Measures and concepts of social support. In S. Cohen & S. L. Syme (Eds.), *Social support and health* (pp. 83-108). Orlando, FL: Academic Press.
- Howell, D. C. (2007). *Statistical methods for psychology* (6th ed.). Belmont, CA: Thomas Wadsworth.
- Jones, L., Kyle, J. G., & Wood, P. L. (1987). *Words apart: Losing your hearing as an adult.* London, England: Tavistock Press Limited.

- Karney, B. R., & Bradbury, T. N. (1995). The longitudinal course of marital quality and stability: A review of theory, methods, and research. *Psychological Bulletin*, 118, 3-34.
- Kelly, E. L., & Conley, J. J. (1987). Personality and compatibility: A prospective analysis of marital stability and marital satisfaction. *Journal of Personality and Social Psychology*, 52, 27-40.
- Knutson, J. F., Hinrichs, J. V., & Tyler, R. S. (1991). Psychological predictors of audiological outcomes of multi-channel cochlear implants: Preliminary findings. *Annals of Otology, Rhinology, and Laryngology*, 100, 817-822.
- Kochkin, S. (2005). MarkeTrak VII: Hearing loss population tops 31 million people. *The Hearing Review*, 12(7), 16-29.
- Kochkin, S. (2009). Why some consumers reject hearing aids but how you could love them! In R. E. Carmen (Ed.), *Hearing loss and hearing aids* (3rd ed.), (pp. 25-45). Sedona, AZ: Auricle Ink.
- Lazarus R. S., & Folkman S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Locke, H. J., & Wallace, K. M. (1959). Short marital adjustment and prediction tests: Their reliability and validity. *Marriage and Family Living*, 21, 251-255.
- MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology*, 58, 593-614.
- Martin, F. N., & Clark, J. G. (2000). *Introduction to audiology* (7th ed.). Boston, MA: Allyn & Bacon.
- McDowell, T. L. ,& Serovich, J. M. (2007). The effects of perceived and actual social support on the mental health of HIV-positive persons. *AIDS Care*, 19, 1223-1229.
- Mendes de Leon, C. F. (2005). Social engagement and successful aging. *European Journal of Ageing*, 2, 64-66.
- Menaghan, E. G. (1982). Assessing the impact of family transition on marital experience. In H. I. McCubbin, A. E. Cauble, & J. M. Patterson (Eds.). *Family Stress, Coping and Social Support* (pp. 90-108). Springfield, IL: Thomas.
- Myklebust, H. R. (1964). *The psychology of deafness*. New York, NY: Grune and Stratton.

- Newland, R. P., Crnic, K. A., Cox, M. J., & Mills-Koonce, W. R. (2013). The family stress model and maternal psychological symptoms: Mediated pathways from economic hardship to parenting across the infancy to preschool period. *Journal of Family Psychology, 27*, 96-105.
- Nurullah, A. S. (2012). Received and provided social support: A review of current evidence and future directions. *American Journal of Health Studies, 27*, 173-188.
- Oyer, E. J., & Paolucci, B. (1970). Homemakers' hearing losses and family integration. *Journal of Home Economics, 62*, 257-262.
- Papp, L. M., Cummings, E. M., & Goeke-Morey, M. C. (2009). For richer or poorer: Money as a topic of marital conflict in the home. *Family Relations, 58*, 91-103.
- Pearlin, L. I. (1989). The sociological study of stress. *Journal of Health and Social Behavior, 30*, 241-256.
- Pearlin, L. I. (1999). The stress process revisited: Reflections on concepts and their interrelationships. In C. S. Aneshensel & J. C. Phelan (Eds.), *Handbook of the sociology of mental health* (pp. 395-415). New York, NY: Kluwer Academic/Plenum.
- Pearlin, L. I., & Schooler, C. S. (1978). The structure of coping. *Journal of Health and Social Behavior, 19*, 2-21.
- Pearlin, L. I., Lieberman, M. A., Menaghan, E. G., & Mullan, J. T. (1981). The stress process. *Journal of Health and Social Behavior, 22*, 337-356.
- Ramsdell, D. A. (1968). The psychology of the hard-of-hearing and the deafened adult. In H. Davis, & S. R. Silverman (Eds.), *Hearing and deafness* (pp. 499-510). New York, NY: Holt, Rhinehart, and Winston.
- Rammstedt, B., & Oliver, J. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality, 41*, 203-212.
- Scarinci, N., Worrall, L., & Hickson, L. (2008). The effect of hearing impairment in older people on the spouse. *International Journal of Audiology, 47*, 141-151.
- Selye, H. (1956). *The stress of life*. New York, NY: McGraw-Hill.
- Seniors Research Group, (1999). HIA-NCOA project documents benefits of hearing instruments. *The Hearing Review, 7*, 8-10, 70).

- Spanier, G. B., & Cole, C. L. (1974, October). *Toward clarification and investigation of marital adjustment*. Paper presented at the annual meeting of the National Council on Family Relations, St. Louis, MO.
- Thoits, P. A. (1981). Undesirable life events and psychophysiological distress: A problem of operational confounding. *American Sociological Review*, *46*, 97-109.
- Thoits, P. A. (1995). Stress, coping, and social support processes: Where are we? What next? *Journal of Health and Social Behavior*, *35*, 53-79.
- Thoits, P. A. (2010). Stress and health: Major findings and policy implications. *Journal of Health and Social Behavior*, *51*(S), S41-S53.
- Thomas, A., & Herbst, K. G. (1980). Social and psychological implications of acquired deafness for adults of employment age. *British Journal of Audiology*, *14*, 76-85.
- Twenge, J. M., Campbell, W. K., & Foster, C. A. (2003). Parenthood and marital satisfaction: A meta-analytic review. *Journal of Marriage and Family*, *65*, 574-583.
- Wallhagen, M. I., Strawbridge, W. J., & Kaplan, G. A. (2001). Five year impact of hearing on physical functioning, mental health, and social relationships. *British Society of Audiology News*, *32*, 9-11.
- Wallhagen, M. I., Strawbridge, W. J., Shema, S. J., & Kaplan, G. A. (2004). Impact of self-assessed hearing loss on a spouse: A longitudinal analysis of couples. *Journal of Gerontology*, *59B*, 190-196.
- Wang, W., & Morin, R. (2009). *Recession brings many young adults back to the nest*. Retrieved from Pew Research Center's website: <http://pewsocialtrends.org/pubs/748/recession-brings-many-young-adults-back-to-the-nest>
- Wethington, E., & Kessler, R. C. (1986). Perceived support, received support, and adjustment to stressful life events. *Journal of Health and Social Behavior*, *27*, 78-89.
- Wie, O. B., Pripp, A. H., & Tvette, O. (2010). Unilateral deafness in adults: Effects on communication and social interaction. *Annals of Otolaryngology, Rhinology, & Laryngology*, *119*, 772-781.
- Zimet, G. D., Powell, S. S., Farley, G. K., Werkman, S., & Berkoff, K. A. (1990). Psychometric characteristics of the multidimensional scale of perceived social support. *Journal of Personality Assessment*, *55*, 610-617.

## **BIOGRAPHICAL SKETCH**

My name is Lilbourne I. Mills, III, and I was born and raised in Franklin, TN. I obtained a B.S. in agriculture from Middle Tennessee State University and completed a Doctor of Veterinary Medicine degree from Auburn University. After being a practicing veterinarian, I obtained a teaching certificate and taught 9th grade Physical Science. I retrained myself to become an accountant through coursework at Tennessee State University and worked in the field as a licensed CPA for a number of years. I returned to the university once again to become a marriage and family therapist, obtaining a Master of Marriage and Family Therapy from Trevecca Nazarene University in Nashville, TN in 2006. Following this training, I entered the doctoral program in Marriage and Family Therapy at Florida State University and will graduate with this degree in the summer of 2014.