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# Attitudes and Barriers Affecting Hearing Aid Use in Hispanics Living in the U.S. Borderland Region

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ATTITUDES AND BARRIERS AFFECTING HEARING AID USE IN  
HISPANICS LIVING IN THE U.S. BORDERLAND REGION

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Master's Program in Speech Language Pathology

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## **Dedication**

This is dedicated to my parents, Mr. and Mrs. Sotelo, for their endless devotion, support, and time spent towards helping me achieve my life's aspirations.

ATTITUDES AND BARRIERS AFFECTING HEARING AID USE IN  
HISPANICS LIVING IN THE U.S. BORDERLAND REGION

by

LOREN RENEE SOTELO, BMS

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## Abstract

Hearing loss can affect a person's overall quality of life, and has been linked to depression and dementia in older adults (Brewster, Ciarleglio, Brown, Chen, Kim, Roose, Golub & Rutherford, 2018; Ciorba, Bianchini, Pelucchi, & Pastore, 2012). In the largest study to date of hearing loss among Hispanic adults residing in the U.S., researchers found that nearly 1 in 7 has hearing loss, which is close to the overall national average (National Institutes of Health, 2015). Currently, hearing aids are the primary/most effective treatment for an age-related hearing loss; Unfortunately, the adult uptake rates are low (Chien & Lin, 2012; Gates, Cooper, Kannel, & Miller, 1990; Lee, Carlson, Lee, Ray, & Markides, 1991). The prevalence of hearing aid use among Hispanics is even lower, and has been estimated to range from 2% to 11% in Mexican Americans (Lee et. al., 1991). However, factors that may contribute to low hearing aid use in Hispanics remain unclear. Thus, we examined the incidence of hearing loss and the attitudes and/or barriers towards hearing aid use among Hispanic adults living in the Borderland region.

A total of 181 Hispanic adults, ages 42-93, from the Paso Del Norte (El Paso, Texas) region of the U.S. participated in this study. Participants completed the Hearing Handicap Inventory Screening Questionnaire for Adults (HHIA) and a hearing aid attitudes survey, which consisted of questions related to hearing loss and hearing aids, as well as, questions regarding general demographic information. Both surveys were administered in paper and pencil format. Last, participants' hearing thresholds were screened at 25 dB HL at 1000, 2000, and 4000 Hz (ASHA, 2018). Results indicated that 63.8% of participants indicated that they would use hearing aids. Logistic regression analysis indicated participants' self-reported hearing handicap was the best predictor ( $p < .05$ ) of an individual's willingness to use hearing aids. Perception of not needing hearing aids was the most commonly cited reason for the nonuse of hearing aids.

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# Chapter 1: Introduction

## 1.1 Presbycusis

Presbycusis, which is the gradual degradation of hearing threshold levels due to the aging process (age-related hearing loss), poses communicative barriers and difficulties with speech discrimination in older adults (Wong & McPherson, 2010). As a person ages, the auditory system goes through a series of changes, which decreases the sensitivity of the cochlea to, primarily, high frequency sounds (Ciorba, Bianchini, Pelucchi, & Pastore, 2012; Dalton, Cruickshanks, Klein, Klein, Wiley & Nondahl, 2003; Gates & Mills, 2005; Heine & Browning, 2002; Sprinzi & Riechelmann, 2010; Wong et al., 2010). These changes manifest bilaterally and symmetrically in the auditory system, and progress slowly as a person ages (Ciorba et al., 2012; Dalton et al., 2003; Gates & Mills, 2005; Heine et al., 2002). Specifically, degeneration of hair cells in the cochlea, a decline in the cochlear metabolic system, and spiral ganglion neuron loss is thought to be involved in presbycusis (Frisina & Walton, 2001). Since presbycusis progresses slowly and gradually, older adults may not notice that these changes to their auditory system are occurring, or they choose to not acknowledge their hearing loss symptoms and blame the speaker for their communication breakdowns; A person with presbycusis may say that others “mumble, do not speak clearly, or speak too softly” (Doherty & Desjardins, 2015).

Presbycusis initiates in the areas that are sensitive to high frequencies (Ciorba et al., 2012; Dalton et al., 2003; Doherty et al., 2015; Gates et al., 2005; Harrison, Nagasawa, Smith, Stanton & Mount, 1991; Heine et al., 2002; Robertson & Irvine, 1989). Consonants are high frequency phonemes that carry the bulk of meaning in speech, making them imperative to the auditory-oral communication process. Thus, a high-frequency hearing deficit can be significantly detrimental to effective communication. This communication breakdown due to presbycusis can lead to poor

interaction with others and further increases the risk of social isolation (Appollonio, Carabellese, Frattola & Trabucchi, 1996; Chou & Chi, 2004; Gates, Murphy, Rees & Fraher, 2003; Kochkin & Rogin, 2000; Wong et al., 2010). Research investigating the impact of untreated presbycusis on the elderly population has concluded that more serious medical conditions may be attributed to presbycusis, including declines in cognition, the onset of anxiety, social isolation, and depression (Ciorba et al., 2012; Dalton et al., 2003; Gates et al., 2005; Heine et al., 2002). Furthermore, a breakdown in sound localization also occurs due to presbycusis, which poses safety risks on those involved (Abel, Giguere, Consoli & Papsin, 2000; Dobрева, O'Neill & Paige, 2011; Noble, Byrne, & Lepage, 1994; Rakerd, Vander Velde & Hartmann, 1998).

As suggested by definition, the primary risk factor for presbycusis is advanced age, and presbycusis has been identified as the leading cause of hearing impairment in the elderly population (Ciorba et al., 2012). In fact, 63.1% of older adults in the United States have some degree of hearing loss (Lin, Thorpe, Gordon-Salant & Ferrucci, 2011; Lin, Niparko, & Ferrucci 2011). It is estimated that approximately 1 in 7 Hispanic/Latino adults in the United States has hearing loss (American Speech-Language-Hearing Association [ASHA], 2015; National Institutes of Health, 2015). The prevalence of hearing loss has been shown to be greater in Hispanics and non-Hispanic whites than non-Hispanic blacks across the age spectrum (Goman & Lin, 2016).

The prognosis for individuals with presbycusis is the continual degradation of hearing abilities; Unfortunately, presbycusis, which is a sensorineural type hearing impairment, cannot be reversed through medical or surgical intervention (Garstecki & Erler, 1998). Hearing aids continue to be the prime treatment option for patients with presbycusis (Garstecki et al., 1998). However, research has demonstrated that it takes most individuals approximately ten years after first noticing the symptoms of a hearing loss to seek intervention options (Davis, Smith, Ferguson, Stephens &

Gianopoulos, 2007; Doherty et al., 2015). Therefore, it is essential to identify hearing impairment early in order for the individual to receive treatment in a timely manner.

## **1.2 Identifying Hearing Loss in Older Adults**

The Hearing Handicap Inventory Screening Questionnaire for Adults (HHIA), also known as the Hearing Handicap Inventory for the Elderly Screening Version (HHIE-S), is a survey that was developed to measure an older adult's perceived social-situational and emotional consequences of hearing loss (see Appendix 2) (Nondahl, Cruickshanks, Wiley, Tweed, Klein & Klein, 1998). Completion of the survey results in an index of the person's perceived hearing handicap (Nondahl et al., 1998). The HHIE-S has been shown to be a valid tool for identifying hearing impairments in the aging population (Lichtenstein, Bess, & Logan, 1988). A study investigating the discriminating accuracy for correctly identifying individuals with hearing loss discovered that the HHIE-S achieved the highest accuracy (79% of individuals were correctly identified) among common hearing screeners (Murlow, Tuley & Aguilar, 1990). Specifically, the HHIE-S demonstrated higher true positive results when compared to the Revised Quantified Denver Scale of Communication Function screening version (RQDS-S) (Murlow et al., 1990). Investigators concluded that the HHIE-S is of high value for screening and assessing older adults with hearing deficits (Murlow et al., 1990).

The HHIE-S was adapted for Mexican-Americans who speak Spanish (Lichtenstein & Hazuda, 1998). The Spanish version of the HHIE-S was validated through regression analysis to be appropriate for Spanish speaking Mexican-Americans (Lichtenstein et al., 1998). Following a five-step process created by Flaherty, Gavira, and Pathak to establish "cross-cultural equivalence", the HHIE-S was translated into Spanish (Flaherty, Gaviria, Pathak, Mitchell, Wintrob, Richman, & Birz, 1988; Lichtenstein et al., 1998). The five-step process included assessing the following

dimensions of equivalence: content equivalence, semantic equivalence, technical equivalence, conceptual equivalence, and criterion equivalence (Flaherty et al., 1998; Lichtenstein et al., 1998). Regression analysis revealed that the English and translated HHIE-S (Spanish version) were equivalent ( $p=1.00$ ) (Lichtenstein et al., 1998).

Other research has demonstrated high accuracy in identifying a hearing loss in older Hispanic adults based on the single question ‘Do you feel you have a hearing loss?’ (Torre III, Moyer & Haro, 2006). Research results indicated that the prevalence of the presence of a hearing loss in older Latino American adults amounted to 57.6%; 53.6% were women and 59.3% were men who self-reported hearing loss (Torre III et al., 2006). The sensitivity, specificity and accuracy were calculated by using the question ‘Do you feel you have a hearing loss?’ compared to thresholds tested at 500 Hz, 1,000 Hz, 2,000 Hz, and 4,000 Hz (Torre III et al., 2006). Sensitivity equaled 75.7%, specificity equaled 72.7%, and accuracy equaled 74.6% (Torre III et al., 2006). Researchers concluded that medical professionals can screen Latino American patients, specifically adults, for hearing loss using the single question ‘Do you feel you have a hearing loss?’ (Torre III et al., 2006).

### **1.3 The Consequences of Untreated Presbycusis**

The consequences attributed to untreated presbycusis are thoroughly documented in the literature across time (Amieva, Ouvrard, Giulioli, Meillon, Rullier, & Dartigues, 2015; Bae, Lee, Lee, Jung, Makino, Park, & Shimada, 2018; Boxtel, Beijsterveldt, Houx, Anteunis, Metsemakers, & Jolles, 2000; Brewster, Ciarleglio, Brown, Chen, Kim, Roose, Golub, & Rutherford, 2018; Desjardins & Doherty, 2013; Garstecki et al., 1998; Hidalgo, Gras, Laperia, Martinez, Verdejo, Rabadan, & Puime, 2008; Hornsby, 2013; Lau & McPherson, 2002; National Counsel of Aging, 1999; Weinstein, 2015; Weinstein, Sirow, & Moser, 2016; Wong et al., 2010). For example,

untreated hearing loss can affect the quality of life of an individual, posing additional health-related problems in the elderly population. Lack of adequate hearing can lead to communication breakdown, resulting in social isolation and has been linked to depression and withdrawal in older adults (Appollonio et al., 1996; Chou et al., 2004; Gates et al., 2003; Kochkin et al., 2000; Wong et al., 2010). According to the National Council of the Aging (1999), people who leave their hearing loss untreated are more likely to report the presence of “sadness and depression, worry and anxiety, paranoia, less social activity, and emotional turmoil and insecurity.” Thus, when left untreated, hearing loss can have a devastating impact on psychosocial aspects in elderly people.

Social relationships help the elderly maintain their health (Steptoe, Shankar, Demakatos, & Wardle, 2013; Weinstein et al., 2016). Maintenance of social relationships in the elderly population supports coping with adverse life experiences (Cohen, 2004; Weinstein et al., 2016). Individuals who engage in minimal social interaction, are not engaged, or feel deficient in fulfilling their roles in social interaction are classified as socially isolated or lonely (Nicholson, 2012; Weinstein et al., 2016). It has been noted that hearing loss is considered a risk factor for loneliness in older adults (Weinstein et al., 2016; Wong et al., 2010). As is, the elderly population reports social handicaps regardless of the degree of hearing impairment (Garsetcki et al., 1998; Mulrow, Aguilar, Endicott, Velez, Tuley, Charlip, & Hill, 1990). When an elderly individual with untreated presbycusis is placed in a social environment, communication breakdown occurs.

An elderly individual experiencing the consequences of presbycusis may experience speech discrimination difficulties, which inhibits fluid conversation (Wong et al., 2010). The communication chain is an interactive process (Stark & Hickson, 2004; Wong et al., 2010). Untreated hearing loss negatively affects all whom are involved with the individual with hearing loss, including family and social cliques (Lau et al., 2002; Stark et al., 2004; Wong et al., 2010).

Communicating with an individual with untreated hearing loss can be stressful for the communicator when a person with presbycusis is having difficulty decoding an oral message. Many natural communicative environments are noise-filled, such as restaurants and social gatherings (music, background noise, etc.). Communication breakdown can be further strained with the presence of background noise due to masking of speech signals, decreasing the overall intelligibility of the speaker (Lau et al., 2002; Wong et al., 2010).

As demonstrated by the literature, leaving presbycusis untreated can be detrimental to an individual's cognitive function (Amieva et al., 2015; Bae et al., 2018; Boxtel et al., 2000). Lower cognitive function has been associated with hearing loss in older adults (Amieva et al., 2015; Boxtel et al., 2000). Decreased verbal memory performance has been demonstrated in those with hearing loss compared to older adults with normal hearing (Boxtel et al., 2000). In a study investigating immediate and delayed recall, it was discovered that a mild to moderate hearing loss was predicative of lower performance in verbal memory measures/tasks (Boxtel et al., 2000). In a differing study, the effects of social handicaps on cognitive functioning was investigated in elderly individuals living in Japan. Results suggested that hearing loss, as well as, social frailty were risk factors for mild cognitive impairment (Bae et al., 2018); The authors concluded that their findings were consistent with previous literature showing that untreated hearing loss can result in social frailty due to the lack of socialization (Bae et al., 2018).

Untreated hearing loss may also cause listening to be more effortful for individuals (Desjardins et al., 2013; Weinstein, 2015). Oftentimes, those with hearing loss report that they experience fatigue when trying to communicate with others, especially in communication environments that present with difficult listening situations, such as noisy restaurants and social gatherings (Desjardins et al., 2013; Hornsby, 2013; Weinstein, 2015). This struggle to

communicate leads the person with hearing loss to not engage in the conversation because their effort in listening is of great expenditure, and their “cognitive resources” are depleted (Hornsby, 2013; Weinstein, 2015).

#### **1.4 Management and Treatment of Presbycusis with Hearing Aids**

When treated, the effects attributed to presbycusis can be mediated and managed (Hidalgo et al., 2008; Ruckenstein, 1995). Management of presbycusis involves a series of approaches. Assisting the individual with the hearing loss, as well as family members, is a vital part of this process; This includes providing education, assessments, instruction, orientation, counseling, follow-up audiologic rehabilitation, and evaluating the outcomes of the patient (Valente, 2006). The proper education on the impact of an untreated hearing loss is important for all individuals in order to provide the best resources to improve the patient’s quality of life (Hidalgo et al., 2008). Rehabilitation efforts to increase a patient’s perception of health, as well as, functional adaptation includes the use of hearing aids (Hidalgo et al., 2008; Tolson, Swan & Knussen, 2002).

Other means to facilitate communication in an individual with presbycusis often involves implementation of compensatory strategies. These compensatory strategies include repetitions of the message during conversation and increasing the volume or intensity of one’s voice or sounds, which can be burdensome to family members and others who come into contact with the person with hearing loss (Stark et al., 2004; Wong et al., 2010). Compensatory strategies to cope with hearing loss have been classified as either adaptive or maladaptive in respect to facilitating meaningful communication (Demorest & Erdman, 1987; Gomez & Madey, 2001). Adaptive strategies are those that promote adequate communication while maladaptive strategies do not facilitate communication (Demorest et al., 1987; Gomez et al., 2001). Maladaptive strategies implemented by a person with hearing loss include avoiding specific situations where difficulty

with communication is present, pretending to comprehend the auditory message delivered, and the display of “somewhat aggressive or hostile behaviors” (Demorest et al., 1987). Strategies considered to be adaptive to good communication include making one’s hearing loss known to the listener, “watching lips”, preferential seating options, and “trying to stay in a well-lighted area” (Demorest et al., 1987).

Hearing aids have been shown to be the most effective treatment for presbycusis (McPherson & Wong, 2005; Sprinzi & Riechelmann, 2010; Wong et al., 2010). Research has shown that lessening the effects of hearing loss by using hearing aids can improve the quality of life, psychosocial aspects, and cognition in the older adults with presbycusis (Arlinger, 2003; McPherson et al., 2005; Wong et al., 2010). When compared to individuals with untreated hearing loss, those who choose to treat their hearing loss oftentimes report “better relationships with their families, better feelings about themselves, improved mental health, and greater independence and security” (National Council of Aging, 1999). Research on elderly adults with hearing loss revealed improved scores on the Geriatric Depression Scale-Short Form (GDS), indicating a decline in depressive symptoms (Acar, Yurekli, Babademez, Karabulut, & Karasen, 2011). In a study investigating the impact of hearing aids on elderly hearing-impaired individuals’ quality of life, results indicated reduced “emotional, social, and total scores on the Hearing Handicap Inventory for the Elderly”, indicating that hearing aids yield positive outcomes concerning psychosocial implications (Said, 2017).

In a study directly investigating the impact of first-time hearing aid use on psychosocial issues in older adults, results indicated decreased stigmas against hearing aid use, decreased personal distress and inadequacy due to hearing difficulties, and decreased hearing handicap after six weeks of hearing aid use (Desjardins & Doherty, 2017). Lessening the effects of hearing loss

with the use of hearing aids has also been shown to alleviate the strain experienced by others that come in contact with the hearing-impaired individual, such as caregivers and family members (McPherson et al., 2005; Wong et al., 2010). This is because hearing aids facilitate communication for individuals with hearing loss and help alleviate communication breakdowns.

Hearing aid use has also been shown to improve cognitive function in older adults with hearing loss (Desjardins, 2016; Doherty et al., 2015). Research aimed at identifying the effects of hearing aid use on auditory working memory function revealed that the utilization of hearing aids improved performance on working memory measures and reduced listening effort in background noise (Desjardins, 2016; Desjardins et al., 2013; Doherty et al., 2015). A study investigating hearing loss, hearing aid use, and cognitive decline in the aging French population revealed that those who reported hearing loss, but did not use hearing aids as treatment, declined in cognitive performance (measured by scores on the Mini-Mental State Examination (MSSE)) across the span of twenty-five years (Amieva et al., 2015). Desjardins (2016) examined the relationship between hearing aid use and cognitive function using a single subject experimental design across six participants. Results show that hearing aid use had immediate positive effects on cognitive tasks of working memory, selective attention, and processing speed for all of the participants in the study. Furthermore, a regression towards baseline performance was noted when the use of hearing aids was withdrawn from participants. Results from this study suggests that consistent use of hearing aids may maintain cognitive function in older adults with hearing loss.

As previously mentioned, fatigue has also been identified as a factor in communication breakdown, especially in noisy listening conditions (Hornsby, 2013; Weinstein, 2015). Hornsby (2013) investigated the effect of hearing aid use on listening effort and mental fatigue in older adults. Results showed that older adults had a decrease in mental fatigue and listening effort in

background noise due to hearing aid use. In a study aimed at identifying the cognitive benefits of hearing aid use as treatment in elderly patients, results indicated that first-time hearing aid users demonstrated improved scores on the Mini-Mental State Examination (MSSE) after three-months of hearing aid use, indicating improve cognitive functioning (Acar et al., 2011). A similar study investigating first-time hearing aid use in older adults suggested that hearing aids improved working memory measures after 6 months of wearing them (Karawani, Jenkins, & Anderson, 2018). Hearing aids were also seen to improve “cortical processing of speech stimuli”, which is important to communication (Karawani et al., 2018).

### **1.5 Barriers Towards Hearing Aid Use in Hispanics and Other Populations**

Despite the fact that hearing aids are the most effective therapy option for individuals with presbycusis, they are not highly utilized. Statistics reveal that only approximately 20 to 30% of older adults with hearing loss use hearing aids (Davis, 2003; Kochkin, 2007; Wong et al., 2010). Different factors have been attributed to the nonuse of hearing aids by patients. Studies investigating hearing aid nonuse factors focused on the elderly found that stigma, age, self-perception of hearing handicap, socioeconomic status and affordability were the most significant factors that contributed to the non-use of hearing aids among older adults (Erler & Garstecki, 2002; Garstecki, 1996; Gopinath, Schneider, Hartley, Teber, McMahon, Leeder, & Mitchell, 2011; Wong et al., 2010).

Research examining stigma has shown that hearing aid use is viewed as significantly different from the norm (Erler et al., 2002). Negative associations concerning hearing aid use as an unacceptable form of treatment is thought to lead to the nonadherence of professional guidance and denial of an existing hearing impairment (Erler et al., 2002). Erler et al., (2002) investigated stigma related to hearing loss and hearing aid use in women of varying age groups. They found

that stigma was greatest for younger women, ages 35-45, as opposed to older women, ages 75-85, whose associated stigma for hearing aid use was relatively low. It was concluded that women in their mid-age years began to recognize the benefits and need of auditory amplification, and were more likely to address hearing concerns (Erler et al., 2002). Additionally, women in their eldest years oftentimes acknowledged hearing aid use as usual and familiar, possibly indicating that marketing and health related outcomes are best for this particular age group (Erler et al., 2002). It can be concluded that stigmas related to hearing aid use as a treatment option are relatively low in older adults, especially females.

Other identified reasons for the nonuse of hearing aids included advanced age and SES. In a study investigating age differences, findings revealed that of those who utilize hearing aids, 65% were 65 years of age or older (Garstecki, 1996). Another study found that those who owned hearing aids were older individuals, self-reported the presence of a hearing impairment, have a hearing handicap, and have a hearing loss that exceeded 25 dB HL (Gopinath et al., 2011). Also, previous correlations between hearing aid use and socioeconomic status was identified. Results collected from a study concerning non-adoption of hearing aids among the elderly Chinese revealed that affordability and low socioeconomic status were reasons for not using hearing aids (Wong et al., 2010). Oftentimes, insurance fails to cover the cost of hearing aids, leaving many low SES individuals without the appropriate resources. Trends indicate that the cost of hearing aids will increase due to inflation, signifying that hearing aid use in the future will continue to decline (Garstecki, 1996).

## **1.6 Hispanic Culture and Belief Systems Impacting Health Care and Services**

Hearing aid use in Hispanics has been shown to be lower than in the general population (Gates, Cooper, Kannel, & Miller, 1990; Lee, Carlson, Lee, Ray, & Markides, 1991). Specifically,

hearing aid use has been shown to range from 6% to 14% in Hispanics compared to 14.2% in the general population in the United States (Chien & Lin, 2012; Gates et al., 1990; Lee et al., 1991;). The Hispanic Health and Nutrition Examination Survey was used to study the prevalence of hearing loss and hearing aid use in the aging Hispanic population (Lee et al., 1991). They found that the use of hearing aids by Hispanics with a hearing impairment remained below 12% (Lee et al., 1991). However, the factors related to the nonuse were not examined.

Differences in how illness and health is interpreted exists across cultures (Salas-Provance, Erickson & Reed, 2002). Disability severity, impact on the patient's life, etiology theories, and treatment preferences are some of the topics that have been identified as variants across differing cultures (Salas-Provance et al., 2002). The influence of technology and science has affected many cultures, therefore leading individuals belonging to certain groups to incorporate medical evidence into their existing health belief systems (Applewhite, 1995; Keefe, 1981; Kleinman, 1980; Salas-Provance et al., 2002). Although these advancements in science and technology exist, traditional beliefs are still existent, including in the United States (De la Cancela & Martinez, 1983; Gartner, Libsky & Turnbull, 1991; Salas-Provance et al., 2002; Seligman & Darling, 1997).

The Hispanic population is the fastest increasing minority in the United States, and Hispanics residing in the United States include those of Spanish descent, Puerto Ricans, Cubans, Mexicans, and Central/South Americans (Alvarez, 1998; Salas-Provance et al., 2002). Hispanics' highest values in life include their family members, followed by religious and traditional beliefs (Madsen, 1974; Salas-Provance et al., 2002; Samora, 1963; Zaldivar, 1994;). The Hispanic culture embraces the idea of interdependence, which holds the welfare of the entire group as opposed to the wellbeing of only one individual (Salas-Provance et al., 2002). Beliefs concerning health are

communicated across generations, and home remedies are oftentimes shared by females who are part of the family (Salas-Provance et al., 2002).

Views concerning one's portrayal of masculinity in the Hispanic population may have a negative effect towards health care and treatment. Services are oftentimes left unaccepted to meet social standards held by the Hispanic population. One's desire to portray one's self as "masculine" may lead to the denial of the presence of a disability, viewing rehabilitation services as a sign of weakness (Salas-Provance et al., 2002). Women are not limited to this kind of barrier towards rehabilitation services. Some Hispanic women may fail to acknowledge the presence of a disability to meet the social standards of "endurance" of the aversive effects of one's illness (Salas-Provance et al., 2002; Zea, Quezada & Belgrave, 1994). Hispanic women may aim at achieving a "strong" persona to allow other family members to develop coping mechanisms for life's challenges.

Studies investigating Hispanics' beliefs on the etiologies of illnesses have identified a number of responses. Some of these beliefs are as follows: illness may occur due to temperature imbalance, wearing the inappropriate attire for the day's weather, the "evil eye", fright sickness, premonitions, past wrong-doings, genetics, trauma at birth, and accidents that occurred during childhood (Arnold, 1983; Baer & Bustillo, 1993; Castro, Furth & Karlow, 1984; Jay, 1996; Kiev, 1968; Logan, 1993; Mardiros, 1989; Martinez & Martin, 1996; Mikhail, 1994; Salas-Provance et al., 2002; Smart & Smart, 1991; Trotter, 1982; White, 1997; Zea et al., 1994). Traditional practices within the Hispanic culture to treat illness contain many home remedies, including the use of herbs, and spiritual cleansings performed by healers (Salas-Provance et al., 2002; Spires-Robin & McGarrahan, 1995). Thus, beliefs of the Hispanic community concerning disability and compliance with treatment options may influence hearing aid use and acceptance of the presence

of a hearing loss. Unfortunately, hearing impairment is viewed as a low priority in Latin American health care systems, limiting resources and audiology services available to society (Madriz, 1999).

### **1.7 Purpose of the Present Study**

In summary, prevalence of hearing loss in Hispanics is relatively high (Gates et al., 1990; Lee et al., 1991). Hearing aids have been identified as the prime treatment for presbycusis, however, uptake rates are low in older Hispanic adults (Lee et al., 1991). However, the reasons attributed to the nonuse of hearing aids in Hispanics remain unclear. Thus, the purpose of the current study was to examine the incidence of hearing loss and/or barriers towards hearing aid use among Hispanic adults living in the Borderland region of the United States. We hypothesized that low hearing aid use among older Hispanic adults with hearing loss may be due to negative stigmas concerning hearing aid use and low access to hearing healthcare.

## Chapter 2: Methods

### 2.1 Participants

A total of 181 participants (60 Male; 109 Female; 12 unidentified) were recruited from 5 local senior centers and health fairs located across El Paso county. Out of the 181 participants, 127 met the inclusion criteria for this study which was hearing thresholds greater than 25 dB HL at 1,000, 2,000 and 4,000 Hz bilaterally, and not currently using a hearing aid. Prior to participating in this research study, all participants were given a study information sheet. Approval from the Institutional Review Board (IRB) was obtained before initiating this study in accordance with the University of Texas at El Paso IRB committee.

### 2.2 Materials

#### *The Hearing History Questionnaire (HHQ)*

The HHQ, adapted from Desjardins and Doherty (2009), is a questionnaire which consists of 15 questions related to general participant demographics, SES, hearing status, hearing aid use, and attitudes towards hearing aids (see Appendix 1). To accommodate the needs of the largely Spanish-speaking community in the Borderland region, the HHQ was translated into Spanish by a native Spanish speaker. The questionnaire was then back-translated into English by four Spanish-English bilinguals; two bilingual graduate students in the speech-language pathology program at the University of Texas at El Paso, a professor from the Spanish Department at the University of Texas at El Paso, and a local bilingual older adult from the El Paso, Texas community. The HHQ was piloted on 100 Spanish-speaking older adults at a community health fair. Minor alterations were then made to the HHQ to improve the clarity of the questionnaire in Spanish.

### ***Hearing Handicap Inventory Screening Questionnaire for Adults (HHIA)/ Hearing Handicap Inventory for the Elderly-Screening Version (HHIE-S)***

The Hearing Handicap Inventory Screening Questionnaire for Adults (HHIA) (Ventry & Weinstein, 1983), also known as the Hearing Handicap Inventory for the Elderly Screening Version (HHIE-S), (see Appendix 2) was used to assess participants' hearing handicap. In this study, both the English and Spanish versions were used to best serve the linguistically diverse community of the Borderland. The HHIE-S is composed of 10 questions that relate to situations where a hearing impairment is often troublesome. Participants are asked to respond "NO", "YES" or "SOMETIMES" based on their self-perception of hearing handicap for each given scenario question. Weight for each response is as follows: "NO"= 0, "YES"= 4, "SOMETIMES"= 2. A total score of 0-8 indicates that there is no hearing handicap present, a total score of 10-24 indicates that there is a mild to moderate hearing handicap present, and a total score of 26-40 indicates that the participant has a significant hearing handicap. Scores for each participant were calculated based on their responses.

### **2.3 Procedure**

Participants were presented with a research study information sheet along with the HHQ and the HHIE-S in paper and pencil format. A hearing screening was then administered by a certified hearing screener in the State of Texas, or trained student, according to the American Speech-Language-Hearing Association guidelines for hearing screening (ASHA, 2018). Fail criteria included no response at any of the three frequencies (1,000, 2,000 and 4,000 Hz) at 25 dB HL (ASHA, 2018). Any previous problems with hearing, such as injury, chronic otitis media, or military work, and previous/current use of a hearing aid device(s) were also recorded. Individuals who failed the hearing screening were referred to audiology services available in the area.

## **2.4 Statistical Analysis**

Data from the HHQ, HHIA/HHIE-S and hearing screening results were coded and entered into SPSS v 22 (IBM, Armonk, NY, 2013). Descriptive data analysis was conducted for participants' survey responses. A Logistic Regression was used to determine the factors that were most predicative of hearing aid use among participants.

## **Chapter 3: Results**

### **3.1 Hearing Screening Results**

To be included for participation in the current study, each participant was required to present with a failed hearing screening, and report that they did not currently use a hearing aid. Results for each participant's hearing screening were classified into two groups: Pass or Fail. Criteria for passing the hearing screening included two recorded responses (hand raising or clicker response) at 25 dB HL for all three frequencies (1000, 2000, and 4000 Hz) bilaterally. Out of the 181 participants tested, 54 (30%) passed the hearing screening and 127 (70%) failed the hearing screening. The results indicate that in this study, approximately 7 in 10 of the participants had some degree of hearing loss.

### **3.2 Hearing Demographic Information for Participants Who Met Inclusion Criteria**

#### **Participant Demographics**

Table 3.1 shows the participant demographics.

Of the 127 participants who met the study inclusion criteria (failed hearing screening and did not currently use a hearing aid), 50 identified themselves as male and 77 identified themselves as female. All 127 participants identified themselves as Hispanic and were between 42-93 years of age (Mean= 66.23; SD=11.18). None of the 127 participants reported the current use of hearing aids.

Table 3.1: Participant Demographics

	<i>Frequency</i>	<i>Percent (%)</i>
<b><i>Gender</i></b>		
<i>Male</i>	50	-
<i>Female</i>	77	-
<b><i>Country of Origin</i></b>		
<i>Mexico</i>	97	80.8
<i>United States</i>	21	17.5
<b><i>Employment</i></b>		
<i>Full-Time</i>	15	12.5
<i>Part-Time</i>	15	12.5
<i>Unemployed</i>	18	15
<i>Looking for Work</i>	2	1.7
<i>Home</i>	4	3.3
<i>Retired</i>	66	55
<b><i>Heath Insurance</i></b>		
<i>None</i>	41	33.1
<i>Employer</i>	8	6.5
<i>Governmental Assistance</i>	55	44.4
<b><i>Previous Employment</i></b>		
<i>Private</i>	6	4.8
<i>Other</i>	12	9.7

The majority of the participants (80.8%) reported that Mexico was their country of origin. Over half of the participants (55%) were retired, followed by part-time and full-time employed (12.5%). Approximately 70% of the participants reported that they have some form of health insurance, with the majority (44.4%) claiming a governmental form of assistance (i.e., Medicaid and/or Medicare).

### **3.3 Hearing Handicap**

Percentages for reported hearing handicap severity were calculated for the 127 participants who met the inclusion criteria. 55.4% percent of participants indicated that they had no hearing handicap, 28.1% indicated that they had a mild to moderate hearing handicap, and 16.5% indicated that they had a severe hearing handicap.

### **3.4 Participants' Response to the question "Would you use a hearing aid to treat your hearing loss?"**

Responses to the question "If you did have a hearing loss, would you obtain hearing aid(s) for treatment?" on the Hearing History Questionnaire revealed that 36.2% of participants responded "NO" and 63.8% responded "YES". The 36.2% percent of participants who responded that they would not utilize hearing aids to treat their hearing loss were prompted to answer the supplementary question, "If you answered "No" Why not? (choose all that apply)". Responses and percentages for the nonuse of hearing aids to treat a hearing loss are as displayed in Table 3.2. The most commonly cited reason for the nonuse of hearing aids was the participant's perception of their need for them followed by the inability to purchase hearing aids.

Table 3.2: Reported Reasons for the Nonuse of Hearing Aids

<i>Reported Nonuse Reason</i>	<i>Percentage (%)</i>
<i>I don't know where to obtain hearing aids.</i>	9.5
<i>I can't afford to obtain hearing aids.</i>	33.3
<i>I don't need them.</i>	40.5
<i>It would embarrass me to have to wear a hearing aid.</i>	9.5
<i>From what I know, hearing aids don't help a great deal.</i>	2.4
<i>Other</i>	11.9

### 3.5 Factors Predictive of Hearing Aid Use

A Logistic Regression was performed to determine the best model to predict the utilization of hearing aids to treat presbycusis among Hispanics. The dependent variable was the question “Would you use a hearing aid to treat your hearing loss?” The independent variables were age, gender, employment, highest grade completed, HHIA/HHIE-S score, and health insurance status. The variable in the model that was most predictive of hearing aid use was participants’ hearing handicap (see Table 3.3).

Table 3.3: Best Model Predictive of Hearing Aid Use in Hispanics

	<i>B</i>	<i>S.E.</i>	<i>df</i>	<i>Significance</i>	<i>Exp (B)</i>
<i>Age</i>	-.005	.031	1	.867	.995
<i>Gender</i>	.135	.496	1	.785	1.145
<i>Employment</i>	-.962	.747	1	.198	.382
<i>Highest Grade</i>	.057	.052	1	.276	1.059
<i>Hearing Handicap</i>	.094	.028	1	<b>.001</b>	1.099
<i>Health Insurance</i>	.397	.603	1	.511	1.487
<i>Constant</i>	-.515	2.178	1	.813	.597

## Chapter 4: Discussion

The current study examined hearing loss and hearing aid use among Hispanics in El Paso, Texas. We found that approximately 7 in 10 Hispanics failed the hearing screening in this study, indicating that nearly 70% of the individuals tested had some degree of hearing loss. Results from this study exceed findings with previously conducted research concerning hearing loss statistics in the Hispanic population. It was previously reported that approximately 1 in 7 Hispanics had some degree of hearing loss, however that statistic included Hispanics between the ages 20-69 years whereas the current study included older adults only (Argawal, Platz, & Niparko, 2008; National Institutes of Health, 2005). Thus, it is likely that the number of hearing screening failures was elevated in the current study, in part, due to the ages of the individuals that were screened (42-93 years old). In the general population, 63.1% of older adults in the United States are thought to have some degree of hearing loss (Lin et al, 2011a; Lin et al., 2011b). The current study indicates an approximate 10% increase in the incidence of hearing loss in Hispanic adults when compared to the general older population. As indicated in earlier research, the prevalence of hearing loss has been shown to be greater in Hispanics and non-Hispanic whites than non-Hispanic blacks (Goman et al., 2016). Given this information, it can be assumed that Hispanics may be predisposed to hearing loss when compared to other individuals for other racial/ethnic groups.

The most significant predictive factor for hearing aid use among older Hispanics in this study was participants' self-perceived hearing handicap scores on the HHIA/HHIE-S. This result is consistent with previous studies that revealed that hearing handicap is significantly associated with hearing aid use among older adults (Wong et al., 2010). For example, Wong et al. (2010) examined the reasons for the nonuse of hearing aids among the elderly Chinese population. They found that 70% of elderly Chinese participants with hearing loss preferred not to use hearing aids

because they had enough residual hearing to communicate to their desire (Wong et al., 2010). In other words, the participants in Wong et al.'s study, similar to the current study, most likely felt that their hearing handicap wasn't severe enough to adopt hearing aids as treatment.

This finding may tie into the fact that the denial of the presence of a hearing impairment was relatively high in this study; A total of 55.4% of the participants who failed the hearing screening scored themselves within a total of 0-8 on the HHIA/HHIE-S, indicating the nonexistence of a hearing handicap when there was a high possibility of one present. This may be attributed to Hispanic beliefs on masculinity and endurance (Salas-Provance et al., 2002). It has been thought that acceptance of a disability is considered a sign of weakness for men and acceptance of a disability in women was a sign of lack of endurance, leading to the denial of disabilities further affecting acceptance of treatment (Salas-Provance et al., 2002). Possibly, denial of the presence of a hearing loss may be attributed to the desire to fulfill social standards and difficulties with accepting the fact that they have a disability.

Healthcare access for Hispanics remains an obstacle for services and medical devices. The second most reported reason for the nonuse of hearing aids by participants was the inability to afford them (33.3%). Thus, financial strain may be deterring individuals from seeking out health/audiological services, further limiting the identification of a hearing loss and the recommendation of hearing aids for treatment. A potential solution to remediate this situation may be through cost-free or low-cost health fairs for the public. Health fairs engage the community and promote self-care through means of education, evaluation and prevention (Dillon & Sternas, 1997). Increasing the available audiologic services (to include, but not limited to, assessment, education and access to hearing aids) through health fairs may have potential to motivate the Hispanic community to take charge of their hearing health and understand the consequences if left untreated.

Another route worthy of consideration is promoting health care services (including audiology) in telehealth/telemedicine format. Telemedicine has shown to speed up access to medical professionals, increase the convenience and money savings for patients, improve access between types of patient care (primary, secondary or tertiary), and improve the quality of patient care (Hjelm, 2005). Another benefit of telemedicine is “improved equity of access to care between and within regions” that was previously denied due to contributing factors, such as socioeconomic constraints and services only located in a particular area (Hjelm, 2005).

Almost half of participants in this study (44.4%) who reported having health insurance relied on some form of governmental assistance, such as Medicaid or Medicare. Variability exists when concerning coverage for hearing aids. The cost of hearing aids is not covered by Original Medicare Part A and Part B (Cross, 2018). Although this coverage is not available for Medicare carriers, hearing examinations are 80% covered of the approved amount under Medicare Part B when a hearing evaluation is medically essential (Cohen-Mansfield & Infled, 2006). Medigap is a private insurance which was developed to absorb costs not covered by Medicare, however, none of the 10 plans available cover hearing aid costs (Cohen-Mansfield et al., 2006). Confusion may also exist that Medicaid does not cover the cost of hearing aids in any of the states since it is a form of governmental assistance like Medicare. Medicaid is a combined federal and state insurance and coverage varies across states (Cohen-Mansfield et al., 2006). Medicaid will cover partial or total costs for hearing aids depending on the state, including Texas (Cohen-Mansfield et al., 2006). Data from the year 2003 revealed that Medicaid coverage for hearing aids for older adults in Texas paid providers \$300, 1 every 6 years, and covered \$62 for an evaluation (Cohen-Mansfield et al., 2006).

Only a small portion (9.5%) of the subjects who failed the hearing screening indicated that they did not like the way hearing aids look and false beliefs concerning the efficacy of hearing aids was also low (2.4%). This may be indicative of the influence of technology and the integration of current medical knowledge into Hispanic belief systems (Salas-Provance et al., 2002). A study conducted on elderly Mexican-Americans found that the reliance on traditional folk-healing practices diminished in their late adulthood and relied more on conventional healthcare providers/practices (Applewhite, 1995). Although Mexican-Americans have strong ties to their cultural beliefs, residing in the United States resulted in the influence of advances in medical technology and available health care services (Applewhite, 1995). Additionally, one's motivation to utilize hearing aids may be related to the extent of the listener's hearing handicap, "personal distress", and "minimization of hearing loss" (Alicea & Doherty, 2017). Possibly, participants in this study may not have been motivated to seek out intervention services for their hearing loss due to these factors.

### **Clinical Implications**

Healthcare professionals should consider the patient perspective on their hearing impairment to make cost-benefit predictions for the patient when considering hearing aids as treatment. Given the results from this research, if a patient believes they do not have a hearing impairment, it is highly likely they will not implement the use of hearing aids. Administering the HHIA/HHIE-S may be helpful in determining patient compliance with hearing aid use. It continues to be evident that affordability remains an obstacle for Hispanics, given that the second most commonly reported nonuse factor was affordability. Based on the findings of this study, professionals should advocate for measures that promote affordability and accessibility of audiological services. Insurance companies must operate with the understanding that untreated

hearing loss increases the risk for other diseases, which therefore impacts their budgeting efficacy. Better patient education concerning the cognitive and psychosocial aspects related to untreated hearing loss should be prioritized. Most importantly, it is essential that professionals fulfill their role as patient advocates and bring awareness to the continual decline (both physical and mental) that hearing loss inflicts. With more knowledge of cognitive and social declines available to the public, it may be possible to prevent chronic life-threatening conditions stemming from untreated presbycusis through insurance coverage and available preventive audiological services.

### **Research Limitations and Recommendations for Future Investigation**

This study's participants were limited to the El Paso, Texas Region. Future studies should investigate barriers/stigmas towards hearing aid use in Hispanics residing in differing parts of the country to compare to the findings of this research study to achieve a comprehensive profile of Hispanics. Additionally, the current study did not investigate marital status, which may be a contributing factor towards hearing aid use. Research has revealed that men without a spouse underutilized hearing aids in comparison to men with a spouse; There was not an identified correlation for women with or without a spouse in terms of hearing aid use (Helvik, Krokstad & Tambs, 2016). Possibly, the use of hearing aids depends on an individual's motivation to communicate with others. One's desire to communicate with a significant other may have led to hearing aid use in men who are in a relationship (Helvik, et al., 2016).

Future research should consider investigating the actual uptake of hearing aids as a form of treatment for presbycusis. As demonstrated in this study, 63.8% of participants who failed the hearing screening reported that they would utilize hearing aids to treat their hearing loss. This study revealed that the intentions of the aging Hispanic population to use hearing aids to treat presbycusis is present, however, this intention does not explain the chronically low uptake rates of

hearing aids. As previously mentioned, hearing aid use by older adults is relatively low in developed countries, ranging from 20 to 30% (Wong et al., 2010). This implies that the intentions to act upon something are oftentimes greater than the action itself. Hispanics' intent to use hearing aids is present, but other factors may be affecting their utilization in everyday life. Additionally, self-perception of hearing handicap in older Hispanic adults in different regions should be investigated to determine if it is a factor contributing to hearing aid use in differing areas of the country.

## **Conclusions**

This study indicated that hearing aid use was correlated with perception of hearing handicap in participants with hearing loss and hearing impairment in the Borderland Hispanic community is relatively high in number (7 in 10 older adults have a hearing loss). Given this information, it can be assumed that Hispanics with hearing loss will continue to dismiss the use of hearing aids if they do not feel that their impairment is severe enough or impacts their daily lives and communication with others. This entails that healthcare providers must educate their patients about the long-term consequences of untreated hearing loss and strongly encourage the use of hearing aids. Additionally, future research should focus on the uptake of hearing aids for treatment. This study indicated that the intention to use hearing aids is existent, however, actual uptake rates may differ.

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## Appendix

### Appendix 1- *Hearing History Questionnaire (HHQ)* (English and Spanish Versions) Hearing History Questionnaire

*Please answer the following questions to the best of your ability.*

1. Age: \_\_\_\_\_ Gender: Female / Male
2. What is your country of origin? \_\_\_\_\_
3. Do you identify as Hispanic or Latino?
  - a. Yes
  - b. No
4. What language(s) do you speak at home?
  - a. Spanish
  - b. English
  - c. Both
5. What language(s) do you speak at work?
  - a. Spanish
  - b. English
  - c. Both
  - d. N/A (nonapplicable)
6. What is the highest grade (or year) of regular school you have completed? (check one.)

Elementary school	High School	College	Graduate School
01_____	9_____	13_____	17_____
02_____	10_____	14_____	18_____
03_____	11_____	15_____	19_____
04_____	12_____	16_____	20+_____
05_____			
06_____			
07_____			
08_____			

**7. What is the highest degree you earned?**

\_\_\_\_\_ High school diploma or equivalency (GED)

\_\_\_\_\_ Associate degree (junior college)

\_\_\_\_\_ Bachelor's degree

\_\_\_\_\_ Master's degree

\_\_\_\_\_ Professional (MD, JD, DDS, etc.)

\_\_\_\_\_ Other specify

\_\_\_\_\_ None of the above (less than high school)

**8. Which of the following best describes your current main daily activities/or responsibilities?**

\_\_\_\_\_ Working full time

\_\_\_\_\_ Working part-time

\_\_\_\_\_ Unemployed or laid off

\_\_\_\_\_ Looking for work

\_\_\_\_\_ Keeping house or raising children full-time

\_\_\_\_\_ Retired

**9. Do you have a form of health insurance?**

a. Yes

b. No

**10. If yes, which form of health care coverage?**

\_\_\_\_\_ employer

\_\_\_\_\_ governmental assistance

\_\_\_\_\_ previous employment

\_\_\_\_\_ private

\_\_\_\_\_ other

**11. Do you currently, or did you ever work in a noisy work environment? (e.g., farm work, factory, newspaper printing press, landscaping, hair stylist)**

a. Yes

- b. No

**If yes, for how many years?** \_\_\_\_\_

**What was/is your occupation?** \_\_\_\_\_

**12. Do you think you have a hearing loss?**

- a. Yes
- b. No

**13. If you did have a hearing loss, would you obtain hearing aid(s) for treatment?**

- a. Yes
- b. No

**14. If you answered “No”, Why not? (choose all that apply)**

- a. I don't know where to go to get hearing aids.
- b. I can't afford to obtain hearing aids.
- c. I don't need them.
- d. It would embarrass me to have to wear a hearing aid.
- e. From what I know, hearing aids don't help a great deal.
- f. Other \_\_\_\_\_

**15. Do you currently use a hearing aid?**

- a. Yes
- b. No

## Cuestionario Sobre El Historia Auditivo

*Por favor conteste las siguientes preguntas lo mejor posible.*

1. **Edad:** \_\_\_\_\_ **Sexo:** Femenino / Masculino
2. **¿Cuál es su país de origen?** \_\_\_\_\_
3. **¿Se identifica usted como Hispano o Latino?**
  - a. Sí
  - b. No
4. **¿Qué idioma habla en su casa?**
  - a. Español
  - b. Inglés
  - c. Ambos
5. **¿Qué idioma habla en el trabajo?**
  - a. Español
  - b. Inglés
  - c. Ambos
  - d. No se aplica
6. **¿Cuál es el nivel más alto de educación que ha obtenido? (Escoga uno)**

Primaria      Secundaria      Preparatoria      Universidad

1 \_\_\_\_\_      1 \_\_\_\_\_      1 \_\_\_\_\_      1 \_\_\_\_\_

2 \_\_\_\_\_      2 \_\_\_\_\_      2 \_\_\_\_\_      2 \_\_\_\_\_

3 \_\_\_\_\_ 3 \_\_\_\_\_ 3 \_\_\_\_\_ 3 \_\_\_\_\_

4 \_\_\_\_\_ 4 \_\_\_\_\_

5 \_\_\_\_\_ 5 \_\_\_\_\_

6 \_\_\_\_\_

**7. ¿Cuál es el nivel escolar mas alto que ha obtenido?**

\_\_\_\_\_ Primaria

\_\_\_\_\_ Secundaria

\_\_\_\_\_ Preparatoria

\_\_\_\_\_ Universidad Tecnológica

\_\_\_\_\_ Instituto Tecnológico

\_\_\_\_\_ Licenciatura

\_\_\_\_\_ Maestría

\_\_\_\_\_ Doctorado

**8. ¿Cuáles de las actividades o responsabilidades lo/a describen mejor?**

\_\_\_\_\_ Trabaja tiempo completo

\_\_\_\_\_ Trabaja medio tiempo

\_\_\_\_\_ Desempleado/a

\_\_\_\_\_ En busca de trabajo

\_\_\_\_\_ Responsable de cuidar a los niños en casa por tiempo completo

\_\_\_\_\_ Jubilado/a

**9. ¿Tiene usted un tipo de Seguro médica/salud?**

a. Sí

b. No

**10. Si la respuesta es sí, ¿cuál tipo de seguro medico o de salud tiene?**

\_\_\_\_\_ empresa o trabajo

\_\_\_\_\_ asistencia del gobierno

\_\_\_\_\_ empresa o trabajo pasado

\_\_\_\_\_ privada

\_\_\_\_\_ otro

**11. ¿Actualmente, o alguna vez, ha trabajado en un ambiente ruidoso? (e.g., trabajo en granja, fábrica, de periódicos, jardinería, construcción, estilista)**

a. Sí

b. No

¿Si es así, por cuántos años? \_\_\_\_\_

¿Cuál es o era su ocupación? \_\_\_\_\_

**12. ¿Usted tiene o padece alguna pérdida de audición?**

a. Sí

b. No

**13. Si la respuesta es sí, ¿usted obtendría un aparato auditivo para corregir su problema?**

- a. Sí
- b. No

**14. Si la respuesta es no, ¿por qué? (escoja todo lo que aplica)**

- a. No sé dónde o como obtener un aparato auditivo.
- b. No puedo comprarlo.
- c. No lo necesito.
- d. Me avergonzaría usar un aparato auditivo.
- e. Según lo que yo sé, los aparatos auditivos no ayudan de gran manera.
- f. Otra razón no incluida: \_\_\_\_\_

**15. ¿Usted utiliza actualmente un aparato auditivo?**

- a. Sí
- b. No

**Appendix 2- Hearing Handicap Inventory Screening Questionnaire for Adults (HHIA/HHIE-S)**

Hearing Handicap Inventory Screening Questionnaire for Adults

1) Answer By Circling **No**, **Sometimes** or **Yes** for each question.  
 2) Do not skip a question if you avoid a situation because of a hearing problem.  
 3) If you use a hearing aid, please answer according to the way you hear with the aid.

	No	Sometimes	Yes
1. Does a hearing problem cause you to feel embarrassed when you meet new people?	0	2	4
2. Does a hearing problem cause you to feel frustrated when talking to members of your family?	0	2	4
3. Do you have difficulty hearing / understanding co-workers, clients or customers?	0	2	4
4. Do you feel handicapped by a hearing problem?	0	2	4
5. Does a hearing problem cause you difficulty when visiting friends, relatives or neighbors?	0	2	4
6. Does a hearing problem cause you difficulty in the movies or in the theater?	0	2	4
7. Does a hearing problem cause you to have arguments with family members?	0	2	4
8. Does a hearing problem cause you difficulty when listening to TV or radio?	0	2	4
9. Do you feel that any difficulty with your hearing limits or hampers your personal or social life?	0	2	4
10. Does a hearing problem cause you difficulty when in a restaurant with relatives or friends?	0	2	4
<b>Totals:</b>			

\* Adapted from: Ventry, I., Weinstein, B. "Identification of elderly people with hearing problems" American Speech-Language-Hearing Association. 1983, 25, 37-42. \*

Interpreting the Raw Score:

- 0 – 8 = 13% probability of hearing impairment (no handicap)
- 10 – 24 = 50% probability of hearing impairment (mild-moderate handicap)
- 26 – 40 = 84% probability of hearing impairment (severe handicap)

## Vita

Loren Renee Sotelo is a graduate student clinician at the University of Texas at El Paso (UTEP) completing her Master's degree in Speech-Language Pathology. Loren completed her Bachelor's degree in Multidisciplinary Studies in 2017 and graduated with honors (Summa Cum Laude). Loren has participated in research in the Aging and Cognition Laboratory since her undergraduate career; Loren has presented her research on hearing aid use in the Borderland Hispanic population at the 2017 Campus Office of Undergraduate Research Initiatives (COURI) Symposium and at the 2017 American Speech-Language-Hearing Association (ASHA) Convention in Los Angeles, California. Loren has been recognized by the Golden Key International Honour Society for outstanding performance in academia. Loren has served as the fundraising officer for the National Student Speech-Language-Hearing Association – UTEP Chapter. Loren aspires to serve the aging Hispanic population following her graduation in May 2019.

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