

University of Nevada, Reno

**Quality of Life of Deaf and Hard of Hearing Individuals in Northern Nevada**

A dissertation submitted in partial fulfillment of the  
requirements for the Doctor of Philosophy in  
Social Psychology

by

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THE GRADUATE SCHOOL

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prepared under our supervision by

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## ABSTRACT

The primary focus of the present study was to explore the relationship between deafness-related factors, cultural competency variables and quality of life indicators among a group of deaf and hard of hearing individuals living in Northern Nevada. A model, that included four deafness-related factors (e.g. age of onset of hearing loss, mode of communication while growing up, type of high school attended and degree of hearing loss), four cultural competency styles (e.g. hearing acculturation, deaf acculturation, biculturalism and marginalism) as well as several quality of life indicators, both subjective and objective, was proposed to examine this issue. It was predicted that all deafness-related factors will influence cultural competency styles and determine which style an individual with hearing loss feel most comfortable with. Regression analysis and qualitative comparative analysis results supported the notion that those deaf people who were born deaf, attended residential school for the deaf, used sign language as a primary mode of communication while growing up and had a significant hearing loss are more likely to be Deaf culture oriented. On the other hand, those who attended public school with no support services for the deaf, relied on their residual hearing and their voicing abilities and had mild or moderate hearing loss are likely to be more Hearing culture oriented. Although previous studies suggested that Bicultural or Deaf culture oriented individuals tend have higher self-esteem and satisfaction with life (Bat-Chava, 2000; Gilman, Easterbrooks & Frey, 2004; Maxwell-McCaw, 2001), this study indicated that those deaf and hard of hearing Northern Nevadans who are more Hearing culture oriented are likely to have higher quality of life. They tend to have higher self-esteem, higher educational level, higher civic well-being and higher income. However, future research is recommended to use a larger and wider sample and include more indicators to find how deafness-related factors and cultural competency influence overall quality of life.

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## CHAPTER 1: INTRODUCTION

Deafness is a unique condition. While it is disabling in a society that relies heavily on aural communication, it can also help deaf people bond together when they otherwise might feel like outsiders in a hearing world.<sup>1</sup> Hearing loss, however, is the only common characteristic found in deaf people. Otherwise, the group is heterogeneous with its members varying widely along demographic factors such as age, gender, and religious affiliation, and also along lines that are uniquely related to deaf people, such as age of onset of hearing loss, preferred mode of communication, and degree of hearing loss (Higgins, 1980).

While there have been an increasing number of studies in the social sciences literature on the psychological well-being or subjective well-being of various minority groups, the deaf constitute a largely understudied group perhaps because of the unresolved status of deaf people as a group.<sup>2, 3</sup> Berry (1994) claims that disabled groups form non-ethnic minorities; yet more and more scholars advocate the notion that deaf individuals do not belong to the disabled category.<sup>4</sup> They claim that being categorized as disabled suggests a kind of “broken-ness” while in fact deafness is not merely the absence of hearing (Berbrier, 2002; Bienvenu, 1989; Senghas & Monaghan, 2002). Rather, it creates membership in a unique cultural minority group characterized by a distinct language (American Sign Language); fundamental norms and values

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<sup>1</sup> *Aural communication* means expressing thoughts and feelings by means related to the ear.

<sup>2</sup> Psychological well-being is defined as the optimal experience and psychological functioning of individuals (Ryan & Deci, 2001), while subjective well-being is the individual’s evaluation of their happiness and it encompasses several domains such as satisfaction with life and self-esteem (Diener, 2000).

<sup>3</sup> It is difficult to obtain an accurate estimate of the number of deaf individuals in the United States. The National Health Interview Survey (2002) indicates that 15% of the total population age 18 or over has hearing problem; however, this figure entails all people with some degree of hearing trouble without hearing aid. Other estimates put the number of functionally *deaf* individuals between 1 and 4 million, or approximately .01% of the U.S. population (e.g., <http://gspp.gallaudet.edu/> or [www.wrongdiagnosis.com](http://www.wrongdiagnosis.com)).

<sup>4</sup> To list all of these scholars is beyond the scope of this study but among the most notable scholars who published extensively in support of the existence of Deaf culture are: Harlan Lane, Susan Kersting, Christopher Krentz, Paul Higgins, Tom Humphries, Carol Padden, Yael Bat-Chava and Heidi Rose.

that are different from those of the hearing majority; organizations; and members who are easily recognized by both members and non-members when they sign (Maxwell-McCaw, 2001).<sup>5</sup>

*Medical model of disability versus Cultural model of deafness*

The discourse on disability versus cultural perspectives on deafness dominates current scholarly discussions on deaf and hard of hearing individuals. Until about 30 years ago, academic literature discussing deafness typically addressed it as a pathology, focusing on cures or mitigation of the perceived handicap. Recently, studies of deafness have adopted more complex sociocultural perspectives, raising issues of community identity and language ideology (Senghas & Monaghan, 2002). Taking either of these perspectives largely determines how one thinks about and treats deaf people.

The medical or pathological model is undertaken by the majority of the hearing population who look at deafness as a disabling auditory condition (Lane, 1993; Reagan, 1995; Senghas & Monaghan, 2002). It is most often advocated by medical doctors and scientists as well as by social welfare professionals who focus on the amount of hearing loss and the various ways this problem can be corrected. The correction is accomplished through cochlear implants and hearing aids, as well as speech therapy and lip-reading (Reagan, 1995). Therefore, the pathological view of deafness is characterized by efforts to help deaf individuals become as much like hearing people as possible (Reagan, 2002). Some deaf people, especially those who lose their hearing suddenly after acquiring a spoken language or more gradually as a result of the aging process, adopt this model as they become less able to function in the hearing world and hope to restore that ability as much as possible (Lane, 1993).

The cultural model of deafness, on the other hand, looks at deafness not as a disability but rather as an asset, in much the same way as it is an asset to be Mexican within the community of

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<sup>5</sup> An accurate census of deaf individuals who use American Sign Language is not available, but most sources rely on Padden's (1987) estimation of 100,000 to 500,000.

Mexicans across the American Southwest. This perspective is predominantly advocated by deaf people themselves, especially pre-lingually deaf people whose primary language is the sign language of their nation or community. In the United States this language is called American Sign Language (ASL). The cultural model is also supported by members of the social networks of deaf people as well as social scientists who seek to identify, define and conceptualize the very essence of what constitutes a culture or cultural model of human experience (see for example Bat-Chava, 2000; Lane, 1993; Maxwell-McCaw, 2001; Padden & Humphries, 1988; 2005; Rose, 1995; Testriep, 1993). From this perspective being deaf is a positive trait because it defines membership in a unique minority culture.

#### *Validity of a Culture*

Cohen (2001) claims that cultures are adaptations to the environment, while Greenfield (1997) argues that cultures are created by processes that occur between, as well as within, generations. From this perspective, groups that do not have any distinctive religion, clothing or diet, and do not even inhabit a particular geographical space they call their own, can still be called cultural (Padden & Humphries, 2005). This definition suggests that culture results from a group of people coming together to form a community around shared experience, common interests, shared norms of behavior, and shared survival techniques. Hispanic-Americans or indigenous people such as the Inuit tribe of Alaska, for example, are such well-known cultural minorities; they are bound together because they are disadvantaged by the beliefs and practices of the majority culture in which they are embedded (Lane, Hoffmeister, & Bahan, 1996; Padden & Humphries, 2005).

These notions are echoed by the advocates of Deaf culture who claim that the very existence of this minority culture is a response to the difficulties deaf people endure in the

Hearing world (Higgins, 1980; Linderman, 1997; Testriep, 1993).<sup>6,7</sup> Virtually all deaf people experience the feeling of rejection from the hearing majority at some point or another in their lives, and this significantly shapes their worldview. At the same time, it also produces anger, hopelessness and fatalism (Linderman, 1997). These hardships bring deaf individuals together to form a social and emotional bond based on shared experiences that no hearing person can completely understand due to their lack of hearing loss (Maxwell, Poeppelmeyer & Polich, 1999).

Culture is a set of learned behaviors of a group of people who have their own language, values, rules of behavior, and traditions (Padden, 1987). In this regard, Deaf people, a unique subset of all individuals with hearing loss, because they have a language, unique behavior patterns, and history that binds them together have the conceptual framework to be viewed as a culture. While members of most cultural minority groups learn their culture from their parents, a distinctive element of Deaf culture is the manner in which children are acculturated. Since ninety percent of all deaf children are born to hearing families (Kyle & Pullen, 1988; Weisel, Dromi & Dor, 1990), they are rarely acculturated into Deaf culture by their parents who are often not familiar with its norms and practices. Rather, they might become acculturated through their peer group later in their lives (Higgins, 1980; Testriep, 1993).

While there are millions of Americans with some degree of hearing loss, the number of those who are culturally Deaf is much smaller. Some deaf people choose not to become culturally Deaf and others do not have the opportunity to participate in this minority culture (cf. Berbrier, 1998; Brubaker, 1994). Since no exact census figures exist, the number is difficult to pin down, but estimates range from 550,000 to one million in the United States and Canada (<http://www.dawnsign.com/journey/index.html>).

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<sup>6</sup>“Deaf” with a capital letter is a sociocultural term referring to those individuals who consider themselves members of the minority group, while “deaf” is an audiological term referring to all individuals with any degree of hearing loss.

<sup>7</sup>“Hearing” refers to the sociocultural condition of being hearing-identified (and by extension, identification with mainstream society and culture) and “hearing” is used to denote audiological condition only (Senghas & Monaghan, 2002).

Membership in the Deaf culture is not determined solely by hearing loss but rather by the individual's choice or opportunity to embrace the language and the core values of the community. In fact, hearing loss is one of the least important criteria used to delineate group membership (Lane, et al, 1996). The use of the cultural label is a declaration of personal identity much more than an explanation of hearing ability. Some people who are audiologically hearing or hard of hearing label themselves as Deaf from the cultural perspective (Senghas & Monaghan, 2002). Deafness is not simply an adjective to describe their difficulty of hearing, it is their chosen identity, a way of life and a different pattern of behavior that are based on the use of vision as the dominant means of communication.

American Sign Language is the single most important element of Deaf cultural identity (Lane, et al., 1996; Reagan, 2002, 1995). It is a visual-manual language that is quite independent of English or any other spoken languages. It is a complete, natural language with its own grammar; rules of word and sentence formation that are different from English and with a vocabulary that does not correspond to that of English. Kyle and Pullen (1988) argue that it is a language in all respects except that it is not spoken. It also does not have a written form, although only a relatively small percentage of spoken languages have written forms. It uses English words called glosses when trying to translate the meaning of ASL signs and for trying to write down ASL sentences (Moore & Levitan, 1993).<sup>8</sup> However, with the invention of the video camera and other technologies, ASL can now be captured and preserved in ways that were impossible before the twentieth century (Reagan, 2002).

Language is not only a communication channel, it is also important because it expresses and transmits cultural mores, values, traditions and history (Dodd, 1995). Indeed, face-to-face communication in ASL – whether in dyads, small groups, or public settings – has an important

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<sup>8</sup> For example, the English sentence: "I gave a man a book" would be translated and written down in ASL in the following way: "I-give-him man book finish".

cultural value that can be seen in the vast range of folklore, creative sign play, cultivation of eloquence and imagination in storytelling, and conversations at social gatherings (Schultz, 2001). These all highlight visual acuity and expressiveness and stimulate pride in Deafness (Testriep, 1993).

In addition to a distinct language, members of the Deaf community also have behavioral norms for eye contact, physical touching, conversational turn taking, and facial expressions that are different from the general hearing population (Janesick & Moores, 1992; Reagan, 1995). Maintaining eye contact is a necessary condition for communication, but tapping at someone's shoulder to draw attention, pointing at others and the extensive use of facial expression and body language are also accepted parts of an encounter. While non-verbal cues are important parts of a spoken language as well, in American Hearing culture they are not considered as significant parts of the conversation as the actual words spoken (Dodd, 1995).

Informality and physical contact are highly valued; giving one another hugs of hello and good-bye is expected as it is considered to promote unity (Lane et al, 1996). The custom of clear communication and blunt talk often startles hearing people who are used to hinting and vague conversation in an effort to be polite. For example, a hearing student who is dissatisfied with their grade is likely to say to their teacher: "Excuse me; I would like to talk with you about my grade". On the other hand, a Deaf student is likely to say: "You gave me a C. Why?" (Lane et al, 1996).

These practices, norms and values are passed from generation to generation during social gatherings. There are a number of events, get-togethers, sports activities that many Deaf people opt to attend often at the expense of spending time with their own hearing families. Many deaf and hard of hearing individuals express isolation and solitariness in hearing groups and often disincline to participate in such gatherings (Maxwell et al., 1999). As Dianne Kinnee explains in her poem: "Being Deaf":

Isolation is no stranger to me.  
 Relatives say hi and bye  
 But I sit for 5 hours among them  
 Taking great pleasure at amusing babies  
 Or being amused by TV. [...]

I'm supposed to smile to show my happiness.  
 Little do they know how truly miserable I am.  
 People are in control of language usage,  
 I am at a loss and really uncomfortable! [...]

Facing the choice between Deaf Event weekend  
 or a family reunion.  
 Facing the choice between the family commitment  
 And Deaf friends.  
 I must make the choices constantly,  
 Any wonder why I choose Deaf friends????<sup>9</sup>

Deaf people not only often choose their friends from the Deaf community but they also often marry within the community. The estimates of the rate of in-group marriage in the Deaf community range from 86% to over 90%, which is a remarkably high rate in contrast to other minority groups in contemporary American society (Preston, 1995; Reagan, 1995). Even though the acceptance of American Sign Language as a foreign language, and the opportunity for more hearing people to encounter deafness and deaf people have increased intergroup marriages, the endogamous marital patterns within the Deaf community remain strong. The preference of deaf individuals for marrying other deaf individuals is a major force in continuing the cohesion of the Deaf community (Janesick & Moores, 1992).

#### *Biculturalism among the deaf*

Even those deaf people who live predominantly within the Deaf culture come regularly into contact with the dominant hearing society around them (Lane, 1995; Maxwell-McCaw, 2001). Therefore, duality is a reality to most of them, and in any event they must learn to function in two very different worlds (Reagan, 2002). As a result of the Americans with

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<sup>9</sup> The full poem by Dianne Kinnee can be read at [http://www.deaf-center.org/being\\_deaf.htm](http://www.deaf-center.org/being_deaf.htm)

Disabilities Act (ADA) of 1990 which requires equal access to public resources and the subsequent technological advances that make this possible, the modern Deaf community is becoming increasingly bicultural (Emerton, 1996).

Biculturalism ensues from both retaining a cultural identity and establishing a positive relationship with a new culture. It entails that the two internalized cultures take turns in the thoughts and feelings of bicultural individuals depending on the context (Hong, Morris, Chiu, & Benet-Martinez; 2000; LaFromboise et al, 1993; Phinney & Devich-Navarro, 1997; Phinney, 1999). In the case of deaf biculturals in the United States, the two cultures entail the minority Deaf culture and the dominant American culture of hearing people. While bicultural deaf individuals navigate between the two cultures, there are others who are part of only the Deaf community or the Hearing world, and consider the two as opposing or even conflicting.

In recent decades, the acculturation literature has attempted to explore whether biculturalism has an impact on the subjective well-being and quality of life of members of minority groups. The empirical studies have resulted in conflicting results: while some claim positive effects (see for example, LaFromboise et al., 1993; Lang, Munoz, Bernal, & Sorensen, 1982), others emphasize the feelings of loneliness and alienation among bicultural individuals (Suarez, Fowers, Garwood, and Szapocznik 1997). These negative feelings may be the result of tension and stress caused by the individuals' efforts to handle the requirements of two different cultures. Research conducted among deaf people yields positive results of biculturalism, but also emphasizes that this positive effect can be similarly found in the case of those deaf individuals who live predominantly in the Deaf culture. In a study about the diversity of deaf identities and their relationship to self-esteem, Bat-Chava (2000) found that identification with the Deaf culture, as well as identification with both the Deaf and the Hearing world, can be considered an asset to one's psychological well-being. These individuals had higher self-esteem than the culturally Hearing or those who do not identify with either the Deaf or the Hearing.

In one of the largest studies conducted to this day about the effects of acculturation style on the psychological well-being of deaf and hard of hearing individuals, Maxwell-McCaw (2001) indicates the same findings. She claims that in terms of psychological well-being, bicultural deaf people do not differ from those who participate predominantly in the Deaf community. Other studies conducted among deaf children placed in public schools show that spending an increasing amount of time within the Hearing world does not have positive effects on the psychological well-being of deaf students; rather, they may result in negative psychological or behavioral outcomes, such as loneliness, emotional insecurity, and social maladjustment (Leigh & Stinson, 1991; Stinson, Whitmire & Kluwin, 1996; Stinson & Whitmire; 1992).

Nevertheless, the above-mentioned studies exploring the connection between biculturalism and the quality of life of deaf people are limited in their scope. They focus on the effects of biculturalism on the self-esteem (Bat-Chava, 2000) or life satisfaction of deaf individuals (Gilman, Easterbrooks & Frey, 2004; Maxwell-McCaw, 2001), but none of them explore its influence on the overall quality of life of deaf people. While subjective well-being and life satisfaction are important domains, they do not fully account for quality of life, a more comprehensive concept in contemporary society that is striving to promote equal access and life conditions to disadvantaged societal groups (Lane, 1996). Satisfaction with life is a cognitive appraisal during which individuals judge their life based on their own selected standards (Gilman, Easterbrooks & Frey, 2004) while quality of life is a more complex construct that entails objectively measurable conditions experienced by an individual and the subjective response to such conditions (Felce, 1997).

While there have been extensive studies about the relationship between biculturalism and psychological well-being, less is known about acculturation and the indicators of sociocultural adaptation, defined as adjustment to the social demands of everyday life in such areas as work and school (Coatsworth, Maldonado-Molina, Pantin & Szapocznik, 2005). Nevertheless, success

in the academic and work settings is also an important indicator of quality of life, and it is a problematic area for most minority groups (Welsh & Foster, 1991). Studies show that compared to their hearing counterparts, deaf individuals tend to have high rates of academic failure and low rates of college enrollment (Rogers, Muir & Evenson; 2003; Siegel, 2000; Schildroth, Rawlings & Allen, 1991). Type of school placement arguably makes a difference, however, there are currently no studies that would examine the role of biculturalism on educational achievement. Some studies state that deaf children placed in mainstream settings, where they presumably use sign language as the primary mode of communication while also learning the values and norms of the hearing society, generally have higher academic achievement than those who attend residential schools for the deaf (Geers, 1990; Kluwin, 1990). However, no research has yet been conducted on the higher educational level that would suggest the outcome of bicultural skills on the academic achievement of deaf students.

Underemployment and unemployment are also common among the deaf (Luft, 2000; MacLeod-Gallinger, 1992; Siegel, 2000). While there is no research study that investigates the influence of biculturalism on employment rates, the deafness-related literature suggests that the ability to interact and communicate with hearing people with fewer difficulties as well as an adequate English literacy level are keys in deaf people's employment opportunities (Luft, 2000; Welsh, 1993). However, more studies are needed in order to find if biculturalism has an influence on the employment rates of deaf individuals. This may have substantial applications for those who work directly with deaf people.

Another important missing element is the investigation of those factors that might determine a deaf person's ability to become bicultural. It is likely that degree of hearing loss, age of onset of hearing loss, preferred mode of communication and other deafness-related factors influence the extent to which a deaf person is competent and comfortable in both the Deaf and the Hearing worlds (Bat-Chava, 2000).

This dissertation is divided into two analytic components. The first component explores the origins of biculturalism in the lives of deaf people from a cultural perspective of deafness, examining whether deafness-related factors influence the ability of deaf people to negotiate between two cultural settings. This question may have significant implications for professionals who work with deaf children by indicating to them how to help these children develop the necessary skills to become competent in both the Deaf and the Hearing worlds. Understanding how deafness-related factors affect biculturalism may lead to specific educational interventions targeted to deaf children with specific deafness-related factors.

The second component of this dissertation examines the effects of biculturalism and cultural competency in general by testing their association with quality of life, both psychological and socio-economic. If, in this exploratory study, cultural competency is linked to psychological well-being, levels of education, and occupational success, then research should further examine the influence of cultural competency on the quality of life of deaf people and explore how biculturalism can be fostered among deaf people.

In Chapter 2, a more extensive review of the current literature on characteristics unique to deaf and hard of hearing individuals, the so-called “deafness-related factors,” is presented. Furthermore, the concepts of cultural competency and biculturalism are defined and developed.

## CHAPTER 2:

### DEAFNESS AND CULTURAL COMPETENCY: REVIEW OF LITERATURE

Contemporary work on acculturation provides strong support for the idea that individuals can successfully integrate two different cultural orientations, two sets of cultural values, attitudes and behaviors (Benet-Martinez, Leu, Lee & Morris, 2002). The literature on the correlates of acculturation and biculturalism is weighted heavily towards examining how these variables are related to psychological well-being (Coatsworth et al., 2005). Biculturalism has been shown to be an important predictor of subjective well-being since it reflects a form of cultural flexibility that allows an individual to access social support and meaning in two different cultural contexts.<sup>10</sup> Several empirical studies have shown the beneficial effect of biculturalism: Berry and Kim (1988), for example, stated that identification with just one culture – either the mainstream or the minority – is more stressful than involvement or identification with both. In a similar vein, Suarez and his colleagues (1997) found an inverse relationship between biculturalism and loneliness and alienation, while Kaplan and Marks (1990) demonstrated a higher level of depression among more Americanized immigrant youth.

#### *Deafness-related factors and cultural competency*

Deaf people form a highly heterogeneous group. The only common factor is their hearing loss, but even the degree of that loss varies considerably. Each of the factors related to deafness may have an influence on what directions a deaf individual's life takes. Based on the existing literature, there are four components that are considered essential in determining the cultural competency of a deaf person: 1) age of onset, 2) degree of hearing loss, 3) type of schooling, 4) communication method used while growing up.

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<sup>10</sup> The terms subjective well-being and psychological well-being are used interchangeably in this study.

### Age of onset of deafness

Congenital deafness is more of a linguistic problem since these deaf people most often do not learn any spoken language correctly. Trying to learn English without the access to the aural channel makes oral language acquisition difficult at best (Overstreet, 1999).<sup>11</sup> It is estimated that a profoundly deaf child has at most a five percent chance of developing intelligible speech (Moore & Levitan, 1992). Speech therapy and the ever-improving assistive technological devices such as hearing aids and cochlear implants may help diminish this problem although they are unlikely to provide a perfect solution. A hearing aid cannot make other people's speech clearer, only a bit louder (Luey, Glass & Elliott, 1995). Deaf children often find hearing aids of limited use in improving hearing and facilitating the development of spoken language skills (Jones et al, 2001).

Cochlear implants do not even do such a thing; deaf people with a cochlear implant are still deaf and they need visual cues in order to understand what others are saying. These electronic devices bring a sense of sound to people who have severe to profound hearing loss. Deafness is most often caused by damage to the hair cells, and the cochlear prosthesis bypasses the normal hearing mechanism (outer, middle and part of the inner ear that includes the hair cells) and electrically stimulates the remaining auditory neurons directly. Once these neurons are stimulated, they fire and propagate neural impulses to the brain which interprets them as sounds (Loizou, 1998). How well deaf people with cochlear implants comprehend spoken words vary greatly. Even though some can follow speech quite well when the range of topics is limited, they still often need to rely on speech reading, gestures and sign language to be able to completely follow a conversation. Generally, individuals who lose their hearing after the acquisition of a spoken language have the best opportunity to benefit from these devices.<sup>12</sup>

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<sup>11</sup> The term *oral* is related to the mouth. The inability to hear makes learning to speak difficult.

<sup>12</sup> This quote and further information about cochlear implants can be found at <http://www.nad.org/site/pp.asp?c=foINKQMBF&b=399061>

Deafness acquired post-lingually creates problems that are different from the problems of those who were born deaf or lost their hearing during their early childhood (Munoz-Baell & Ruiz, 2000; Overstreet, 1999). Late-deafened individuals usually face an entirely different problem: to develop competency in the Deaf community. Hearing loss significantly changes their lives as they adjust and adapt to new communication strategies and often to an entirely different lifestyle. They often retain their speech skills, and are familiar and comfortable with the values and norms of the hearing community, such as polite conversations without blunt interruptions; providing personal space without much physical contact; communicating with fewer gestures and facial expressions (Crowe, 2000). However, these late-deafened individuals have to establish a new identity and recreate their existing social relationships. They also need to learn to rely more on their other senses and face the fact that they cannot hear the voices and sounds of the world any more. Learning to read lips, which is essential for interaction with hearing people, involves a high proportion of guesswork since only about 30% of all spoken English sounds are visible on the lips (Moore & Levitan, 1992). Furthermore, mastering American Sign Language, which is a key to becoming functional in the Deaf community, takes time, commitment and practice (Moore & Levitan, 1992). Studies investigating the connections between deafness-related factors and type of acculturation, suggest that those who become deaf later in life tend to be Hearing acculturated, while the pre-lingually deaf are likely to feel belongingness in the Deaf world (Bat-Chava, 2000; Hintermair, 2007).

#### Degree of hearing loss

Audiologically, hearing can be limited in any degree and in any combination of frequencies (Luey, Glass, & Elliott, 1995). Those with profound hearing loss are often forced to come to terms with their deafness since not even the most developed technological devices can help their hearing significantly. These deaf individuals often spend their time with similar others, and they do not often communicate orally with ease even if they can speak and lipread (Maxwell,

et al., 1999). As a result they prefer to mingle with other deaf individuals with whom communication comes easily and they share similar experiences and a common fate conducting their lives in a predominantly hearing society (Higgins, 1980; Overstreet, 1999).

Those who have lesser hearing loss may try to conceal their deafness. They have some residual hearing that enables them to hear some of the sounds and voices around them. With the help of such cues as face-to-face communication with eye contact, lip-reading and body language, they are often able to conduct a fairly smooth conversation with hearing people in spoken English. On the other hand, they often struggle to develop skills to get along in the Deaf community. Many of them do not learn to communicate in sign language which is an essential requirement to become part of the community of Deaf people.

Currently existing literature claims that those with a higher degree of hearing loss tend to be Deaf acculturated while those with a severe but not completely profound hearing loss tend to be more biculturally oriented (Hintermair, 2007). Although Laszlo (1994) proposes that hard of hearing individuals who learn to sign have the greatest flexibility in shifting between the Deaf and the Hearing cultures, a study by Hintermair (2007) indicates that those with a progressive hearing loss or with a lesser degree of hearing loss are likely to be Hearing acculturated (Hintermair, 2007).

#### Type of schooling

As a result of the various public laws concerning the education of children with disabilities, deaf children today have various placement options. They can be placed in different educational environments that can be ordered along a continuum from residential schools for the deaf to oral education with predominantly hearing students. The kind of school they attend can significantly influence how they make sense of who they are and how they react to both the Deaf and the Hearing worlds (Jones et al., 2001).

In residential schools all students are deaf and American Sign Language is the primary mode of communication. According to the Annual Survey of Deaf and Hard of Hearing Children and Youth conducted by the Gallaudet Research Institute, in the 2003-2004 academic year 27% of deaf children attended special schools or residential schools for the deaf where classroom instruction is conducted by specially trained teachers through sign language. Children learn and socialize in an environment that fosters the acceptance of deafness rather than treating it as a deficiency. These schools often provide speech therapists and strongly encourage vocational training, but they generally do not prepare students to achieve the educational level and learn the social skills that are important to function well in the hearing society (Jones et al., 2001; Kluwin, 1999; Van Gurp, 2001).

In contrast, deaf students who are placed in schools where most students are hearing and sign language is not encouraged may feel isolated because they cannot participate in the activities of other students (Jones et al., 2001). Inclusion of deaf students in public schools where the instruction is conducted in English with the use of sign language interpreters or other assistive devices has been the most common model since the 1990s. The National Center for Education Statistics (2002) reported that 35.4% of deaf students received services in general education classes in 1995-1996 (Stinson & Kluwin, 2003). In the 2003-2004 academic year, this number jumped to 46%. These deaf individuals often have higher educational attainment than deaf students attending residential schools but they rarely form close relationships with hearing people (Kluwin, 1999; Stinson, Whitmire & Kluwin; 1996) as a result of the communication barrier. At the same time they are likely to have limited contact with other deaf people, especially adults (Reagan, 2002).

Another increasingly popular form of inclusion is the self-contained classroom. Inclusion with a resource room provides a dual learning environment in which deaf children learn their core subjects in the resource room but are in a regular classroom with hearing children for their non-

core subjects such as art or physical education. Self-contained classrooms are also located in regular public schools with teachers who are specially trained in deaf education. These classrooms only contain children who are deaf and they have restricted opportunities to interact with their hearing peers (Marschark, 1997). However, the goal for all students in this educational environment is to become functionally bilingual in both American Sign Language and in English. In addition, it gives deaf students the opportunity to study not only the common curriculum shared with their hearing peers but also history of Deaf culture and Deaf communities around the world. In this way, they can become essentially bicultural: able to function competently and comfortably in the Hearing world while still at home within the Deaf community as well (Gilman et al., 2004; Reagan, 2002). A study conducted by Hintermair (2007) indicates that those who have attended a school for the deaf tend to be more Deaf acculturated, while those who have attended regular schools tend to be more Hearing acculturated.

#### Communication method used while growing up

Language is the key to communication. It is not merely a series of utterances or signs, but a communication system that requires knowledge of referents, cultural symbols, and socially shared meanings of contexts, and such knowledge is intricately connected to the ability to relate to others (Stinson & Whitmire, 1992). The medical model of deafness, which considers deafness as a disability or deficiency that must be cured, places emphasis on learning to speak and read lips at all costs in a spoken language (Berbrier, 2002). It supports the use of hearing aids and cochlear implants from an early age based on the belief that they would enable deaf children to learn to speak (Jones et al., 2001). This approach often denies the validity or linguistic nature of signing altogether (Senghas & Monaghan, 2002).

Communicating through American Sign Language (ASL) is the most important requirement for being able to get along in the Deaf culture in the United States (Reagan, 1995).

Those deaf individuals who are born to Deaf parents learn ASL as their first language, whereas deaf children with hearing parents often learn to sign from other deaf individuals later in their lives. Not all deaf people who consider ASL as their preferred form of communication sign fluently, but many of them accept and respect it as an important and distinct language (Moore & Levitan, 1992).

There are Deaf people who deem ASL as their primary mode of communication because it enables them to easily express their feelings and thoughts to similar others and those who are fluent at the language. Yet, many of them also speak well enough to feel comfortable interacting with hearing individuals who cannot sign. They have the greatest flexibility in establishing relationships and functioning well in both the Hearing and the Deaf community since they can switch to the most appropriate mode depending on with whom and in what context they are communicating (Stinson & Whitmire, 1992; Testriep, 1993). A study conducted by Hintermair (2007) confirms this idea claiming that those deaf and hard of hearing individuals who can sign are either connected to the Deaf world or are bicultural, i.e., competent in both the Deaf and Hearing cultures.

### *Cultural competency*

Studies conducted on biculturalism have proposed a number of different characteristics that may be important for an individual to be able to successfully navigate between two cultures. LaFromboise and her colleagues (1993) focused on the behavioral aspects of biculturalism and claimed that it entails the ability to display culturally appropriate behaviors in both the mainstream and the minority cultural settings. Others, such as Benet-Martinez and her colleagues (2002) as well as Phinney and Devich-Navarro (1997) discussed the influence of the psychological aspects (i.e. identity). In their definition, bicultural individuals are able to

negotiate two sets of cultural values, attitudes and expectations within themselves, that is, they possess a dual cultural identity (Phinney, 1999).

Following in the footsteps of Birman (1994), who emphasized the necessity to consider both aspects, this study focuses on the following dimensions in assessing the cultural competency of deaf individuals: (a) the psychological component of identification with the majority and the minority culture; as well as the various behavioral aspects such as (b) communication ability, (c) knowledge of cultural beliefs and values, and (d) attitude toward the hearing and the deaf.

#### Psychological component of cultural competency

The first aspect of cultural competency is identification with a culture. Our identity tells us where we fit into the world. Most people experience a sense of belonging within at least one but more often several social groups and develop identification with them through an interactional process (Crocker, 1993). Glickman (1993), using racial and ethnic identity development models as a theoretical framework, established a Deaf/Hearing cultural identity paradigm consisting of four cultural orientations potentially applicable to deaf people: the culturally Deaf, the culturally Hearing, the culturally marginal, and the bicultural.

The *culturally Deaf* are deaf people who fully identify with the Deaf culture and tend to reject Hearing values, most importantly the emphasis on aural communication. These deaf people do not consider themselves handicapped or disabled but as members of the Deaf community and often take pride in belonging to this community (Munoz-Baell & Ruiz, 2000). They are not preoccupied with their hearing loss even though they know that it blocks them in their everyday life (Higgins, 1980). Their ties with the Deaf community are a strong part of their identity, and they try to separate themselves from the Hearing community which they consider threatening to this identity (Lane et al., 1996).

The *culturally Hearing* are deaf people who are also called “think-hearing” because for them, hearing norms and values are the reference points, and the role of deafness in their identity

is not emphasized. They are generally characterized as people with “hearing minds and deaf ears”. Even though they are audiologically deaf, they prefer to socialize with hearing people, they use their voice and lip-reading skills to communicate and generally speaking they think like hearing people, all of which are negatively valued in the Deaf culture (Lane, 1993).

The *culturally marginal* are deaf people who do not fit into either the majority society or the Deaf community (Leigh, Marcus, Dobosh & Allen, 1998). They are usually caught between the two worlds with the feeling that they do not belong to either of them. They are considered deaf by the hearing but not really deaf by the Deaf world. They are audiologically deaf and cannot fully fit into the Hearing world around them as a result of communication difficulties but they do not adopt the values of Deaf culture which excludes them from the Deaf world as well.

Hintermair (2007) claims that it is generally the older people with progressive hearing loss that are more marginalized.

Finally, the *biculturals* are deaf people who identify with both the Hearing and the Deaf worlds. They are proud of their Deaf cultural traditions, but they are also comfortable with pursuing their own individual interests in the majority society. They possess the skills to move comfortably back and forth between the two groups (Emerton, 1996; Leigh et al., 1998; Testriep, 1993).

Benet-Martinez et al. (2002) claim that minority and majority group identifications are independent of one another. This view is reinforced by several research studies showing that ethnic identity scores are uncorrelated with American identity scores (LaFromboise et al., 1993; Oetting & Beauvais, 1991; Phinney & Devich-Navarro, 1997). Rather than possessing unchanging, internalized worldviews that color their experiences in a continuous way, individuals are able to move between cultural meaning systems depending on the context they find themselves in. This suggests that the identification process is bi-directional; people identify with the majority society and their minority group separately (Coatsworth et al., 2005; Ryder, Alden &

Paulhus, 2000). As a result, deaf people can also develop a positive sense of identity as Deaf persons while at the same time embracing the cultural values, attitudes, beliefs and behaviors of the larger American culture. The everyday experience of deaf people may be different from that of hearing people which may result in a different identity construction. However, this does not restrict deaf people from sharing many of the same beliefs and perceptions as hearing individuals or from participating in many of the activities of mainstream American life (Humphries, 1994).

#### Behavioral components of cultural competency

The first behavioral component of cultural competency is knowledge of cultural beliefs. Cultural awareness and knowledge involves the degree to which an individual is aware of and knowledgeable about the history, values, norms and everyday practices of a given culture. In many cases, deaf people have limited knowledge of the majority society's cultural and behavioral norms since as a result of their hearing loss, many of the usual means by which hearing people gain knowledge about another culture are not readily accessible to them (Brubaker, 1994).

Deaf people have distinctive behavioral and cultural patterns, many of which have been developed in order to help them function in the hearing society. These practices tend to be significantly different from the norms generally accepted by hearing people. For example, deaf people may touch someone's shoulder, stomp on the floor or flicker the lights to gain other people's visual attention, but hearing people may interpret these behaviors as overly intimate or rude, respectively. Even when deaf people are familiar with the different social norms of the Hearing world, following them can be difficult (Foster, 1998). For example, unless the hearing person stands in front of deaf people and seeks eye contact with them, they do not acknowledge the hearing individual and do not engage in any kind of conversation with them. The seemingly simple rules of greeting, apologizing, and conversational turn-taking might be broken for deaf people without the appropriate visual cues.

There are deaf individuals who never come into contact with Deaf culture and consequently do not know American Sign Language, and are unaccustomed to the different social practices of members of Deaf culture, such as tightly-knit personal relationships, extensive use of body language and facial expression. As a result, they often feel uncomfortable or socially isolated among their deaf peers (Kersting, 1997; Kluwin, 1999). Kersting (1997), however, reports that once deaf college students learn to sign and interact more with other deaf peers, they usually develop bonds with the Deaf world.

The second behavioral component of cultural competency is communication. Communication used while growing up is treated in this study as a deafness-related factor that might influence bicultural competence. Here, communication is treated as a component of bicultural competence but it is going deeper than a simple matter of language use; it dissects the particulars that lead to the mastery of a language and the ability to convey abstract meaning and feelings.

Communication is a vehicle by which people transmit and receive information and convey meaning to each other. It is also used to express feelings or develop relationships (Foster, 1998). Communication can be conducted in a variety of languages, and language competency is a major building block of bicultural competence (LaFromboise et al., 1993). Since deafness represents a communication barrier, this dimension may have extensive relevance in the cultural competency of deaf people.

While other linguistic minority groups in the United States have the opportunity to learn to speak English, learning a spoken language is problematic for most deaf individuals (Overstreet, 1999). It is a significant misjudgment to expect deaf people to be fluent in any spoken language. Hearing people absorb a spoken language through their ears which is not available for many deaf people with anything more than a mild hearing loss (Overstreet, 1999). When their parents are hearing and converse with their deaf children without sign language, either a low percentage of

the linguistic content is accurately exchanged or the conversation is severely limited or simplified (Obrzut, Maddock & Lee, 1999). Even if they establish some communication pattern with their family members, it is often rudimentary and does not allow for the exchange of more abstract ideas and feelings or full participation in everyday family life.

Since most hearing parents emphasize the necessity of learning to speak, most deaf individuals have frequently scheduled visits with speech language pathologists throughout their childhood years where they strive to learn speech articulation. Quigley and Kretschmer (1982), however, argue that severely and profoundly deaf children are unlikely to achieve natural fluency in a spoken language despite intensive training in speech and lip reading. Since they do not hear themselves, they cannot control the pitch and the inflection or loudness of their voices. As a result, stalled communications are everyday experiences for many deaf people who often have to realize that despite years of speech therapy, their voice is not clear enough to be understood by a hearing listener (Moore & Levitan, 1993). Those with profound deafness are also often unable to understand hearing people.

Mastery of written English also poses a challenge to deaf individuals (Margellos-Anast, Hedding, Perlman, Miller, Rodgers, Kivland, DeGutis, Giloth & Whitman, 2005). Only ten percent of deaf adults in the United States are literate in English, and the average deaf high school graduate reads and writes on a 5th grade level (Overstreet, 1999). The blame is often put on hearing professionals who equate communication with speech and stress the importance of learning to speak instead of teaching deaf children a language and to read (Kolod, 1994; Moore & Levitan, 1993; Overstreet 1999). Since they do not have the required literacy and a reasonable degree of fluency even in written English, most deaf individuals cannot read for pleasure or follow the closed-captions offered to them by most television programs. Therefore, their ability to understand the Hearing world is restricted (Brubaker, 1994).

The first language of more than half of all Americans with a significant hearing loss and of most culturally Deaf people living in the United State is American Sign Language. However, most of them are not bilingual mainly because they are not fluent in English (Margellos-Anast et al., 2005). Overstreet (1999) claims that deaf children of deaf parents who learn ASL as their first language do better than deaf children of hearing parents in academic achievement, the ability to use a language, and emotional and social maturity. In addition, they also do better in learning to read and write in English as they often do so through American Sign Language. On the other hand, deaf children of hearing parents are claimed to enter the educational setting without any functional language (Moore & Levitan, 1993).

Kannapell (1989) proposed six communication categories into which deaf people in the U.S. can be classified. Since this study focuses on biculturalism in general, the three bilingual subcategories (ASL dominant bilinguals, balanced bilinguals and English dominant bilinguals) are merged into one category: bilinguals. As a result, based on their communication ability, deaf people are designated into the following groups: (1) ASL monolinguals; (2) Bilinguals; (3) English monolinguals, and (4) Semilinguals.

*ASL monolinguals* express themselves and understand others well in American Sign Language, and have no or very limited skills in English. *Bilinguals* express themselves and understand others well in both ASL and English. *English monolinguals* express themselves and understand each other well in English, but have no or very limited skills in ASL. Finally, *semilinguals* have some skills either or both in ASL and English but do not express themselves or understand others well in either.

Stinson and Whitmire (1992) suggested that those students who are proficient in both speech and signing are likely to enjoy the greatest flexibility and ability to shift from one culture to the other and establish relationships with both hearing and deaf peers. The mastery of English is an important condition for effective functioning in the majority society while proficiency in

American Sign Language allows deaf people to fully participate in social gatherings and community events either directly or indirectly through sign language interpreters.

Attitudes toward the hearing and the deaf are another important component of cultural competency. LaFromboise and her colleagues (1993) claim that without positive attitudes toward both the majority and the minority groups, individuals are limited in their ability to feel good about interacting with a group that is a target of negative feelings. Most deaf people have at least a somewhat unfavorable disposition toward hearing individuals primarily because of the frustrating experience of awkward interactions with them throughout their everyday life (Moore & Levitan, 1993). Deaf people often report lack of acceptance by the Hearing community (Jones et al., 2001; Kersting, 1997).

Attitudinal deafness means that an individual has identified him or herself as a member of the Deaf community and is accepted by its members (Janesick & Moores, 1992; Rutherford, 1988). They enjoy interaction with other Deaf people, but they are critical of the hearing society (Overstreet, 1999). They also dislike deaf people who opt to immerse themselves in the dominant culture, to use any speech skills or residual hearing they may have, and often exclude them from the Deaf community (Higgins, 1980; Maxwell, Poepelmeyer & Polich, 1999).

Some of those deaf individuals who experience rejection from their deaf peers harbor negative feelings toward the Deaf world (Kersting, 1997). Deaf people who are firmly planted in the Deaf world are not always very accommodating to those deaf individuals who are in transition. The unconditional support given to those in the Deaf community tends to only be extended to those who are outside if they abide by the rules of the culture (Corker, 1998; Skelton & Valentine, 2003). As a reaction, deaf people who are outside of the culture often reject those who are inside and refer to them in a way that makes it clear that they do not include themselves in that group. These deaf individuals often report a more favorable attitude toward the hearing and mentioned frequent and positive interactions with their hearing peers (Kersting, 1997).

Contact with members of both the Hearing and the Deaf community is an essential element in developing a positive attitude toward both groups. According to the contact hypothesis, contact provides information regarding values, life-styles, behaviors, and experiences of a given group (Ellison & Powers, 1994). However, empirical studies consistently show that mere contact between members of two groups does not inevitably lead to more favorable views (Hewstone & Brown, 1986). Indeed, Stinson and Whitmire (1992) showed that strained and unpleasant interactions can lead to distorted perceptions of each other when deaf and hearing students come in contact.

Ellison and Powers (1994) argued that the early experience of intergroup contact provides opportunity for minority group children to learn to counter the effects of negative stereotypes of members of the majority group by experience, and to acquire the social and communication skills that are needed for successful intergroup interactions later in life. This proposition is somewhat restricted in the case of deaf children since there is often a considerable communication barrier to overcome. And the bullying by their hearing peers, the neglect by their hearing teachers often leaves a lasting influence on their attitude toward the hearing (Jones et al., 2001; Skelton & Valentine, 2003).

Chapter 3 will explore how cultural competency affects the quality of life of deaf and hard of hearing individuals. Based on existing literature, the various quality of life indicators, such as psychological well-being, social well-being, educational achievement, are examined in the context of cultural competence as it pertains to the Deaf and Hearing worlds.

**CHAPTER 3:**  
**DEAFNESS, CULTURAL COMPETENCY AND QUALITY OF LIFE: A REVIEW OF**  
**THE LITERATURE**

*Quality of life of deaf people*

In 1994 the World Health Organization (WHO) defined quality of life as “an individual’s perception of their position in life in the context of the culture and value system in which they live and in relation to their goals, expectations, standards, and concerns” (Utsey, Chae, Brown & Kelly, 2002: 369). Quality of life may be viewed as a subjective evaluation that is embedded in a cultural, social, and environmental context. On the other hand, several researchers suggest that in order to understand people’s quality of life, it is not enough to rely only on subjective well-being measures but economic and social indicators that reflect people’s objective circumstances in a given cultural or geographic unit are also needed (Diener, 2000; Diener & Suh, 1997).

While quality of life for deaf people largely comprises the same factors as quality of life for hearing people, they also have unique needs related to their condition such as need for communication, support and technology. Deafness, whether it occurs at birth or later in life, causes the affected individual to have a unique perspective on life as they face challenges and barriers unknown to hearing people. They often have to strive to achieve quality of life since it is likely to be strained due to the functional limitations imposed on them by their deafness and the restricted social interaction that results from the communication barrier. Those deaf individuals who are able to make the best of the situation to improve their circumstances despite the difficulties they face, are likely to experience a higher quality of life than their counterparts with hearing loss.

Although research investigating the quality of life of deaf individuals is in its early stages, there are some studies that examine a single component of it, such as *psychological well-being* or *life satisfaction*, within the context of cultural identification (Gilman et al., 2004;

Hintermair, 2007; Maxwell-McCaw, 2001). Minority group members, in general, with the ability to adapt their behavior to two different cultures tend to have higher self-esteem and psychological well-being (LaFromboise et al., 1993). However, the limited research on the biculturalism of deaf individuals is inconclusive. Some studies suggest that living in segregated settings, either predominantly Hearing or predominantly Deaf, restricts the opportunities of deaf individuals to acquire the social behaviors and competency to function well, ultimately lowering their quality of life (Cartledge, Paul, Jackson & Cochran, 1991; Mertens, 1989). Another study found no difference in overall life satisfaction between those deaf students who conducted their lives mainly among their deaf peers and those whose lives were more mainstreamed (Gilman et al., 2004). While the results of these studies merit some attention, it is important to note that many of them suffer from methodological problems. The most notable shortcomings are small sample size and lack of representativeness. These studies were often conducted among a segment of the deaf population, such as a small group of students or college graduates, thereby leaving out a significant proportion of deaf people who do not attend college. Schroeder and Geyer (2000), for example, acknowledged that blue-collar deaf workers as well as the unemployed are rarely included in self-report studies.

Maxwell-McCaw's (2001) study on the biculturalism and psychological well-being of deaf individuals is the most comprehensive to date. Her research indicated that bicultural and culturally Deaf individuals have roughly the same level of life satisfaction and psychological well-being. Her internet based study recruited a wide variety of deaf individuals, but her research was conducted in English. Since the reading level of many deaf people is at the 5<sup>th</sup> grade level or lower (Overstreet, 1999), this might have resulted in distorted outcomes. In addition, her recruitment process left out those deaf individuals who do not have access to the internet. Furthermore, she fully relied on subjective measures and did not take social or economic indices into account.

*Labor force status* is considered a powerful determinant of overall quality of life (Welsh & Foster, 1991). The economic shifts toward information and technology as well as service-based industries present substantial barriers to deaf employees as literacy and communications skills are increasingly important in both areas (Luft, 2000). Deaf people are often aware of their limited employment opportunities as they frequently work in manual labor or semi-skilled positions (Luft, 2000). In fact, according to a report of 1993, nearly 90% of deaf people had manual labor positions in comparison to the 50% rate among hearing persons (Scheetz, 1993). Moreover, it is reported that the lifetime wages of deaf people are between \$356,000 and \$609,000 less than their comparably educated, hearing counterparts (Luft, 2000; Welsh, 1993). A more recent study by Jones (2004) argues that there is no evidence of an earnings lag relative to the hearing population. However, Jones focused only on those individuals who hold at least a 2-year college degree while admits that the educational level of deaf and hard of hearing individuals is lower than that of the general population hence the difference in earnings.

Most of the earlier studies were conducted before or shortly after the passage of the ADA of 1990 which might have contributed to the reduction of income difference among college educated deaf and hearing individuals. Nevertheless, even the more recent studies mention problems with finding and maintaining satisfactory employment, and major life stressors as a result of the communication problems in a hearing-oriented world (Luft, 2000; Mowry, 1988; Siegel, 2000; Smith & Campbell, 1997; Welsh & Foster, 1991). There is a tendency to believe that people who are deaf cannot perform tasks as well as a hearing person. Therefore, many employers may find it difficult to hire a deaf person, especially since it is often challenging for deaf and hard of hearing individuals to cooperate and socialize with their hearing counterparts. This in turn may make working in groups complicated (Vogel & Keating, 2005).

The crux of the problem seems to lie with the *educational attainment* of deaf and hard of hearing individuals. When things go wrong at school, the overall quality of life may be

significantly reduced (Jones et al., 2001). While in this study type of school placement is treated as a deafness-related factor that influences the development of cultural competency of deaf individuals, eventual educational attainment is treated as a quality of life indicator as it can have a significant influence on the overall well-being of deaf and hard of hearing individuals.

Deafness seems to be a condition that considerably impacts the educational achievement, vocational training and placement options of deaf individuals (Luft, 2000). Their continuing and cumulative lack of language learning results in a constant struggle with English, low literacy rates, low rates of acquiring high school diplomas and low rates of college enrollment (Luft, 2000).<sup>13</sup> The academic achievement of deaf children who spend more time in general education classrooms is higher, yet the National Longitudinal Transition Study of Special Education Students conducted between 1987 and 1990 showed that in terms of post school outcomes there is little difference between those who attend special versus regular schools (Wagner & Blackorby, 1996). Regular academic courses are hard for many deaf children and if they fail in these classes, they are more likely to drop out of school. The estimated drop-out rate of postsecondary schools for deaf children is 70% (Luft, 2000; Stinson & Walter, 1997), and those who do graduate from postsecondary schools have higher employment success than those who do not (Luft, 2000; Moores, 1996).

The National Longitudinal Transition Study found that up to three years after graduating from high school, the competitive employment rate was 25% for deaf individuals. A study by Wagner indicated similar results: two years after graduation, 24% of deaf and hard of hearing individuals were working full-time (while 38% were attending postsecondary schools).

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<sup>13</sup> Moores (1996) reports that 50% of deaf and hard of hearing students receive a high school diploma and a report for the U.S. Department of Education (1995) indicates that 35% of hard of hearing and 28% of deaf individuals enroll in postsecondary programs. The similar statistics for the general United States population as reported by the U.S. Department of Education (2001) are 84% of high school graduation rate and 62% for college enrollment (<http://www.ed.gov/about/offices/list/ovae/pi/hs/hsfacts.html>).

*Social well-being*, or the quality and breadth of interpersonal relationships; intimacy and reciprocal affection within household life, with family, relatives and friends, is an important consideration in quality of life (Mowry, 1988; Schalock, 1996). The feeling of belonging to social communities is an important resource in everyone's life (Hintermair, 2008). Mowry (1988) states that Hearing acculturated individuals reported more frequent visits with their friends than did Deaf acculturated individuals, but the study did not focus on the relationship between cultural competency and the individual's satisfaction with their relationships. Furthermore, in the case of deaf children with hearing parents, parents often act as gatekeepers, influencing their children's access to the world around them. These parents often feel that their children lack the social skills that are needed to deal with a largely hearing world (Jones et al, 2001).

*Civic well-being* covers privacy, protection under the law and civic responsibilities, such as social participation in various activities (Felce, 1997). Deaf and hard of hearing individuals tend to want to be able to participate in typical everyday life activities and would like to be able to make a contribution to society just like hearing people do (Harris & Bamford, 2001). However, participating in various activities is often difficult for them as they often face problems accessing services largely as a consequence of language and communication difficulties (Jones, Atkin & Ahmad, 2001; Lane et al, 1996). These complexities challenge the way in which deaf people can exercise control over their lives. In addition, access to information may affect inclusion or exclusion (Harris & Bamford, 2001). Although the ADA requires that all deaf people obtain the accommodations that provide equal access in the public sphere and at the workplace, the barriers that deaf individuals face in having their needs recognized persist (Margellos-Anast et al., 2005). The lack of sign language interpreters, for example, causes particular problems (Harris & Bamford, 2001; Jones et al., 2001). However, without effective services, deaf and hard of hearing individuals cannot fully perform their socially sanctioned roles as citizens.

Despite the importance of these quality of life indicators, there are currently no studies that measure them and assess whether they are influenced by the cultural competency of deaf people. This study is the first to assess the precursors, including cultural competency, of a wide range of quality of life indicators

#### *Development of research questions and goals*

The purpose of this study is to explore the origins and effects of four types of cultural competency in and on the lives of deaf people. Initially, this study will examine how deafness-related factors influence deaf people's bicultural ability, i.e., their ability to successfully function in both the Hearing and the Deaf community. The influence of deafness-related factors on Deaf culture and Hearing cultural competencies will also be separately assessed.

In the case of deaf people, *cultural competency* is conceptualized as a two-dimensional process since they conduct their everyday life in the hearing society but they may also be a part of a unique cultural minority group called the Deaf world. Cultural competency is based on the extent of their identification with the Hearing and the Deaf community; their communication ability in English and American Sign Language; the extent of their knowledge of the cultural norms and values of the mainstream Hearing and Deaf cultures; and their attitude toward the Hearing and the Deaf cultures. Thus, the cultural competency of deaf people can be broken down into four categories: (1) the Hearing acculturated, (2) the Deaf acculturated, (3) the culturally marginal, and (4) the bicultural.

Table 3.1 presents a typology of the components of each type cultural competency according to four dimensions: (1) communication ability, (2) cultural identification, (3) knowledge of cultural norms and values, and (4) attitudes toward the hearing and the Deaf. This typology was developed by the researcher relying on several models currently in the deafness-related literature (Glickman, 1993; Kannapell, 1989; Maxwell-McCaw, 2001). While these categories might not be exhaustive since there may be some deaf people who will not perfectly fit

into any of them, the typology is a useful framework for enhancing our understanding of cultural competency paradigms as it captures the various experiences of deaf individuals. In addition, while the study aims toward finding individuals that fit into each of these categories, in reality the marginal group represents a hard-to-reach population as they tend to be either extremely isolated or living within confinements that are unattainable for general research purposes.

Table 3.1  
*Cultural Competency Typology*

	<b>Hearing acculturated</b>	<b>Deaf acculturated</b>	<b>Marginal</b>	<b>Bicultural</b>
<b>Communication ability</b>	English monolingual	ASL monolingual	Semi-lingual	Bi-lingual
<b>Cultural identification</b>	Culturally hearing	Culturally Deaf	Does not identify with either culture	Identifies with both cultures
<b>Knowledge of cultural norms and values</b>	High knowledge of hearing culture	High knowledge of Deaf culture	Low knowledge of both cultures	High knowledge of both cultures
<b>Attitude toward the hearing and the Deaf</b>	Positive attitude toward the Hearing world	Positive attitude toward the Deaf world	Negative attitude toward both cultures	Positive attitude toward both cultures

The effects of cultural competency on the *quality of life* of deaf people, both psychological and socio-economic, will be examined in the second part of this dissertation. Subjective well-being allows the individual to subjectively assess the quality of their lives (Diener, 2000). It refers to people's affective and cognitive evaluation of their own lives and encompasses several dimensions including self-esteem and satisfaction with various domains of life. Subjective well-being research in current empirical psychology is quite prominent and it reflects the increasing awareness that positive affect is not the opposite of negative affect and well-being is not the absence of mental illness (Diener & Suh, 1997; Ryan & Deci, 2001). Rather, the concept is a continuum that varies from extreme distress to high subjective well-being. In current research, subjective well-being is frequently equated with happiness which is

formally defined as life satisfaction, satisfaction with important domains such as work satisfaction, positive affect, and low levels of negative affect (Diener, 2000; Ryan & Deci, 2001).

Socio-economic indicators reflect people's objective circumstances in a given cultural unit (Diener & Suh, 1997). In contrast to the subjective nature of psychological well-being, these indicators are based on objective, quantitative indicators. The conceptual domain of socio-economic indicators encompasses a variety of social factors such as social welfare, human rights, education and standard of living. Since deaf people lag behind hearing individuals in terms of academic achievement and economic status, these are important domains to examine.

In addition to occupational status and earnings, there are many other indicators that are important parts of material comforts such as housing and financial security. Ownership and type of residence may help reveal the overall economic status of deaf individuals. People with lower education and lower earnings are more likely to rent instead of owning a home as they cannot afford to buy a house or even a condominium. Unemployed people with disabilities are generally qualified to receive social security income but this amount is rarely enough to enable them to live on their own; they most often have to live with relatives or friends.

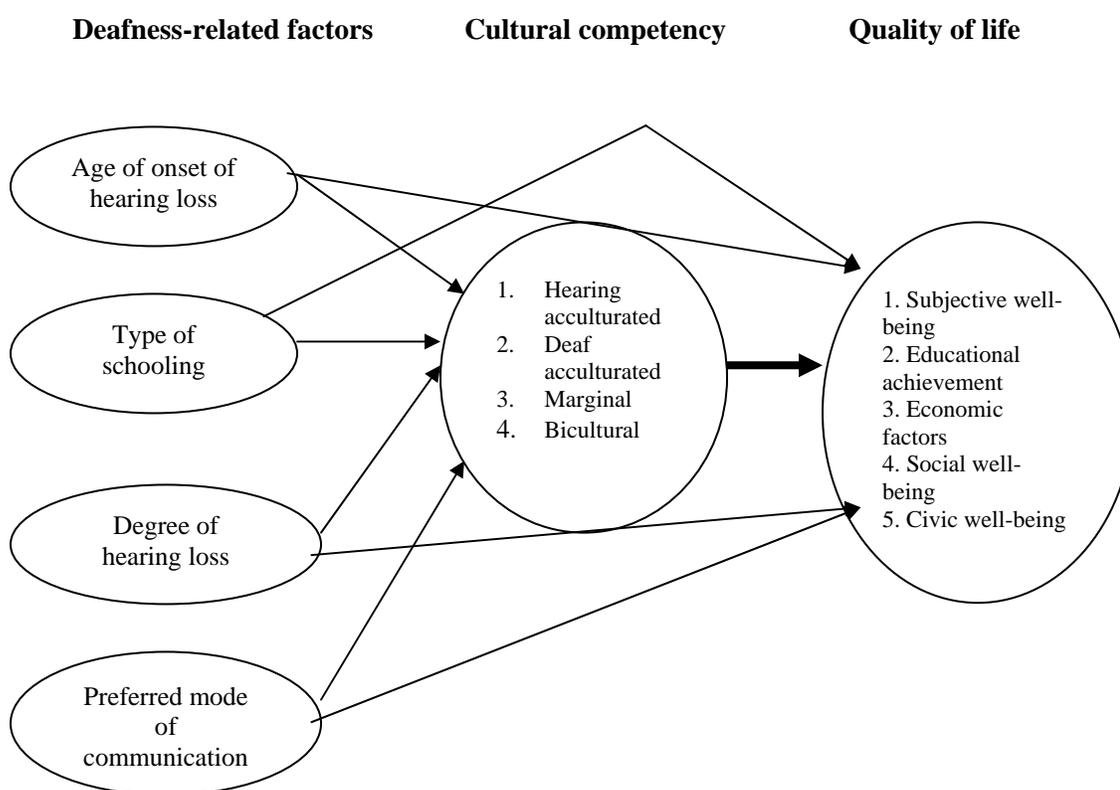
The literature on quality of life also calls for the significance of measuring hitherto little or unexplored areas such as social and civic well-being (Mowry, 1988). Thus, this dissertation will assess a broad range of indicators, including subjective or psychological well-being, academic and economic factors, social and civic well-being.

Figure 3.1 presents a conceptual model of the origins of cultural competency among Deaf and hard of hearing individuals, and of the effects of cultural competency on quality of life. Although it is possible that indicators of quality of life may, in turn, affect cultural competency, this study is primarily concerned with the role of cultural competency as a predictor of quality of life. The conceptual model posits that the effect of cultural competency will be predominant since it is considered a necessary prerequisite for educational achievement and economic success

for deaf individuals. Nevertheless, as a result of the synergistic relationship between education and culture as well as socioeconomic status and culture, data will be collected on educational placement at all levels (elementary school, high school and post-secondary institutions) as well as on the socioeconomic status of the family of the deaf individual. These earlier indicators can serve as controls to determine the casual direction between cultural competency and quality of life.

*Figure 3.1*

Factors affecting the quality of life of deaf and hard of hearing individuals



Chapter 4 describes the methodology and the analytic strategy used for this study. First it reviews the method of recruitment and the questionnaire used to collect the data. Then it describes the analytic strategy for the data analysis. Special attention is paid to Qualitative Comparative Analysis (QCA), a relatively unknown method of analysis suitable for small samples. Although the method is little known, it is considered the most suitable for data analysis in this study.

## **CHAPTER 4:**

### **METHODOLOGY**

#### *Recruitment*

A wide range of deaf and hard of hearing individuals across Northern Nevada was asked to participate in this survey study, including those with diverse ethnic backgrounds, educational histories, communication preferences, levels of hearing loss, and age. Individuals were recruited through various deafness-related organizations, primarily, the Northern Sierra Chapter of the Nevada Association of the Deaf (NVAD) and the Deaf and Hard of Hearing Advocacy Resource Center (DHHARC). NVAD is a state association affiliated with the National Association of the Deaf, the oldest and largest organization for the deaf in the United States. Its membership base is varied and participation is completely voluntary. The DHHARC is an organization which provides support and advocacy services to the deaf and hard of hearing throughout many Northern Nevada counties: Washoe, Carson, Douglas, Lyon, Storey, Churchill, Eureka, Elko, Pershing, Humboldt, Lander, White Pine, Nye and Esmeralda. It offers guidance in legal, mental health, social, educational and employment services and represents deaf individuals in these areas. These two organizations sent the recruitment letter to a total of 57 deaf and hard of hearing individuals.

In order to ensure representation of oral deaf and hard of hearing people who might not be affiliated with either of the above-mentioned organizations, the Rehabilitation Division of the Department of Employment, Training and Rehabilitation and the Claude I. Howard Speech and Hearing Clinic at the University of Nevada, Reno were contacted. They sent out a total of 268 letters to their clients with hearing loss who have sought their assistance in looking for employment or speech therapy. In addition, in order to reach individuals who were not affiliated with any organizations or agencies, the researcher pursued deaf and hard of hearing individuals known and referred to by others. Seven participants were recruited this way. The total number of

people that were contacted is hard to determine since it is possible that some individuals received the letter from more than only one organization, resulting in some overlap. It is only known that 332 letters were sent out to recruit deaf and hard of hearing individuals for this study. Thirty-two letters were returned as they were deemed undeliverable by the United State Postal Services.

The recruitment letter introduced the study and asked individuals to return a reply-card directly to the researcher if willing to participate. Once the researcher received a reply-card, she contacted the prospective participant in the method indicated on the card. Most often it was via email and less frequently, it was by phone. Then an appointment was made for a meeting at the place and time most convenient for the participant. The majority of these meetings took place at a local Starbucks Café or at the home of the participant. The interviewing process lasted over a period of five months, starting from November, 2007 to March, 2008. The participants, as well as the agencies and organizations that helped the recruitment process, were offered the opportunity to obtain a summary of the results once it became available. All of them requested to be contacted with the available information.

At the meeting, the researcher presented and explained the use of the interactive video-questionnaire (IVQ) and introduced the survey itself. The IVQ is a relatively new technology for interviewing deaf persons. It was developed by Lipton, Goldstein, Fahnbulleh and Gertz (1996) in the 1980s and has been improved ever since as a result of substantial improvements in software and hardware technology. The technique was created to avoid the pitfalls of traditional survey instruments, both self-administered questionnaire and interviewing. Some of the problems encountered by researchers when trying to survey deaf people are: (a) the difficulty of deaf people to read a written questionnaire as their average reading level is that of a fifth grader (Lipton et al., 1996; Overstreet, 1999); (b) the fact that deaf and hard of hearing people use several sign modalities, such as ASL, English-based signed systems or lipreading, and there are only a few multilingual people who are skilled at using each of these methods; (c) the very labor

intensive and expensive nature of hiring enough skilled interpreters to do face-to-face household surveys (Lipton et al., 1996); (d) the difficulty of carrying out a reliable interview study with multiple interpreters (Lipton et al., 1996); and (e) the reality that deaf people often do not feel comfortable with hearing people and are reluctant to share information with an interpreter (Higgins, 1980; Fellingner, Holzinger, Dobner, Gerich, Lehner, Lenz & Goldberg, 2005; Lipton et al., 1996).

For this study, the Interactive Video-Questionnaire was generated through the cooperation of a deaf woman who was recorded onto a videotape as she signed the survey, a computer programmer and a graphic designer. The whole study was saved on a CD-Rom and presented to the participants on the laptop computer of the researcher. The participants were able to choose between three communication modalities: American Sign Language, Signing Exact English (SEE), and written English.<sup>14</sup> It was essential that the three versions of the questionnaire, though presented in different languages, had the same meaning to all respondents. To achieve this, the written English questionnaire was translated by the researcher and another deaf person skilled in each signed modality. The scripts then were shown to two certified multilingual interpreters, both of whom were hearing. One of them was a child of deaf adults and as such claimed American Sign Language as his first language, while the other's first language was English, both of whom backtranslated the material. At the end of the process, the four translators discussed various issues related to the material and achieved consensus on both the ASL and SEE versions.

Most participants decided to use either the ASL or the English version; only two of them opted for SEE. Once the respondents felt comfortable using the equipment, the researcher

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<sup>14</sup> Signing Exact English is the sign modality most often taught to deaf students in the inclusion system. It is not a language, but rather a system that assigns signs to English base words taking into account how those words are pronounced, and spelled and what they mean. The system incorporates many forms borrowed from ASL along with many invented forms, such as adding a fingerspelled -L-Y to adjectives to create adverbs (Lane et al., 1996).

withdrew to give them privacy, but remained nearby in order to answer any technical questions. Most participants found the equipment and the test procedure comprehensible and easy to handle. The most common question was how to change answers if they felt they made a mistake. The computer program was designed in such a way that it allowed for checking previous answers or replaying any questions, thereby allowing participants to change their answers at any point during the survey. In each version, the questions and the response categories appeared on the laptop screen, and the participants could indicate their answers and control movement through the questionnaire by using the computer mouse. In order to ensure anonymity, participants were assigned a number and their answers were saved and stored on the hard drive without reference to their names. There is no file that could link the numbers to the participants' names, thus ensuring their anonymity.

### *Participants*

A total of 102 individuals sent back the reply-card with their contact information, leading to a response rate of 33 percent which is conventional for mail surveys (see Mangione, 1995). However, as a result of possible overlaps, this number is likely to be an underestimation of the response rate. Out of the 102 individuals, 66 were included in the study as the rest of them did not respond to several email or phone call attempts (28), had moved out of the state of Nevada (4), could not meet during the time frame the interview process took place as a result of illness or family emergencies (2), or were excluded because their hearing loss was a result of a natural aging process (2). Thirty six (55%) of the 66 participants were female and 30 (45%) were male. The sample reflected the overwhelmingly Caucasian population of Northern Nevada as 57 (86%) indicated they were white with 5 (8%) Hispanic and 2 (3%) Asian-American. The youngest participant was 19 years old while the oldest was 72, with a mean age of 45.

### *Measures*

The questionnaire (see Appendix A) consisted of multiple items measuring the following concepts: deafness-related factors, cultural competency, subjective well-being, civic well-being, social well-being as well as questions about academic achievement, economic status, and demographic variables.

*Age of onset of hearing loss* was assessed by asking respondents whether they were born deaf. If they answered negatively, they were asked to indicate at what age they became deaf. *Type of schooling* was measured by asking the subjects what kind of schools they have attended in elementary school, secondary education, and post-secondary education. Type of schooling was broken down by hearing school with no special services, oral school for the deaf, mainstream school with special services (such as interpreters, real-time captionists, note-takers), self-contained classroom in a hearing school, residential school for the deaf or other. Participants were asked to check all the categories that apply to them since most deaf people have attended more than just one type of school even at a single educational level. *Degree of hearing loss* was assessed by asking respondents to rate their hearing loss with and without hearing aids. Answers to both of these questions were scored on a 5-point Likert-type scale ranging from (1) normal hearing to (5) profound hearing loss without specific guidelines indicating their measurement in decibels. While decibels may give a more correct measurement of hearing loss, many deaf and hard of hearing people are not familiar with the actual number. Therefore instead of asking for those numbers, the researcher explained the meaning of each category; such as profound hearing loss means not being able to hear anything. *Mode of communication in the home while growing up* was measured by a single question asking the participants whether their primary mode of communication as they were growing up was oral communication, mostly oral communication with some sign, mainly sign language or other.

*Cultural competency* was assessed with a scale constructed by Maxwell-McCaw (2001). The Deaf Acculturation Scale (DAS) was originally developed by Maxwell and Zea (1998) but was slightly modified by Maxwell-McCaw. The DAS is based on the underlying assumption that acculturation is a two-directional process; deaf people can gain competency in either the Deaf or the Hearing culture, or both, to varying degrees. The DAS measures competency in each culture (Deaf and Hearing) separately, and each of these dimensions is assessed by several subscales. In addition to communication ability, cultural identification, knowledge of cultural norms and values and cultural attitudes, the DAS incorporates cultural participation which is considered redundant and was not utilized in this study. The four Deaf and four Hearing subscales are parallel to each other.

The *cultural identification* subscales measured the internalization of cultural values associated with the Deaf and Hearing cultures. Overall there are 12 Likert-type scale items where the values ranged from (1) strongly disagree to (4) strongly agree. Questions included “I am comfortable socializing with hearing people” and “I never wish I were hearing.” The *cultural attitudes* subscales assessed preferences for friends, lovers, spouses, work and educational settings to be either Deaf or Hearing. The measure contained eight items such as “I would want to work in an environment with other deaf employees” and “I would prefer my closest friends to be hearing.” Answers to these questions were scored on a 4-point Likert-type scale ranging from (1) completely untrue to (4) completely true. The *language competence* subscales measured competence in receptive and expressive skills in ASL as well as competence in spoken and written English with questions such as “How well do you know current ASL slang and popular expressions in ASL” and “How well do you know English idioms and English expressions”. The Likert-type scale had 12 items with answer categories ranging from (1) not at all to (5) excellent. The *knowledge of cultural norms and values* subscales consisted of 16 items such as “How well do you know organizations run for deaf people?” and “How well do you know organizations that

promote better hearing and speech?” Answer categories on the five-point Likert-type range from (1) not at all to (5) excellent.

*Subjective well-being* was measured by two scales: Rosenberg’s Self-Esteem Scale (1965) and Diener, Emmons, Larsen and Griffin’s Satisfaction with Life Scale (1985).

Rosenberg’s Self-Esteem Scale is considered a standard in measuring self-esteem, and it achieved acceptable alphas in studies conducted among deaf individuals with an alpha reliability of .78 in ASL and .80 in English (Jambor & Elliott, 2005). The response categories on this Likert-type scale ranged from (1) strongly disagree to (4) strongly agree. The Satisfaction with Life Scale is a six-item scale that measures global life satisfaction as a cognitive-judgmental process. It does not assess satisfaction in various life domains but assumes that the scores reflect a conscious and evaluative judgment on the part of the respondents of the overall quality of life compared to their own judgments (Diener et al., 1985). Answer categories ranged from (1) completely untrue to (4) completely true. Maxwell-McCaw (2001) reported an alpha of .86 for this scale for her deaf population.

*Educational achievement* was measured by a single item that asked about the level of education completed in the form of degrees attained. *Economic status* was assessed by multiple items inquiring about the respondents’ annual incomes, employment status broken down into employed full-time, employed part-time, student, on welfare, unemployed with no supplemental security income or other, and housing arrangement categorized into own a house, own a condominium, own a mobile home, rent a house, rent an apartment, rent a room, living with relatives/friends or other.

*Social well-being* was assessed by the Social Support List of Interactions (SSL 12-I). The scale was developed by Kempen and Van Eijk (1995) and reflects the extent of perceived social support received through social interactions with members of the respondent’s primary

social network. It is a 12-item Likert-type scale on which scores can theoretically range from 12 to 48 with higher scores indicating more social support.

A scale to measure *civic well-being* was developed by the researcher since these types of questions has not yet been assessed with a deaf population. The Likert-type scale consists of 7 items, such as “Assistive support, such as an interpreter or captioning, is available to me when I have a doctor’s or court appointment.” Answer categories ranged from (1) never to (5) always.

In addition, age in years, gender (male/female), and ethnicity were measured and served as control variables. These data were collected so that they could provide a fuller description of the sample. Each of these variables was measured by a single item inquiring about the respondents’ demographic background. *Age* was calculated by subtracting their year of birth from the relevant year in which the study was conducted (2007 or 2008). *Ethnicity* was coded into several categories after participants were asked to select all of those that apply to them: White/Caucasian (1), Black/African-American (2), Hispanic (3), Indian/Native-American (4), Asian/Asian-American (5) or other (6). There was, however, no one in this study that checked multiple categories.

#### *Analytic Strategy*

The analytic strategy has three parts. In the first part, descriptive statistics are used to portray the characteristics of the study population, and bivariate correlations between all pairs of variables are tested and evaluated. In the second part of the analysis, ordinary least squares regression is employed to predict quality of life according to cultural orientation and the third part introduces a relatively rarely used technique designed for explanatory models with small samples, qualitative comparative analysis (QCA) developed by Charles Ragin. Since the number of cases is rather low, this technique is used to avoid the pitfalls of traditional inferential statistics and to predict cultural competency and quality of life. Most readers are familiar with descriptive

statistics, bivariate correlations, and regression analysis but far fewer are familiar with QCA. For this reason, QCA is explained in great detail.

### *Qualitative Comparative Analysis*

Qualitative comparative analysis (QCA) is a research strategy that combines elements of the quantitative research tradition typified by regression analysis with the qualitative tradition typified by the case study (Kilburn, 2004). It is an analytic technique that uses systematic and logical case comparisons to identify the combinations of explanatory variables that are unique to a given outcome (Soulliere, 2005). QCA has a number of key features. First, it does not seek to infer population properties from a sample, nor does it seek to make causal inferences. Instead, its goal is to aid causal interpretation, in sync with knowledge of the individual cases. Second, each case is conceived of holistically as a configuration of causal conditions rather than a collection of scores on variables. QCA does not assume that the effect of an explanatory variable is the same regardless of the values of other variables; rather it assumes that variables exert their influences in combination with other variables (Soulliere, 2005). QCA rests on combinatorial rather than additive logic. Whereas additive logic focuses on the contribution of each variable individually, combinatorial logic focuses on the contribution of unique combinations of variables (Ragin, 1987).

The main goal of QCA is to identify the causal conditions shared by multiple cases. When a set of cases have essentially the same outcome, QCA searches for combinations of causal conditions that are shared by those cases to provide important clues regarding which factors must be present to produce the outcome in question (Ragin, 2000). In addition, QCA assumes causal heterogeneity, the notion that there are alternative combinations of causal conditions which may lead to the same outcome (Ragin, 1987). Furthermore, the logic of QCA is deterministic rather than probabilistic: the explanation of the outcome, in terms of configurations of causal conditions, is invariant rather than more or less probable (Soulliere, 2005). That is, once a combination of

factors is discovered that results in a given outcome 100 percent of the time, it is considered to be a sufficient combination to guarantee the given outcome. In practice, however, it is rare to find a causal combination that produces the same results in 100 percent of cases. However, the outcome is often something that does not vary substantially across cases since the goal is to identify common causal conditions linked to a specific outcome across a relatively small number of cases. The focus is on the cases with a specific outcome rather than on cases that vary widely in how much they have that outcome (Ragin, 2000).

### *Crisp sets*

In its original version (Ragin, 1987), QCA is an extension of Boolean-algebraic tools from the realm of formal logic to the task of causal inference in social science (Seawright, 2006). This original version requires all variables to be dichotomized (Seawright, 2005). Boolean algebra uses variables that have two possible values: true or false, which can be represented numerically as one or zero. Variables measured in this way are referred to in QCA as “crisp sets.” Recoding variables into binary values is analogous to assigning, for example, deaf people to set memberships representing the set of deaf people with hearing loss or the lack of it. For example, the crisp set that corresponds with hearing loss might have a value of zero for people with no hearing loss and a value of one for people with any amount of hearing loss. In this way crisp sets differ little from nominal or dichotomous variables as cases with a clear membership boundary rule are coded as one and those without such a rule are coded as zero in both set and variable.

In the current data, some variables, such as mode of communication growing up and type of schooling attended in secondary school, are measured as crisp sets where one means membership in the given set and zero means non-membership in the set. Analyzing the data thus transformed into crisp sets starts with the construction of the so-called “truth table.” The truth table is essentially a chart that has one row for each possible combination of values for the

independent variables. It presents binary values in which zero means the absence and one means the presence of a given factor in the configuration. With crisp sets, it is a simple matter to determine whether the cases sharing a specific combination of conditions constitute a “subset of the outcome.” Subsets of the outcome refer to groups of cases that share a given causal configuration and a given outcome but do not constitute 100% of the sample. The researcher simply examines cases sharing each combination of conditions and assesses whether or not they agree in displaying the same outcome (Ragin, 2007). The truth table is used to sort cases according to the causal conditions they share and to assess whether or not the cases in each row agree on the outcome.

Table 4.1 presents a hypothetical truth table for crisp set variables including born or not born deaf, uses sign language or not, and attends residential secondary school for the deaf or not. The dependent variable in this example is membership in Deaf culture and it has two values, one indicating member of Deaf culture and zero indicating a non-member, so the target set in this case is member of Deaf culture. All possible combinations of these three conditions are depicted in the truth table as well as both possible outcomes on Deaf culture. The column between the causal conditions and the dependent variable presents the number of cases that fit into each configuration of values. The column after the dependent variable presents the consistency values.

Table 4.1  
*Hypothetical Truth Table*

<b>Born deaf</b>	<b>Use sign Language</b>	<b>Attend residential school</b>	<b>Number Of Cases</b>	<b>Deaf Culture</b>	<b>Consistency Values</b>
1	1	1	20	1	.92
1	1	0	15	1	.90
1	0	1	11	1	.85
0	0	0	9	0	.71
0	0	1	6	0	.58
1	0	0	5	0	.55

Consistency values range from zero to one and assess the degree to which cases that share a specific condition or combination of conditions have the same value on the dependent variable. A value of zero consistency would mean that none of the cases share the same value on the dependent variable whereas a value of one would indicate that all cases did. In general, values below .75, meaning that fewer than 75% of cases sharing the same combination of causes share the same value on the dependent variable, are considered inconsistent, meaning that the particular combination does not consistently predict the same outcome. However, the researcher may examine several different thresholds and assess the consequences of lowering and raising the consistency cut-off (Ragin, 2007b). If the combination of causes is deemed consistent, that is, if it has a consistency value above .75, then cases that share that particular combination are considered members of Deaf culture and are given a value of one for Deaf culture. If the combination of causes is deemed inconsistent, that is, if it has a consistency value below .75, it is considered an unreliable predictor of membership in Deaf culture. Therefore, the cases that comprise the combination are considered non-members of Deaf culture and are given a value of zero for membership Deaf culture.

The first row of the hypothetical truth table indicates that out of the total sample, twenty individuals were born deaf, use sign language as a preferred mode of communication and have attended residential school for the deaf. The consistency value is .92 which means that this combination indicates that 92 percent of cases that share this combination of values are members of the Deaf culture, so this combination is indeed a subset of the outcome of individuals that are competent in the Deaf culture. Since the consistency threshold is set at .75, the last three rows are treated as “remainders” and not as subsets of the Deaf culture because these combinations do not consistently result in the same outcome.

A truth table may include causal configurations that predict the same outcome, but differ by only one causal factor. In these cases, locating the “prime indicators,” meaning the indicators that are always present for the outcome, might require further assumptions and analysis (Amenta and Poulsen, 1994). One of the techniques that is often used is the so-called simplification process which entails a series of paired comparisons between configurations that differ in only one respect. If two terms that differ in only one causal condition yield the same outcome, the distinguishing factor is considered irrelevant and is dropped from the pair of configurations (Soulliere, 2005). The end result of this simplification process is a prime-implicant equation (Soulliere, 2005). A prime-implicant equation includes only the causal conditions that are necessary for a given outcome and excludes those that are extraneous.

For example, if we look at row one and row two in Table 4.1, we notice that being born deaf and using at least some sign language while growing up produces membership in Deaf culture whether those individuals also attended residential school for the deaf or not. As a result, QCA considers the factor “attended residential school” as irrelevant when combined with being born deaf and using sign language since membership in the Deaf culture is the end result. In this manner, QCA produces case-based rather than variable-based results (Miethe & Drass, 1999). QCA repeats these comparisons, eliminating conditions that are not necessary to a given

outcome, until no further reductions are possible. Once redundancies among the remaining reduced configurations are eliminated, the final solution is produced. An example of such a solution is given in the next section.

Thus, the goal of QCA is to identify the crucial combinations that are necessary for a certain outcome to occur. It strives to be parsimonious by isolating the fewest number of factors and the fewest combinations of conditions that are necessary to produce the outcome to be explained (Ragin, 1993; Soulliere, 2005).

### Fuzzy sets

The most recent version of Qualitative Comparative Analysis is called fuzzy-set QCA or fs/QCA (Ragin, 2000) which is a fundamentally set-theoretic technique, as opposed to a correlational technique (Ragin, 2007a). Set-theoretic logic focuses on whether cases belong to particular sets or not, rather than the placement of a case along an established ordinal or interval dimension (Crawford, 2005).<sup>15</sup> Since fuzzy sets address set-theoretic relationships, they offer researchers the opportunity to analyze evidence in ways that directly reflect their theoretical arguments (Ragin, 2000).

“Fuzzy” in this context has a new meaning that is unrelated to its original meaning of unclear or muddled (Ragin, 2000). When applied to a set, fuzzy refers to variables with additional values falling somewhere between zero and one. These are intermediate values interpreted as partial membership in the set in question. The basic idea is to permit the scaling of degree of membership and thereby allow partial or fuzzy membership (Ragin & Pennings, 2005). Fuzzy sets are especially useful for categories that are imprecise, such as degree of hearing loss. For example, in the set of deaf people there is a broad range of cases that fall somewhere in

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<sup>15</sup> Paper presented at the Workshop in Political Theory and Policy Analysis in Bloomington, Indiana in 2005 and can be seen at [http://www.indiana.edu/~workshop/papers/crawford\\_festschrift.pdf](http://www.indiana.edu/~workshop/papers/crawford_festschrift.pdf).

between perfect hearing and profound hearing loss. Fuzzy-set membership scores address the varying degree to which different cases belong to sets.

In fuzzy sets, a membership score of one indicates full membership in a set. It typically corresponds to what in regression analysis would be seen as an extreme value on a continuous variable (Katz, Vom Hau, Mahoney, 2005). Scores close to one indicate strong but not quite full membership in a set whereas scores less than .5 but greater than zero indicate that the objects are more “out” than “in” a set, but still weak members of the set. These intermediate cases are evaluated in relationship to the polar extremes (Katz et al., 2005). The so-called cross-over point indicating partial membership has a value of .5 and indicates objects that are neither fully in nor fully out of the set in question. A score of zero indicates full non-membership in the set. For example, in the set of deaf people, a value of one indicates profoundly deaf people, a zero indicates individuals with a mild hearing loss, and a value of .5 might correspond to individuals who have about half of all the characteristics of profoundly deaf people.

There are four different types of fuzzy sets. The three-value logic (using zero, .5 and one to indicate non-membership, partial membership, and full membership, respectively) is a rudimentary form of fuzzy set (Ragin, 2000). A more complex version of fuzzy set uses five numerical values where zero indicates “definitely not in”, .25 indicates “probably not in”, .5 indicates “may be or may not be in”, .75 indicates “probably in” and one indicates “definitely in” the set. Essentially, the five-value logic scheme uses a cross-over point (a fuzzy membership score of .5) to separate cases that are “more in” from those that are “more out” and also distinguishes between cases that are “more out” versus “fully out” (Ragin, 2000).

A still more fine-grained fuzzy set uses seven values. Like the five-value fuzzy set, the seven-value fuzzy set utilizes two qualitative states (“fully out” and “fully in”) and the cross-over point. However, the seven-value fuzzy set inserts two intermediate levels between “fully out”

and the cross-over point (“mostly out” and “more or less out”) and two intermediate levels between the cross-over point and “fully in” (“more or less in” and “mostly in”).

The five-value and the seven-value fuzzy sets might seem equivalent to ordinal scales but in reality they are qualitatively different from ordinal scales. It is unlikely that an ordinal scale would translate automatically to a fuzzy set as the specific translation of ordinal ranks to fuzzy membership scores depends on the fit between the content of the ordinal categories and the researcher’s conceptual understanding of the fuzzy set (Ragin, 2000). Fuzzy sets must be carefully calibrated with respect to the sets they reference.

The translation of ordinal or interval scale variables into fuzzy set membership scores is neither automatic nor mechanical (Ragin, 2007b). A key difference between a fuzzy set and a conventional variable is how they are conceptualized and labeled. For example, conventional measures of hearing loss are based on such indicators as decibels or hearing thresholds an individual might still discern. These might be valid and reliable measures but they do not reflect theoretical relevance as to why degree of membership in the set of deaf people matters and how it should be assessed. For example, it has been shown that deaf people have lower self-esteem than hearing people. But does this proposition apply to all deaf people or only to people with profound deafness or to individuals who are more in the set of deaf people or out of it? Fuzzy sets allow the varied interpretations of this proposition with a single instrument and also make it possible to draw conclusions that are more nuanced than they might be with conventional variables. For example, it may show that people with mild hearing loss have a slightly higher self-esteem than those with a moderate hearing loss.

The calibration process, or the transformation of ordinal-scale variables into fuzzy sets, starts with the designation of a target set. The target set refers to the state of full membership in the construct under study. A person who indicates that they are moderately deaf would have less than a full membership in the set of people who are deaf but have full membership in the set of

people who have hearing loss. Therefore, the designation of a target set not only structures the calibration of the set but it also provides a direct connection between theoretical discourse and empirical analysis (Ragin, 2007a).

A key feature of the calibration of fuzzy sets is the differentiation between relevant and irrelevant variation (Ragin, 2007a). For example, the difference between the individual who has profound hearing loss and an individual who has severe hearing loss might be determined to be irrelevant to the set of individuals who are deaf, for both of these are fully in this set. When calibrating a fuzzy set, variation that is irrelevant to the set must be truncated so that the resulting membership scores faithfully reflect the target set's label (Ragin, 2007a).

The calibration process becomes especially important with the fourth type of fuzzy set form, the so-called "continuous" fuzzy set. This fuzzy set permits cases to take values anywhere in the interval from zero to one. In the current data set, there are six concepts that were transformed into "continuous" fuzzy sets following the direct method of calibration delineated by Ragin (2007a). These include self-esteem, satisfaction with life, social well-being, civic well-being as well as Deaf and Hearing cultural orientation.

The direct method of transforming interval-scale variables into continuous fuzzy sets starts with the clear specification of the target set, followed by the designation of three important qualitative anchors: the threshold for full membership (the point at which full membership is reached; i.e. a definitely deaf person with a membership score of one), the threshold for full non-membership (the point at which full non-membership is reached; i.e. a definitely not deaf person with a membership score of zero), and the cross-over point between being in or outside the target set. The cross-over point is usually the value of the interval or ordinal scale variable where there is maximum ambiguity as to whether a case is more in more out of the target set (Ragin, 2007a). The three qualitative anchors are set by the researcher based on substantive knowledge after carefully examining the given study sample. An explicit rationale for each breakpoint is

necessary as the researcher separates cases that are fully in the set from those that are mostly in the set and so on. In other words, these breakpoints define the fuzzy sets.

The direct method of calibration uses the estimates of the log of the odds of full membership in a set as an intermediate step (Ragin, 2007a). During this process, the various verbal labels, such as full membership in a set, threshold of full membership in a set, mostly in the set and so on, are transformed into numerical values based on the differing degrees of set membership. The odds of full membership result from the transformation of set membership scores using the following formula:

$$\text{odds of full membership} = (\text{degree of membership in the set}) / (1 - (\text{degree of membership in the set}))$$

The degree of set membership indicates the position of a case in the given set; a value that can range from zero to one. The closer the value of degree of membership is to one, the greater the membership of the case in the set.

Once the associated odds are determined, the natural log of the odds is calculated. These odds are in essence different representations of the same numerical values, using different metrics. Working in the metric of log odds is useful because this metric is completely symmetric around 0 (an odds of 50/50) and suffers neither floor nor ceiling effects (Ragin, 2007a). Ceiling effect refers to an effect whereby data cannot take on a value higher than the “ceiling”. In the case of a ceiling effect, the majority of scores are at or near the maximum score possible for the measure, which essentially means the data lack variability. Floor effect has the opposite outcome; most scores are close to the minimum score for the measure. This method successfully eliminates the problem allowing the data to be more evenly distributed.

Table 4.2 shows the different metrics that are used in the direct method of calibration. The first column shows the various verbal labels that can be attached to differing degrees of set

membership, ranging from full non-membership to full membership. The second column shows the degree of set membership linked to each verbal label, which are figures supplied by Ragin (2007a) without clear explanation of how they were derived. The third column shows the odds of full membership based on the formula explained above. The last column shows the natural log of the odds reported in column 3 (Ragin, 2007a).

Table 4.2  
*Mathematical Transformations of Verbal Labels*

<b>One</b>	<b>Two</b>	<b>Three</b>	<b>Four</b>
Verbal label	Degree of set membership	Associated odds	Natural log of the odds
Full membership	.993	148.41	5.0
Threshold of full membership	.953	20.09	3.0
Mostly in	.881	7.39	2.0
More in than out	.622	1.65	.5
Cross-over point	.5	1.00	0
More out than in	.378	.61	-.5
Mostly out	.119	.14	-2.0
Threshold of full non-membership	.047	.05	-3.0
Full non-membership	.007	.01	-5.0

Table 4.3 presents the full calibration process using the self-esteem construct as an example. Ten out of the sixty-six cases are included in the demonstration. The original scale for self-esteem was calculated as the mean of individual's responses on the nine items indicative of self-esteem or the lack thereof divided by ten or the number of items. The response options for the items and the additive scale range from (1) "strongly disagree" to (4) "strongly agree". The target set of this analysis is deaf and hard of hearing Northern Nevadans with high self-esteem. In the original ordinal scale, the scores ranged from 2.11 to 4, and as such the score of four indicates full membership in the set of study participants with high self-esteem and 2.11 indicates

full non-membership. While there were no individuals in this sample who scored “fully disagree” on each self-esteem item, those with a score of 2.11 can be deemed as fully out of the set of those with high self-esteem. Respondents at this score of 2.11 answered most of the questions on this scale with the “strongly disagree” with some “disagree” which indicates that they are likely to have problems with their self-esteem.

Table 4.3

*Calibrating Degree of Membership in the Set of Participants with High Self-Esteem*

<b>One</b>	<b>Two</b>	<b>Three</b>	<b>Four</b>	<b>Five</b>	<b>Six</b>
<b>Case number</b>	<b>Original Self-Esteem Score</b>	<b>Deviation from the cross-over point</b>	<b>Scalar</b>	<b>Product (3x4)</b>	<b>Fuzzy-set score</b>
1	3.12	.065	3.59	.233	.52
2	3.00	-.050	4.14	-.207	.45
3	3.00	-.050	4.14	-.207	.45
4	3.56	.506	3.59	1.816	.86
5	3.11	.055	3.59	.197	.51
6	3.33	.283	3.59	1.016	.73
7	3.89	.839	3.59	3.012	.95
8	2.78	-.272	4.14	-1.125	.25
9	3.56	.506	3.59	1.816	.86
10	3.44	.394	3.59	1.414	.8

The next step is to determine the cross-over point. The cross-over point is the conceptual midpoint of every fuzzy set, and it is set at .5. From the set-theoretic perspective, it does not matter that all the cases may have scores greater than this value or less than this value because the cross-over point is based more on the meaning of the scale than the quantitative midpoint (Ragin, 2000). As the score closest to the median of the self-esteem scale, the cross-over point is set at 3.055 in this sample. This score represents an equal number of “agree” and “strongly agree” answers on the 4-point scale. The cross-over point leans in the positive direction in this sample because self-esteem is not normally distributed but is higher than neutral. Scores above this point

tended to lean toward the “strongly agree” category which means the respondents were more likely to have higher self-esteem. On the other hand, scores below this point tended to present more “disagree” responses that indicate that the respondents were likely to be lower on the self-esteem continuum.

The next step in the calibration of the self-esteem fuzzy set is to calculate the deviations of the ordinal scale scores from the cross-over point. Column 2 in Table 4.3 presents the original self-esteem scale values, while column 3 presents the deviation of each respondent’s self-esteem score from the cross-over point. A positive value for the deviation score indicates that the individual scored higher than the cross-over point whereas a negative value indicates a score that falls below the cross-over point.

After determining the deviation of each case from the cross-over point, the researcher must then designate two important qualitative anchors: the thresholds for full membership and full non-membership. For the self-esteem scale, the full membership threshold was set at 3.89. Respondents who reached this score answered all of the self-esteem questions, except one, with “strongly agree”, and therefore can be deemed as having high self-esteem. The threshold for full non-membership was set at 2.33 because most of the answers were “disagree” and “strongly disagree” which indicate that respondents are likely to have lower self-esteem. Based on Table 4.2, the natural log odds corresponding to the threshold of full membership and the threshold of full-non-membership scores are given at 3 and minus 3, respectively.

The natural log odds are utilized in the calculation of the so-called “scalar” scores presented in Column 4 of Table 4.3. The scalar scores represent the ratio of the log odd to the deviation score associated with either the full membership threshold or with the full non-membership threshold. When a case’s deviation score is positive, the assigned scalar value is the ratio of the log odds to the deviation score associated with the full membership threshold. Whereas, when the deviation score is negative, the scalar value is the ratio of the log odds to the

deviation score associated with the full non-membership threshold. In the self-esteem example, the natural log of the odds of the full membership threshold is three (see Table 4.2). Thus, the scalar associated with full membership is the ratio of three to the deviation score associated with full membership, i.e.,  $3/(3.89-3.055)$ , or 3.59. The full non-membership threshold is -3 (see Table 4.2). Thus, the scalar associated with full non-membership is the ratio of the log odds to the deviation score associated with full non-membership is  $-3/(2.33-3.055)$ , or 4.14.

Column 5 in Table 4.3 presents the product of columns 3 and 4, which translates the self-esteem deviation scores into the log odds metric, using the three qualitative anchors for full membership and full non-membership to structure the transformation via the two scalars. The fuzzy-set scores reported in column 6 are derived from the log odds by converting them to scores that range from 0 to 1 by using the following formula:

$$\text{Fuzzy set score on degree of membership} = \exp(\log \text{ odds}) / (1 + \exp(\log \text{ odds}))$$

For example, as it is seen in the first row of Table 4.3, the original self-esteem score of a participant in this study is 3.12. The deviation of the sample self-esteem score of 3.12 from the cross-over point is  $3.12-3.055$ , which equals .065. Since this number is positive and higher than the cross-over point, the scalar to be used is 3.59, as calculated above. The product of .065 and 3.59 is .233. The exponential number for this value is 1.262 and the degree of membership is 1.262 divided by  $1+1.262$  or 2.262 which equals .52. Therefore, the fuzzy-set score of this participant in the set of high self-esteem individuals is .52 which indicates that this individual is more in the set of deaf and hard of hearing Northern Nevadans with high self-esteem rather than being out of it.

While fuzzy sets solve the problem of trying to force-fit cases into one of the two categories (membership or non-membership in a set), they are not well suited for conventional truth table analysis (Ragin, 2007b). With fuzzy sets, there is no simple way to isolate the cases sharing a specific combination of causal conditions because greater variability in the values

assigned for each construct reduces the likelihood that two or more cases will share the same set of values. Cases also may have different degrees of membership in the outcome and can have partial membership in every logically possible combination of causal conditions (Ragin, 2007a).

In the crisp-set approach, the researcher selects cases displaying the outcome in question and then looks for causal commonalities. In other words, the researcher selects cases with crisp-set scores of one on the outcome and then checks to see if any of the possibly relevant causal conditions are constant across the cases. This approach does not work with fuzzy sets as for most cases it is not possible to do a simple sorting into the presence or absence of conditions either in the cause or the outcome. Instead, a test of the set-theoretic relationship between a causal condition and an outcome is necessary. A key in understanding the fuzzy-set approach to necessary conditions is that when fuzzy membership scores in the outcome are less than or equal to fuzzy membership in the cause, then it is possible to argue that the instances of the outcome are subset of instances of the cause (Ragin, 2006). When researchers find this pattern, they may cite this evidence as support for an argument of causal necessity (Ragin, 2000). A necessary condition is one that must be satisfied in order for the outcome to be true.

The relationship between necessary conditions and an outcome can be tested one at a time, even when there are several jointly necessary conditions for the outcome in question. If there are several necessary conditions for an outcome, then the fuzzy membership in the outcome will be less than or equal to fuzzy membership in each causal condition and less than or equal to fuzzy membership in the intersection of the relevant conditions (Ragin, 2000). Compound fuzzy sets are formed when two or more sets are brought together in some way. Membership in this compound set is determined by the minimum membership score of each case in the sets that are intersected. For example, if a deaf person's membership score in the high self-esteem set is .94 and their membership score in the high life satisfaction set is .54, their membership in the set of deaf people with high self-esteem and high satisfaction with life is .54. Necessary conditions

have an enabling character; they sometimes provide the context or setting needed to generate an outcome without producing the outcome in a more direct manner such as with a sufficient condition (Ragin, 2000).

Since fuzzy sets could not be easily transformed into truth tables, Ragin (2000) developed an algorithm for analyzing configurations of fuzzy-set memberships. This fuzzy-set algebra builds a bridge between fuzzy sets and truth tables and makes it possible to construct a conventional binary truth table from fuzzy-set data. Fuzzy sets representing causal conditions can be understood as a multidimensional vector space with  $2^k$  corners, where  $k$  is the number of causal conditions. The number of corners in this vector space is the same as the number of rows in a crisp truth table with  $k$  causal conditions (Ragin, 2007b). With two fuzzy sets there are four corners; that is, four logically possible combinations of full membership and full non-membership in the two sets. With three fuzzy sets there are eight corners ( $2^3$ ), with four sets there are sixteen corners ( $2^4$ ), and so on (Ragin, 2000). When using a truth table to analyze the results of fuzzy set assessments, the truth table rows do not represent subsets of cases, as they do in crisp set analyses. Rather, they represent the  $2^k$  causal arguments that can be constructed from a given set of causal conditions (Ragin, 2007b). Thus, in the translation of fuzzy set analyses to crisp truth tables, the rows of the truth table specify the different causal arguments based on the logically possible combinations of causal conditions (Ragin, 2007b). In essence, truth table rows become predicates in statements about vector space corners and the truth table itself represents statements about the corners of the vector space formed by fuzzy sets (Ragin, 2005). Each row answers the question: is degree of membership in the corner of the vector space a subset of degree of membership in the outcome?

There are two important pieces of information to look for in the fuzzy-set truth table: (1) the number of cases with strong membership in each corner; that is in each combination of causal conditions, and (2) the consistency of the empirical evidence that degree of membership in the

causal combination is a subset of the degree of membership in the outcome. Establishing a number-of-cases threshold is analogous to developing a rule for classifying some combination of conditions as “relevant” and others as “remainders” based on the number of cases with greater than .5 membership in each. An important property of combinations of fuzzy sets is that each case can have only one single membership score greater than .5 in the logically possible combinations formed from a given set of causal conditions (Ragin, 2007b). A membership score greater than .5 in a causal combination indicates that a case is more in than out of the causal combination in question. This property of fuzzy sets makes it possible for the investigator to sort cases according to the corners of the vector space, based on their degree of membership (Ragin, 2007b). The number-of-cases threshold rule established by the investigator must be based on such factors as the total number of cases and the number of causal conditions. With a relatively small number of cases, such as in the present investigation, a reasonable frequency threshold is two. That is, the causal combinations with at least two cases with greater than .5 membership score are retained for further examination.

Once the empirically relevant causal combinations are identified, the next step is to evaluate each combination’s consistency with the set-theoretic relation in question (Ragin, 2007b). This is also called a sufficiency test to evaluate which combination of causes is sufficient to support causal complexity. The key in the sufficiency test is to understand that when fuzzy membership scores in a causal combination are less than or equal to fuzzy membership scores in the outcome. A sufficient condition is one that, if satisfied, assures the statement's truth. When this is the case, it is possible to argue that instances of the cause are a subset of the instances of the outcome (Ragin, 2000). It is possible that several different combinations of causal conditions may be linked to the same outcome.

The sufficiency test uses a probabilistic criterion. The benchmark or cut-off point for “almost always sufficient” is .80 but it can be lowered by the researcher if it is considered to

reveal more causal complexity. However, it should not be lower than .75. The basic idea behind the sufficiency test is that there may be several routes to a given outcome (Ragin, 2000). Causal combinations with consistency scores at or above the cut-off value are designated fuzzy *subsets* of the outcome and are coded one; those below the cut-off value are not fuzzy subsets and are coded zero (Ragin, 2007b).

Once these procedures are complete, a crisp truth table is constructed. Table 4.4 presents the example of a crisp truth table using both crisp and fuzzy-set conditions and depicts how deafness-related factors and the cultural competency variables influence self-esteem. The first 12 columns present codings of the causal conditions or independent variables, the second to last column presents the crisp-set value on the dependent variable (where zero means inconsistent and one means consistent) attached to each truth table row (vector space corner). The last column presents the consistency values of each combination.

In this analysis, there are seven causal combinations with at least one case with greater than .5 membership in the target set of high self-esteem. The consistency value of each combination states whether membership in the combination of conditions in the given row is a subset of membership in the outcome, high self-esteem. Applying .75 as a cut-off point yields two rows as true (one), while five rows are set as remainders (zero) indicating that these causal combinations are false. The interpretation of the original truth table shows that there are two pathways to high self-esteem among deaf and hard of hearing individuals of Northern Nevada. The first pathway involves being born deaf, using at least some sign language while growing up, attending mainstream high school with some support services for the deaf, and having significant hearing loss. The second pathway involves becoming deaf as a young adult, using speech with no sign language as the primary mode of communication while growing up,

Table 4.4

*Original Truth Table Configurations for QCA of Self-Esteem of Deaf and Hard of Hearing Individuals in Northern Nevada*

<b>Independent Variables</b>											<b>Dependent Variable</b>	<b>Consistency Values</b>
<u>Deafness related factors</u>										<u>Cultural Competency variable</u>		
<i>Born deaf</i>	<i>Deaf as a child</i>	<i>Deaf as a young adult</i>	<i>Deaf in mid to old age</i>	<i>Use speech without sign</i>	<i>Use sign language</i>	<i>Attend hearing high school</i>	<i>Attend mainstream high school</i>	<i>Attend residential high school</i>	<i>Significant hearing loss</i>	<i>Low Competency in Deaf culture</i>	<i>Self-Esteem</i>	
0	0	1	0	1	0	1	0	0	1	1	1	.93
1	0	0	0	0	1	0	1	0	1	0	1	.80
0	1	0	0	0	1	0	1	0	0	0	0	.62
0	0	1	0	1	0	1	0	0	1	0	0	.60
1	0	0	0	1	0	0	1	0	0	1	0	.56
0	0	0	1	1	0	1	0	0	1	1	0	.53
1	0	0	0	0	1	0	0	1	1	0	0	.34

Table 4.5

*Final Truth Table Configurations for QCA of Self-Esteem of Deaf and Hard of Hearing Individuals in Northern Nevada*

<b>Independent Variables</b>							<b>Dependent Variable</b>	<b>Consistency Values</b>	
<u>Deafness related factors</u>						<u>Cultural Competency variable</u>			
<i>Born deaf</i>	<i>Deaf as a young adult</i>	<i>Use speech without sign</i>	<i>Use sign language</i>	<i>Attend hearing high school</i>	<i>Attend mainstream high school</i>	<i>Significant hearing loss</i>	<i>Low Competency in Deaf culture</i>	<i>Self-Esteem</i>	
0	1	1	0	1	0	1	1	1	.93
0	0	1	0	0	1	1	1	1	.92
1	0	0	1	0	1	1	0	1	.80
0	0	1	0	1	0	1	1	0	.64
0	0	0	1	0	1	0	0	0	.62
0	1	1	0	1	0	1	0	0	.60
1	0	1	0	0	1	0	1	0	.56
1	0	0	1	0	0	1	0	0	.30

attending regular high school with no support services for the deaf, having significant hearing loss and having low competency in Deaf culture as components of high self-esteem among deaf and hard of hearing Northern Nevadans participating in this study.

The minimization process started with the analysis of necessary conditions between the fuzzy set independent variables and the dependent variable. Low competency in Deaf culture and having significant hearing loss were determined as necessary conditions as their fuzzy membership scores were higher than that of self-esteem. High competency in Hearing or Deaf cultures has been left out of further analysis as their fuzzy membership score was .71 and .46 in contrast to .76 and .55 for the same measure for self-esteem. Low competency in Hearing culture had a fuzzy membership score of .39 in contrast to the .63 score of self-esteem. It means there is no reason to assume that these factors are necessary conditions in the analysis of high self-esteem of deaf and hard of hearing individuals in Northern Nevada.

Table 4.6

*QCA Minimization Results (Prime Implicants) for High Self-Esteem*

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High Self-Esteem =

BORN DEAF\*deaf as a young adult\*use speech without sign\*USE SIGN LANGUAGE\*attend hearing high school\*ATTEND MAINSTREAM HIGH SCHOOL\*SIGNIFICANT HEARING LOSS\*low competency in Deaf culture+

Born deaf\*deaf as a young adult\*USE SPEECH WITHOUT SIGN\*use sign language\*attend hearing high school\*ATTEND MAINSTREAM HIGH SCHOOL\*SIGNIFICANT HEARING LOSS\*LOW COMPETENCY IN DEAF CULTURE+

Born deaf\*DEAF AS A YOUNG ADULT\*USE SPEECH WITHOUT SIGN\*use sign language\*ATTEND HEARING HIGH SCHOOL\*attend mainstream high school\*SIGNIFICANT HEARING LOSS\*LOW COMPETENCY IN DEAF CULTURE.

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Solution Coverage: .26

Solution Consistency: .89

Note: Capital letters indicate the presence of a condition and lower-case letter indicates its absence. The \*symbol indicates “and”, whereas the + symbol indicates “or”.

A further simplification process was based on paired comparisons and bivariate analysis which indicated positive correlations between becoming deaf as a young adult, attending hearing school with no support services for the deaf and high self-esteem. The resulting truth table included eight independent variables (becoming deaf as a child, becoming deaf in middle to old age and attending residential high school for the deaf were left out) and produced eight rows with three of them being above the cut-off point of .75 for the consistency value. The final truth table can be seen in Table 4.5 and the solution can be seen in Table 4.6. The solution indicates that with the unnecessary conditions eliminated, there are three different pathways to achieving high self-esteem among deaf and hard of hearing individuals in Northern Nevada.

The single most important factor in achieving high self-esteem is having a significant hearing loss because it is present in all three causal combinations presented above. Having a significant hearing loss combines with becoming deaf as a young adult, using speech without sign language growing up and attending hearing high school with no support services for the deaf and having low competency in Deaf culture as the most common pathway to high self-esteem. Another combination leading to high self-esteem joins significant hearing loss with being born deaf, using sign language while growing up, and attending mainstream high school with at least some support services for the deaf. These two combinations reflect two different groups of deaf people: one that is more oriented toward the Hearing culture and another that is more oriented toward the Deaf culture. As it was shown in the correlational analysis and will become more evident in the full QCA result analysis, those deaf people who are more oriented toward Deaf culture tend to be born deaf, use sign language, have significant hearing loss and attended residential school for the deaf. On the other hand, using speech without sign language, attending mainstream school, and becoming deaf later in life are generally characteristics of those who are more Hearing culture oriented. In the third pathway, having low competency in Deaf culture is also an important factor along with significant hearing loss, using speech while growing up and attending mainstream high school with some support services for the deaf.

The final step in interpreting the results of qualitative comparative analysis is to assess the solution coverage and the solution consistency. The first measure assesses the empirical relevance of a consistent subset, whereas the second measure assesses the degree to which a subset relation has been approximated (Ragin, 2006). These two measures sometimes work against each other as high consistency may lead low coverage. Yet, it is important to first establish that a solution is consistent and then check its empirical relevance. In the case of self-esteem, the solution consistency is .89 which is well above the cut-off point of .75 and shows that the causal combinations are indeed a subset of high self-esteem. The solution coverage is .26 which means that the causal conditions in these combinations explain 26 percent of all variance in self-esteem among the deaf and hard of hearing Northern Nevadans of this sample.

In sum, qualitative comparative analysis brings some of the methodological discipline and rigor of quantitative analysis to qualitative analysis and some of the causal complexity and inductive sensitivity of qualitative analysis to quantitative analysis. As such, one of its major strengths is its capacity to travel the middle road between generality and complexity (Soulliere, 2005).

In Chapter 5, descriptive statistics, bivariate correlations, and regression analyses are presented. In Chapter 6, part one of the Qualitative Comparative Analysis is presented in which deafness-related factors predict cultural competency. Chapter 7 presents part two of the QCA analyses in which deafness-related factors and cultural competency predict various quality of life indicators. Finally, in Chapter 8, the results are summarized and discussed in terms of their implications for further research.

## CHAPTER 5:

### RESULTS

#### *Descriptive Statistics*

Descriptive statistics are presented in Table 5.1. A total of 66 individuals participated in the study. An almost equal number of men (45%) and women (55%) answered the interactive video questionnaire. The sample represents the overwhelmingly white population of Northern Nevada as the majority of them (87%) were white, while the remaining nine individuals were Hispanic, Asian or Indian. The youngest participants in the study were 19 years old, while the oldest was age 72, with a mean age of 45.22 (SD=15.21) for the overall sample.

Participants varied in terms of the age they became deaf and the degree of their deafness. Almost half of them (44%) stated that they were born deaf, but the slight majority (56%) became deaf at some later point in their lives. Participants reported a range of hearing losses while using their hearing aids. The majority of them (38%) indicated they had mild hearing loss, nine (13%) had moderate hearing loss, 21 (32%) had severe hearing loss, while four (6%) had profound hearing loss. Seven (11%) claimed they could hear well while using their hearing aids.

In terms of language used in their homes, most individuals (65%) reported that they used only a spoken language without any kind of signing system. Sixteen participants (24%) spoke and used sign language at the same time, while only five (8%) used sign language as the sole mode of communication while growing up. One individual (1%) stated another method of communication but did not specify what kind, and another (1%) did not answer this question and was deemed as missing data.

Participants were asked about their attendance at elementary schools, high schools and college separately. In terms of elementary school background, 31 (47%) attended hearing school with no support services for the deaf, 13 (20%) mainstream school with support services, such as FM systems, sign language interpreters or note-takers, six (9%) attended self-contained classroom in a public school, nine (14%) went to residential school for the deaf and six (9%) attended oral school for the deaf. One

individual (1%) did not answer this question. Attendance to high school revealed a similar trend, with 30 (46%) attending hearing school with no support services for the deaf, 20 (30%) attending mainstream school with support services, two (3%) participating in self-contained classroom, nine (14%) going to residential school for the deaf, and one (1%) attended oral school for the deaf. Two (3%) attended some other kinds of school. Of the 37 participants who had attended college, 12 (18%) went to hearing schools with no support services, 20 (30%) attended college with support services for the deaf, one (2%) participated in a self-contained classroom, and three (5%) went to the only college specifically established for deaf and hard of hearing people: Gallaudet University in Washington, DC. One individual (1%) indicated that they attended a different kind of college but they did not specify what kind exactly. Forty-four percent of the total sample did not attend college at all.

Most respondents scored high on the hearing subscale of the cultural orientation measure ( $M=3.36$ ,  $SD=.58$ ) on a scale from 1 to 5 and relatively lower on the deaf subscale ( $M=2.75$ ,  $SD=.93$ ). This can be attributed to the fact that Northern Nevada does not have a sizeable Deaf community and the majority of deaf and hard of hearing people are accustomed to managing their everyday lives in the Hearing world.

Using their scores on the two cultural orientation measures, an attempt then was made to classify individuals into one of the four categories delineated in the cultural competency typology on page 37. Classification was conducted by utilizing the median-split procedure. Those with scores above the median on the Hearing scale but below the median on the Deaf cultural scale were classified as Hearing acculturated. Those above the median on the Deaf cultural competency scale but below the median on the Hearing cultural competency scale were considered Deaf acculturated. Those who scored above the median on both scales were categorized as biculturals and those who scored below the median on both scales were deemed marginals. It was found that the majority of the respondents (53%) were Hearing acculturated, 13 individuals (19%) were biculturals, while 11 (17%) were classified as Deaf acculturated and only seven individuals (11%) fit into the marginal category.

Most participants scored relatively high on the self-esteem measure,  $M=3.12$ ,  $SD=.51$  on a scale from 1 to 4, where 4 equals the highest possible self-esteem. The mean for the satisfaction of life scale was somewhat lower,  $M=2.95$  with a standard deviation of  $.59$  on a scale from 1 to 4. These results are somewhat unexpected since Nevada, especially Northern Nevada and the rural areas are considered to be an environment where the majority of deaf and hard of hearing individuals cannot expect a lot of support to succeed due to the small size of the Deaf community and the lack of understanding about their special needs.

Respondents reported a range of educational attainment: 11 went to graduate school (17%), 22 attended college (33%), eleven individuals attended vocational school (17%). Nineteen finished high school (29%) and there was one individual that only completed elementary school (1%). Since two participants mentioned that they had other type of schooling not given in the response categories, the researcher recoded those as missing and replaced the mean value as their score for further statistical analyses.

The answer categories for annual personal income ranged from 1=below \$10,000 to 10=\$90,000 and above. The mean for this indicator was 3.44 with a standard deviation of 2.35, indicating a relatively low level of personal income. Nineteen (29%) indicated that their personal income was below 10,000 dollars while 12 (18%) reported an annual personal income between 20 and 30 thousand dollars. Other participants were almost evenly distributed in the other income brackets while the two missing cases in this category were replaced by the mean value.

Thirty-six (55%) of all participants were employed full time, 13 (20%) were employed part time, eight (12%) lived on supplemental social security income, five (8%) were unemployed without any supplemental income and three (5%) were students. One respondent (1%) did not answer this question. In terms of living arrangements, 27 (41%) of all participants reported owning a house, two (3%) owned a mobile home, 16 (24%) lived in an apartment, one (1%) rented a room, nine (14%) lived with friends or relatives, seven (11%) rented a house, while the rest (1%) had other arrangements. There were three missing cases in this category.

Most respondents scored relatively high on both the social well-being and the civic well-being scales ( $M=2.87$ ,  $SD=0.59$  and  $M=3.11$ ,  $SD=0.82$  respectively), where the former was measured on a 4-point scale with 4 indicating the highest level of social well-being and the latter on a 5-point scale with 5 indicating the highest level of civic well-being. The fact that most respondents scored so high on each of the well-being scales might be attributed to the social desirability of favorable responses as they might not have wanted to admit the reality of their circumstances. While the answers were kept confidential, the researcher was still around during the whole procedure and had to save the answers at the end. It might have caused some of the respondents to answer in a way that could have put them in a more favorable light with the researcher. It is also possible that their social and civic well-being is higher than was expected.

As a part of the social well-being measurement, participants were asked about the number of deaf friends they have. Twenty-four participants (36%) reported that they had only a very few deaf friends, 20 (30%) said they had some deaf friends, 11 (17%) had no deaf friends at all, six (9%) claimed that all of their friends are deaf or hard of hearing, and four (6%) said most of their friends are deaf.

Table 5.1  
Descriptive Statistics

Variable		N	%	Variable Range
<b>Demographic variables</b>				
Gender	Male	30	46	1=Male
	Female	36	54	2=Female
Ethnicity	White	57	87	1=White
	Hispanic	5	8	2=Hispanic
	Asian	2	3	3=Asian
	Indian	1	1	4=Indian
	Other	1	1	5=Other
Age				19 to 72 years
<b>Deafness-related factors</b>				
Age of Onset	Born deaf	29	44	1=Yes
	Became deaf	37	56	2=No
Degree of Hearing loss with Hearing Aid	Normal	7	11	1=Normal
	Mild	25	38	2=Mild
	Moderate	9	13	3=Moderate
	Severe	21	32	4=Severe
	Profound	4	6	5=Profound
Mode of Communication at Home	Sign language	5	8	1=Sign language
	Spoken language	43	65	2=Spoken language
	Sign and speech	16	24	3=Sign and speech
	Other	1	1	4=Other
Type of Schooling in Elementary School	Hearing school with no support services	31	47	1=Hearing school
	Oral school for the deaf	6	9	2=Oral school for the deaf
	Mainstream school with support services	13	20	3=Mainstream school
	Self-contained classroom	6	9	4=Self-contained classroom
	Residential school for the deaf	9	14	5=Residential School for the deaf
Type of Schooling in Secondary School	Hearing school with no support services	30	46	1=Hearing school
	Oral school for the deaf	1	1	2=Oral school for the deaf
	Mainstream school with support services	20	30	3=Mainstream school
	Self-contained classroom	2	3	4=Self-contained classroom
	Residential school for the deaf	9	14	5=Residential School for the deaf
	Other	2	3	6=Other
Type of Schooling in College	Hearing school with no support services	12	18	1=Hearing school
	Mainstream school with support services	20	30	2=Mainstream school
	Self-contained classroom	1	1	3=Self-contained classroom
	Deaf college	3	4	4=Residential School for the deaf
	Other	1	1	5=Other
<b>Cultural factors</b>		<b>Mean</b>	<b>SD</b>	
Hearing culture		3.36	.58	1=No membership to 5=Strong membership
Deaf culture		2.75	.93	1=No membership to 5=Strong membership
<b>Quality of Life</b>		<b>Mean</b>	<b>SD</b>	
Subjective Well-Being	Self-Esteem	3.12	.51	1= Low self-esteem to 4= High self-esteem
	Satisfaction with Life	2.96	.59	1= Low satisfaction with life 4=High satisfaction with life
Educational Level		<b>N</b>	<b>%</b>	
	Elementary School	1	1	1=Elementary school
	High School	19	29	2= High school
	Vocational School	11	17	3= Vocational school
	College	22	33	4= College

Annual Personal Income	Graduate School	11	17	5= Graduate school 6=None of the above 1-10 1=Below \$10,000 and 10=Over \$90,000
	None of the above	2	3	
	Below \$10,000	19	29	
	Between \$10,000 and \$19,999	7	11	
	Between \$20,000 and \$29,999	12	18	
	Between \$30,000 and \$39,999	8	12	
	Between \$40,000 and \$49,999	5	8	
	Between \$50,000 and \$59,999	6	9	
	Between \$60,000 and \$69,999	3	5	
	Between \$70,000 and \$79,999	1	1	
	Between \$80,000 and \$89,999	1	1	
Over \$90,000	2	3		
Employment Status	Employed full time	36	55	1=Employed full time 2=Employed part time 3=Student 4=Unemployed with SSI 5=Unemployed without SSI
	Employed part time	13	20	
	Student	3	5	
	Unemployed with SSI	8	12	
	Unemployed without SSI	5	8	
Ownership of Property	Own a house	27	41	1=Own a house 3=Own a mobile home 4=Rent a house 5=Rent an apartment 6=Rent a room 7=Live with relatives/friends 8=Other
	Own a mobile home	2	3	
	Rent a house	7	11	
	Rent an apartment	16	24	
	Rent a room	1	1	
	Live with relatives/friends	9	14	
	Other	1	1	
	<b>Mean</b>	<b>SD</b>		
Social Well-Being	2.87	.59	1= Low social well-being to 4= High Social Well-Being	
	<b>N</b>	<b>%</b>		
Having Deaf and Hard of Hearing Friends	No deaf and hard of hearing	11	17	1=No d/hh friends 2=A very few d/hh friends 3=Some d/hh friends 4=Most d/hh friends 5=All d/hh friends
	A very few deaf and hard of hearing	24	36	
	Some deaf and hard of hearing	20	30	
	Most deaf and hard of hearing	4	6	
	All deaf and hard of hearing	6	9	
	<b>Mean</b>	<b>SD</b>		
Civic Well-Being	3.11	.82	1= Never getting services to 5=Getting services all the time	

### *Measurement Strategies for Multivariate Analyses*

Table 5.2 shows the mean, the standard deviation, alpha reliability (when relevant) and value range for the demographic and study variables. To test bivariate correlations with nominal variables (such as mode of communication and type of school attended) and to facilitate regression analyses and qualitative comparative analyses, some variables were re-coded into dummy variables while others were collapsed as a result of small cell sizes. In the case of age of onset, four dummy variables were coded: (1) born deaf coded 1 versus became deaf later in their lives coded zero; (2) became deaf as a child by age five versus other; (3) became deaf during young adulthood or early middle age (ages 10 to 35) and (4)

became deaf during later middle age or old age or over the age of 35. Early childhood is considered extremely important in expressive and receptive language development. By the time children enter school, they acquire grammatically correct speech by using fairly long and complex sentences. In addition, they enjoy listening to stories and are able to answer short questions about them (Bowen, 1998). If this process is interrupted at any point and language development is halted or delayed as a result of hearing difficulties, children need to see clinical audiologists and speech language pathologists to seek alternative ways to learn a language and possibly to communicate with those around them.

Becoming deaf after spoken language acquisition, which is more typical of those who become deaf as young adults, poses a challenge that is not linguistic but more sociological as these individuals need to recreate their own identities, readjust their lives and adapt to new communication strategies (Crowe, 2000; Overstreet, 1999). However, during the younger years, people are still adaptive, can learn a new language, become members of a different community and build a new lifestyle. Becoming deaf after someone already has established social and career networks, and become accustomed to a certain lifestyle, as would be expected for those who lost hearing after the age of 35, often seriously disrupts their functioning in the world. Such adults are often stuck between two worlds as they are not able to fully communicate with hearing people any more but it is also harder to learn a new language and adjust to the often very different lifestyle of a Deaf community. In this study, 11 (20%) individuals reported that they became deaf as a child before the age of 10, ten (17%) became deaf as teenagers or young adults while the remaining 12 (18%) became deaf as older adults, after the age of 35. One individual (1%) did not give an answer to this question and was deleted from further analysis.

In terms of degree of hearing loss with hearing aid, three categories were created for further statistical analyses. Profound and severe hearing loss were collapsed as in essence both of these categories mean that a person cannot carry on meaningful communication relying strictly on their hearing, rather they need to utilize other skills such as lipreading, sign language or pen and paper. Mild and moderate hearing loss were also collapsed since they represent hard of hearing individuals who may not be able to hear everything but who have enough residual hearing to be able to carry on a communication

with the use of their hearing aids and possibly some other techniques such as lipreading or asking the communication partner to speak more clearly and loudly. Normal hearing stands on its own as it allows the individual to communicate without difficulty just by adjusting their hearing aids to the most useful level. In this study, twenty-five (38%) individuals indicated severe to profound hearing loss, 34 (51%) had mild to moderate hearing loss and seven (11%) reported normal hearing with their hearing aids.

Dummy variables were also created for mode of communication in the home in a way that those who used primarily a spoken language at home were assigned a value of one and those who used sign language or a mixture of spoken and sign languages were assigned the value of zero. The primary reason for collapsing these two categories was the low number of participants who use sign language as a primary mode of communication. Since 90% of all deaf children are born to hearing families that do not know any sign language when their child is born, it is very rare that parents use only sign language with their deaf or hard of hearing offspring. Most often it only happens if the parents are themselves deaf. Nevertheless, using some sign language to aid the communication is substantially different from relying entirely on a spoken language. Understanding a spoken language when someone has a hearing loss and trying to use voice especially if they were born deaf poses quite a challenge. Lipreading involves a high proportion of guesswork as only about 30% of all English sounds are recognizable on the lips (Margellos-Anast et al., 2005). In addition, learning to speak when someone never had the opportunity to hear their own voice is difficult even after years of speech therapy (Moore & Levitan, 1992). The majority (65%) of respondents in this study used a spoken language without any sign language and 21 (32%) used sign language either in its own or combined with some speech as the preferred mode of communication. Two individuals (3%) did not answer this question and were eliminated from further analysis.

The participants' primary type of schooling was measured by their secondary school experience because in this study it had a very similar distribution to elementary school yet is more recent and because all participants attended some type of secondary school, unlike college. In terms of type of schooling in secondary school, the categories "mainstream school with support services" and "self-contained classroom in a hearing school" were collapsed because they are essentially the same since deaf and hard

of hearing children receive the services they need; it is only the amount of inclusion that differs.

Residential school for the deaf and hearing school with no support services for the deaf remained distinct categories and dummy variables were created for each in the same way described above.

Since the classification into the cultural competency typology resulted in small cell sizes that were unsuitable for further analyzes, instead of using the four categories, only the two original cultural competency scales, Hearing culture and Deaf culture competency scores were used for bivariate and regression analyses.

To test economic status, dummy variables were created for employment status and ownership of properties. A value of one was assigned to those who were employed either full-time or part-time and all the others were assigned the value of zero. Similarly, a dummy variable was created assigning the value of one to those who could claim ownership of a property, such as a house, condo or a mobile home and those who rented living spaces or lived with friends or relatives were assigned the value of zero.

To create a standardized measure of social well-being, participants' z-score on the original social well-being scale and their z-score on the deaf friends scale were combined. In order to do this, some variables were collapsed on the deaf friends measure. The categories "all" and "most" deaf friends were collapsed into one as were "some" and "very few" deaf friends, resulting a variable with the following three categories: many deaf friends, some deaf friends and no deaf friends at all.

Table 5.2  
*Recoded Descriptive Statistics*

Variable		M	SD	Alpha	Variable Range
<b>Demographic variables</b>					
Gender		.45	.50		0=Female and 1=Male
Ethnicity		.86	.35		0=Minorities and 1=White
Age		45.22	15.21		19 to 72
<b>Deafness-related factors</b>					
Age of Onset	Born deaf	.44	.50		0=No/1=Yes
	Become deaf as a child	.20	.40		0=No/ 1=Yes
	Become deaf as a young adult	.17	.38		0=No/ 1=Yes
	Become deaf in old age	.18	.39		0=No/ 1=Yes
Degree of Hearing loss with Hearing Aid	Severe to profound hearing loss	.38	.49		0=No/ 1=Yes
	Mild to moderate hearing loss	.51	.50		0=No/ 1=Yes
	Normal hearing	.11	.31		0=No/1=Yes
Mode of communication at Home	Speech without sign language	.65	.48		0=No/ 1=Yes
	At least some sign language	.32	.47		0=No/ 1=Yes
Type of schooling in secondary school	Hearing school with no support services	.45	.50		0=No/1=Yes
	Mainstream school with support services	.33	.47		0=No/1=Yes
	Residential school for the deaf	.14	.35		0=No/ 1=Yes
	Other	.08	.27		0=No/1=Yes
<b>Cultural factors</b>					
Hearing culture		3.36	.58	.95	1=No membership to 5=Strong membership
Deaf culture		2.75	.93	.86	1=No membership to 5=Strong membership
<b>Quality of Life</b>					
Subjective Well-Being	Self-Esteem	3.12	.51	.73	1= Low self-esteem to 4= High self-esteem
	Satisfaction with Life	2.96	.59	.78	1= Low satisfaction with life 4=High satisfaction with life
Educational Level		3.36	1.11		1=Elementary school 2= High school 3= Vocational school 4= College 5= Graduate school
Economic Status	Annual Personal Income	3.44	2.35		1-10 1=Below \$10,000 and 10=Over \$90,000
	Employment Status Ownership of Properties	.74 .44	.41 .50		0=No and 1=Yes 0=No and 1=Yes
Social Well-Being		2.87	.59	.93	1= Low social well-being to 4= High Social Well-Being
	Many deaf friends	.15	.36		0=No/1=Yes
	Some deaf friends No deaf friends	.67 .17	.47 .37		0=No/1=Yes 0=No/1=Yes
Civic Well-Being	Services offered to deaf people	3.11	.82	.75	1= Never getting services to 5=Getting services all the time

### *Bivariate Analyses*

Bivariate correlations for cultural competency and quality of life with all other variables are presented in Table 5.3. Beginning with the demographic variables, being male or being white is not associated with any of the dependent variables. However, age is negatively associated with competency in the Deaf culture whereas it is positively associated with educational attainment and personal income. Almost all deafness-related factors are significantly related to competency in both the Hearing and Deaf cultures. Those who were born deaf are more likely to be competent in the Deaf culture rather than the Hearing world, while those who experienced hearing loss during their young adulthood are more likely to be competent in the Hearing rather than the Deaf world. Those who became deaf much later in their lives are less likely to be a part of the Deaf community; most likely they have never even get in contact with it. Those who have severe to profound hearing loss are more likely to be competent in the Deaf culture while those with mild or moderate hearing loss are more likely to exhibit membership in the Hearing world. Those who used a spoken language at home while they were growing up are more likely to be member of the Hearing culture while those who used sign language are more likely to be competent in the Deaf culture. In terms of type of high school attended, those who went to hearing secondary schools with no support services for the deaf are less likely to be competent in the Deaf culture while those who attended residential school for the deaf are more likely to fit in there well.

These correlations support the theoretical assumptions since being born deaf, having a severe to profound hearing loss, using sign language at home while growing up and having attended residential school for the deaf are the factors that are generally deemed to predict membership in the Deaf culture. On the other hand, those who become deaf later in life, used speech as they were growing up and attended high school without services for the deaf, are common characteristics of those who are affiliated with the hearing rather than the deaf, thus these individuals are more likely to be competent in the Hearing culture.

Some deafness-related factors also reveal significant correlations with the dependent variables. If someone became deaf before the age of five, they are more likely to have lower income while those who

became deaf after the age of 35 are more likely to have higher personal income. This is an interesting finding which seems to support the assumptions that being deaf generally means fewer opportunities at finding prestigious and well-paying jobs, unless someone started to experience hearing loss after they have already established their career.

In terms of self-esteem, those who became deaf between the ages of 10 and 35 are likely to have higher self-esteem as well as those who attended high school with no support services for the deaf. Those who become deaf after a spoken language acquisition but at a relatively young age are considered to have the best chance at becoming bicultural as they have already internalized the language and values of the Hearing culture but they are still young enough to develop their identity as deaf persons and become familiar with the norms of that culture. The data also reveal that those who attended residential high school for the deaf have lower satisfaction with life, and those who use a spoken language as a primary mode of communication are likely to have a higher educational level. On the other hand, those who use at least some sign language seem to have higher social well-being.

The cultural indicators were also related to several of the dependent variables. Membership in the Hearing culture is related to higher self-esteem, higher satisfaction with life and higher civic well-being. On the other hand, if someone is more Deaf culture oriented, they are more likely to have higher social well-being. There are also correlations among the quality of life indicators. Self-esteem is positively related to satisfaction with life and social well-being. Education is negatively related to civic well-being while social well-being is positively related to civic well-being and satisfaction with life.

Table 5.3  
Bivariate Analysis

Variables	Deaf Culture	Hearing Culture	Self-Esteem	Life Satisfaction	Education	Income	Social Well-Being	Civic Well-Being
N=66								
Male	-.05	-.02	-.05	-.10	-.12	.23	.10	.07
White	.03	.07	.04	-.02	.05	.07	.01	.05
Age	-.43**	.05	.07	-.16	.24*	.50**	-.10	-.07
Born deaf	.34**	-.26*	-.22	-.17	-.07	-.15	.04	.01
Deaf as Child	.13	.06	-.02	.01	-.13	-.25*	-.02	.05
Deaf as young adult	-.25*	.32**	.36**	.21	.15	-.03	.15	-.07
Deaf in old age	-.35**	.09	-.02	-.03	.06	.48**	-.11	.08
Severe to profound hearing loss	.28*	-.38**	-.02	-.06	.08	.08	.12	-.01
Mild to moderate hearing loss	-.28*	.27*	.04	-.02	-.06	-.04	-.20	.05
Normal hearing	.01	.16	-.04	.12	-.02	.05	.15	-.07
Speech only at home	-.63**	.38**	.11	.07	.28*	.08	-.21	-.23
Some sign language at home	.61**	-.35**	-.15	-.03	-.21	-.10	.25*	.18
No support services in high school	-.40**	.28*	.28*	.22	.15	.19	-.14	-.12
Mainstream high school with support services	.06	-.03	-.01	.09	.01	-.14	.06	.06
Residential high school	.45**	-.21	-.22	-.31*	-.17	.01	.16	.19
Deaf culture	-	-.41**	-.21	-.07	-.15	-.09	.33**	.13
Hearing culture	-.41**	-	.40**	.25*	.13	-.03	.24	.27*
Self-esteem	-.21	.40**	-	.66**	.19	.16	.28*	.14
Life satisfaction	.07	.25*	.66**	-	.22	.15	.27*	.11
Education	-.15	.13	.19	.22	-	.21	-.09	-.26*
Income	-.09	-.03	.16	.15	.21	-	.12	-.03
Social well-being	.33**	.24	.28*	.27*	-.09	.12	-	.47**
Civic well-being	.13	.27*	.14	.11	-.26*	-.03	.47**	-

### *Regression Analysis*

The first section of the regression analyses presents a two-stage hierarchical regression analysis of competency in both the Deaf and the Hearing culture. In the first stage, the demographic variables are entered while in the second stage, deafness-related factors are added to the model. Subsequently, a four-stage hierarchical regression analysis of quality of life is presented. In the first stage, demographic variables, such as gender, ethnicity and age are entered. In the second stage, deafness-related factors such as age of onset and type or schooling are regressed on each quality of life outcome. In the third stage, competency in the deaf and hearing cultures are added to the regression equation to test the relative effects of each on quality of life. Finally, in the fourth stage, a multiplicative interaction term between deaf and hearing cultural competency is added to assess their joint effect. This interaction term is intended to reflect the construct of biculturalism, meaning joint membership in the deaf and hearing cultures.

### *Regression of cultural competency*

Tables 5.4 and 5.5 present hierarchical regression analyses of competency in the Deaf culture and Hearing world on demographic variables and the deafness-related factors. When predicting competency in the Deaf culture, the demographic variables including age, male (as opposed to female) and white (as opposed to minorities) were entered in the first stage. Age is significantly related to Deaf culture, and it shows that younger deaf and hard of hearing individuals are more likely to have competency in this culture. The other two demographic variables are not statistically significant.

In the second stage, the deafness related factors are added, including age of onset with three dummy variables: born deaf, becoming deaf between the age of 5 and 35, and becoming deaf after the age of 40; and severity of hearing loss with two dummy variables: mild to moderate and severe to profound hearing loss. In addition, the variable using speech and no sign language at all as a mode of communication while growing up and having attended residential school or hearing school with no support services for the deaf as dummy variables for type of high school attended were entered in the model at this time. Age remains significant in equation two, while using speech without any sign

language has a strong negative association with Deaf cultural competency indicating that those who used only speech at home while growing up are unlikely to be competent in the Deaf culture. No other variable is statistically significant, but the demographic controls and the deafness-related factors together explain 46 percent of the total variance. The analysis as a whole suggests that the age of onset of hearing loss and the lack of sign language use at home are key predictors of competency in Deaf culture.

Table 5.4

*Regression of being competent in the Deaf culture on demographic and deafness-related factors (N=66)*

	<u>Equation 1</u>		<u>Equation 2</u>	
	<i>b</i>	$\beta$	<i>b</i>	$\beta$
Male	.16	.09	-.06	-.03
White	.29	.11	.19	.07
Age	-.03*	-.47	-.02*	-.28
Born deaf			.06	.03
Becoming deaf between the age of 10 and 35			-.21	-.08
Becoming deaf after the age of 35			-.13	-.06
Mild to moderate hearing loss			-.07	-.04
Severe to profound hearing loss			.31*	.16
Using spoken language while growing up			-.74	-.38
Attending hearing high school with no support services for the deaf			.08	.04
Attending residential high school for the deaf			.57	.21
Constant	3.75		3.71	
Adjusted R <sup>2</sup>	.17		.46	
S.E.E	.85		.69	

\* $p < .05$

When testing the effect of demographic variables and deafness-related factors on cultural competency in the Hearing world, the same variables were entered into the regression model in the same order as in the case of predicting competency in the Deaf culture. This time none of the demographic variables had a significant association in either stage, indicating that they may not have an influence on participant's competency in the Hearing culture, at least not in this sample.

When entering the deafness-related factors in the second stage, severe to profound deafness emerged as a significant predictor indicating that these individuals are less likely to be competent in the Hearing culture. Furthermore, using speech without sign language is positively related to competency in Hearing culture meaning that those who used a spoken language while growing up but not sign language

tend to be competent in the Hearing culture. In addition to the two significant predictors, the explained variance jumped to 21 percent once the deafness-related factors were entered into the equation. In sum, in the sample consisting of deaf and hard of hearing Northern Nevadans, relying on speech and lip-reading abilities and a smaller degree of hearing loss are the key predictors of being competent in the Hearing culture.

Table 5.5

*Regression of being competent in the Hearing culture on demographic and deafness-related factors (N=66)*

	<u>Equation 1</u>		<u>Equation 2</u>	
	<i>b</i>	$\beta$	<i>b</i>	$\beta$
Male	-.04	-.03	.01	.01
White	.01	.06	.20	.12
Age	.01	.05	-.01	-.16
Born deaf			.01	.01
Becoming deaf between the age of 10 and 35			.35	.23
Becoming deaf after the age of 35			.22	.15
Mild to moderate hearing loss			-.20	-.18
Severe to profound hearing loss			-.55*	-.46
Using spoken language while growing up			.38*	.31
Attending hearing high school with no support services for the deaf			.12	.10
Attending residential high school for the deaf			.18	.11
Constant	3.21		3.36	
Adjusted R <sup>2</sup>	-.04 <sup>16</sup>		.21	
S.E.E	.59		.52	

\* $p < .05$

### *Quality of life indicators*

As it is shown in Tables 5.6 through 5.10, a second set of hierarchical regression analyses was conducted to predict each of the quality of life outcomes, beginning with self-esteem. Table 5.6 presents a regression of self-esteem on demographic controls, deafness-related factors, cultural competency in both the Deaf and Hearing cultures, and the interaction between the two. In the second equation, deafness-related factors are added to the demographic controls but none of the factors is significantly related to

<sup>16</sup> The adjusted R-squared reduces the R-squared by how much fit would probably happen just by luck. Sometimes this reduction is more than the calculated R-squared, so the adjusted R-squared becomes negative.

Table 5.6

*Regression of level of self-esteem on demographic and deafness-related factors and on competency in the Deaf and Hearing cultures and relevant interaction effect (N=66)*

	<u>Equation 1</u>		<u>Equation 2</u>		<u>Equation 3</u>		<u>Equation 4</u>	
	<i>b</i>	$\beta$	<i>b</i>	$\beta$	<i>b</i>	$\beta$	<i>b</i>	$\beta$
Male	-.08	-.08	-.06	-.06	-.06	-.06	-.06	-.06
White	.03	.02	.07	.05	.01	.01	.01	.01
Age	.01	.09	.01	.04	.01	.09	.01	.11
Born deaf			-.11	-.11	-.11	-.11	-.10	-.10
Becoming deaf between the age of 10 and 35			.36	.26	.22	.16	.23	.17
Becoming deaf after the age of 35			-.06	-.05	-.15	-.12	-.16	-.12
Mild to moderate hearing loss			.06	.06	.13	.13	.13	.13
Severe to profound hearing loss			.10	.09	.32	.31	.32	.31
Using spoken language while growing up			-.17	-.16	-.34	-.32	-.35	-.33
Attending hearing high school with no support services for the deaf			.15	.15	.11	.10	.11	.11
Attending residential high school for the deaf			-.28	-.19	-.32	-.22	-.32	-.22
Competency in Deaf culture					-.04	-.07	-.16	-.29
Competency in Hearing culture					.38*	.43	.28	.32
Interaction							.03	.20
Constant	2.99		3.03		1.90		2.23	
Adjusted R <sup>2</sup>	-.04		.03		.16		.15	
S.E.E	.52		.50		.47		.47	

\* $p < .05$

self-esteem. The explained variance is only three percent even when these variables are entered into the model. The third equation adds competency in Deaf and Hearing cultures and indicates that individuals that are more competent in the Hearing culture have relatively higher self-esteem, whereas competency in the Deaf culture is unrelated to self-esteem. The explained variance further increases, this time to 16 percent when cultural competency is added. Finally, the fourth equation adds an interaction terms to test whether competency in both cultures, i.e. biculturalism, is significantly related to self-esteem but it is not, and the explained variance is virtually unchanged. In sum, among the deaf and hard of hearing individuals that were interviewed for this study, the key predictor of self-esteem according to the regression analysis is competency in the Hearing culture.

Table 5.7 presents a regression of life satisfaction with life and in which none of the variables has a statistically significant association with the dependent variable. The explained variance changes from four percent to only eight percent from the second equation to the fourth, which means that the demographic controls, the deafness-related factors, the cultural competency variables and the interaction term together does not account for a lot of important information in predicting the life satisfaction of deaf and hard of hearing individuals in Northern Nevada. It is impossible to know from these results which indicators have relevance in explaining life satisfaction. However, it is possible that the QCA analysis, presented in the next chapter, will shed more light on the determinants of life satisfaction by analyzing the effects of certain causal combinations of values on these variables.

In Table 5.8, a regression of social well-being reveals two significant predictors: cultural competency in the Deaf world, and cultural competency in the Hearing world, both of which are significant positive predictors of social well-being. None of the demographic variables entered in the first stage is statistically significant and entering the deafness-related factors in the second stage does not yield any effect either. The explained variance of equation 3 this equation is 25 percent which is a significant jump from the previous equations. The fourth, final, equation adds the interaction term to test whether biculturalism has an influence on social well-being, but it does not, although the explained variance increases somewhat. While the interaction effect is not significantly related to social well-being,

Table 5.7

*Regression of level of life satisfaction on demographic and deafness-related factors and on competency in the Deaf and Hearing cultures and relevant interaction effect (N=66)*

	<u>Equation 1</u>		<u>Equation 2</u>		<u>Equation 3</u>		<u>Equation 4</u>	
	<i>b</i>	$\beta$	<i>b</i>	$\beta$	<i>b</i>	$\beta$	<i>b</i>	$\beta$
Male	-.08	-.07	-.06	-.05	-.06	-.05	-.05	-.04
White	-.01	-.02	.17	.09	.12	.07	.09	.06
Age	-.01	-.14	-.01	-.25	-.01	-.21	-.01	-.12
Born deaf			-.16	-.13	-.16	-.14	-.10	-.08
Becoming deaf between the age of 10 and 35			.10	.06	.03	.02	.14	.09
Becoming deaf after the age of 35			.01	.01	-.03	-.02	-.11	-.07
Mild to moderate hearing loss			-.15	-.13	-.11	-.09	-.15	-.13
Severe to profound hearing loss			-.04	-.03	.08	.06	.04	.03
Using spoken language while growing up			-.11	-.09	-.18	-.15	-.24	-.19
Attending hearing high school with no support services for the deaf			.27	.19	.24	.20	.25	.21
Attending residential high school for the deaf			-.43	-.25	-.48	-.28	-.47	-.27
Competency in Deaf culture					.02	.03	-1.01	-1.57
Competency in Hearing culture					.22	.22	-.61	-.61
Interaction							.30	1.50
Constant	3.25		3.45		2.61		5.45	
Adjusted R <sup>2</sup>	-.02		.04		.04		.08	
S.E.E	.59		.58		.58		.57	

\* $p < .05$

Table 5.8

*Regression of level of social well-being on demographic and deafness-related factors and on competency in the Deaf and Hearing cultures and relevant interaction effect (N=66)*

	<u>Equation 1</u>		<u>Equation 2</u>		<u>Equation 3</u>		<u>Equation 4</u>	
	<i>b</i>	$\beta$	<i>b</i>	$\beta$	<i>b</i>	$\beta$	<i>b</i>	$\beta$
Male	.44	.15	.23	.08	.28	.09	.26	.09
White	.20	.05	.02	.01	-.39	-.09	-.35	-.08
Age	-.01	-.15	-.01	-.03	.02	.19	.01	.12
Born deaf			.22	.07	-.11	-.11	-.10	-.10
Becoming deaf between the age of 10 and 35			1.41	.35	1.11	.28	.88	.22
Becoming deaf after the age of 35			.45	.12	.27	.07	.42	.11
Mild to moderate hearing loss			-.79	-.27	-.47	-.16	-.38	-.13
Severe to profound hearing loss			-.55	-.18	-.07	-.02	-.01	-.01
Using spoken language while growing up			-.62	-.19	-.51	-.16	-.38	-.12
Attending hearing high school with no support services for the deaf			-.49	-.17	-.72	-.24	-.75	-.25
Attending residential high school for the deaf			.32	.07	-.38	-.09	-.40	-.09
Competency in Deaf culture					.80*	.50	2.96*	1.84
Competency in Hearing culture					1.32*	.51	3.01*	1.19
Interaction							-.63	-1.24
Constant	.87		.80		-6.63		-12.51	
Adjusted R <sup>2</sup>	-.02		-.01		.25		.27	
S.E.E	1.51		1.50		1.30		1.28	

\* $p < .05$

competencies in the Deaf and Hearing culture still positively predict the dependent variable. In sum, the model shows that being competent in either the Deaf or the Hearing world independently predicts higher social well-being among deaf and hard of hearing Northern Nevadans.

As Table 5.9 shows, when predicting civic well-being, the demographic factors, entered in the first stage, again do not yield any significant associations and neither do the deafness-related factors during the second stage. However, when the cultural competency factors are entered in the third stage, using speech without sign language becomes significant indicating that those who used this kind of communication method while growing up have lower civic well-being. Cultural competency in the Hearing world emerges as a positive predictor of civic well-being suggesting that those who are competent in the Hearing world have higher civic well-being. This factor appears to be the key predictor among those deaf and hard of hearing individuals who were interviewed for this study.

Entering the interaction effect, biculturalism, in the fourth stage renders competency in the Hearing world non-significant and also lowers the explained variance. While in the third equation the demographic variables, the deafness-related factors and the cultural competency variables accounted for eleven percent of the total variance in predicting social well-being, once the interaction term is added, the adjusted  $R^2$  decreases slightly to nine percent.

Table 5.10 shows the regression of personal income on demographic controls, deafness-related factors, cultural competency and the interaction term. In the first stage, neither being white nor male is significantly associated with income. Age is the only significant predictor of income in this equation, indicating that income tends to increase with age, as expected. In the second stage, the deafness-related factors are added and age remains a significant predictor. In addition, becoming deaf after the age 35 is significantly related to income showing that those whose hearing loss occurs later in life tend to have a higher income level. None of the other deafness-related factors shows any significant association with income, and the explained variance remains the same 22 percent between equations one and two.

In equation three, cultural competencies in the Deaf and the Hearing culture are entered and although age and becoming deaf after the age of 35 remain positively related to income, the explained

Table 5.9

*Regression of level of civic well-being on demographic and deafness-related factors and on competency in the Deaf and Hearing cultures and relevant interaction effect (N=66)*

	<u>Equation 1</u>		<u>Equation 2</u>		<u>Equation 3</u>		<u>Equation 4</u>	
	<i>b</i>	$\beta$	<i>b</i>	$\beta$	<i>b</i>	$\beta$	<i>b</i>	$\beta$
Male	.18	.11	.11	.07	.11	.07	.11	.07
White	.17	.07	.18	.08	.03	.01	.03	.01
Age	-.01	-.11	-.01	-.18	-.01	-.08	-.01	-.09
Born deaf			.06	.04	.06	.03	.04	.02
Becoming deaf between the age of 10 and 35			.27	.12	.03	.02	.00	.00
Becoming deaf after the age of 35			.64	.42	.49	.23	.51	.24
Mild to moderate hearing loss			.24	.17	.43	.26	.44	.27
Severe to profound hearing loss			.12	.38	.49*	.29	.49	.29
Using spoken language while growing up			-.35	-.20	-.56	-.32	-.54	-.32
Attending hearing high school with no support services for the deaf			-.07	-.04	-.16	-.09	-.16	-.11
Attending residential high school for the deaf			.34	.14	.17	.07	.17	.07
Competency in Deaf culture					.07	.08	.39	.45
Competency in Hearing culture					.70*	.21	.96	.69
Interaction							-.09	-.34
Constant	3.16		3.20		.55		-.32	
Adjusted R <sup>2</sup>	-.03		-.05		.11		.09	
S.E.E	.83		.84		.77		.78	

\* $p < .05$

Table 5.10

*Regression of earned personal income on demographic and deafness-related factors and on competency in the Deaf and Hearing cultures and relevant interaction effect (N=66)*

	<u>Equation 1</u>		<u>Equation 2</u>		<u>Equation 3</u>		<u>Equation 4</u>	
	<i>b</i>	$\beta$	<i>b</i>	$\beta$	<i>b</i>	$\beta$	<i>b</i>	$\beta$
Male	.49	.10	.31	.07	.34	.07	.33	.07
White	.07	.01	.48	.07	.41	.06	.43	.06
Age	.07*	.47	.05*	.32	.06*	.36	.05*	.35
Born deaf			.34	.07	.32	.07	.26	.06
Becoming deaf between the age of 10 and 35			.74	.12	.87	.14	.77	.73
Becoming deaf after the age of 35			2.49*	.41	2.57*	.42	2.64*	.44
Mild to moderate hearing loss			-.30	-.06	-.29	-.06	-.25	-.05
Severe to profound hearing loss			-.07	-.01	-.23	-.05	-.23	-.05
Using spoken language while growing up			-.54	-.11	-.17	-.03	-.11	-.02
Attending hearing high school with no support services for the deaf			-.23	-.05	-.25	-.05	-.26	-.06
Attending residential high school for the deaf			.10	.01	-.13	-.02	-.14	-.02
Competency in Deaf culture					.45	.18	1.39	.55
Competency in Hearing culture					-.09	-.02	.67	.17
Interaction							-.28	-.35
Constant	-.16		.52		-.81		-3.41	
Adjusted R <sup>2</sup>	.22		.22		.21		.19	
S.E.E	2.07		2.08		2.09		2.11	

\* $p < .05$

variance decreases slightly. In the fourth stage, when the interaction effect is entered the results are almost the same with age and becoming deaf after the age of 35 positively related to income but the explained variance slightly decreases some more to 19 percent. In sum, among the deaf and hard of hearing Northern Nevadans that were interviewed for this study, age and the age of onset of hearing loss are the key predictors of income. The older participants and those who lost their hearing later in their lives appear to have higher income among this sample.

### *Summary and Discussion*

In sum, the regression analyses show that in this sample of deaf and hard of hearing Northern Nevadans, the key factors predicting competency in Deaf culture are age and level of hearing loss. The younger participants are more likely to be competent in Deaf culture as well as those who have more profound hearing loss. The first finding is peculiar and is most likely the result of the fact that the younger individuals interviewed for this study were more Deaf culture oriented while the older individuals were more competent in the Hearing world. It is also possible that since the Americans with Disabilities Act was passed by Congress in 1990, American Sign Language and deafness as a culture have become more acknowledged. Prior to the ADA, ASL was not recognized as a language and parents were not encouraged to teach their children to sign but rather to train them to be competent only in the Hearing world. Therefore, it is possible that younger individuals have more pride in their deafness and identify more readily with the Deaf culture than the older participants who might have been raised with different values.

The second finding, that individuals with a more significant level of hearing loss are more competent in the Deaf culture, has been demonstrated in other studies as well (Maxwell-McCaw, 2001). With severe to profound hearing loss, deaf people are unlikely to be able to function well in the Hearing world which is largely built on aural communication and the ability to hear. They are more likely to learn to become competent in the Deaf culture where manual ways of communication provide full access to information and where other individuals have similar life experiences, values and norms that are often different from those of the Hearing world.

The key predictors in determining cultural competency in the Hearing world are level of hearing loss and use of a spoken language while growing up. These findings have also been demonstrated by other studies (Maxwell-McCaw, 2001) and are not unexpected. As it was mentioned above, those with severe to profound hearing loss tend to be more competent in the Deaf culture and not in the Hearing world. In addition, those who use a spoken language tend to be more Hearing culture oriented as using American Sign Language is a foremost characteristic of Deaf culture. Therefore, those who do not learn this manual form of communication are unlikely to become competent in the Deaf world and conversely, are likely to prefer functioning in the Hearing culture.

The finding that those who are competent in the Hearing culture have higher level of self-esteem is somewhat surprising and contrary to previous findings. Phinney (1990) and Bat-Chava (1994) both suggested that individuals who can navigate freely between the two cultures have the highest level of self-esteem and those who are Deaf culture oriented have higher level of self-esteem than those who are more competent in the Hearing world (Maxwell-McCaw, 2001). It is possible that since Northern Nevada does not have a sizeable Deaf community and a flourishing Deaf culture and the services offered to deaf and hard of hearing individuals are behind compared to other states such as California, Colorado or Arizona, Deaf culture oriented individuals in this area feel isolated and less capable of leading a successful life.

The regression analyses results indicate that social well-being, which was measured by the participants' self-perception of how well-liked and accepted by their peers they are as well as by the number of friends they have, is strongly associated with competency in both the Deaf and the Hearing cultures. Not surprisingly, having a strong anchor or good social network in either culture increases social well-being.

The study indicates that participants who are competent in the Hearing culture tend to have higher civic well-being, which was assessed by the services available to deaf and hard of hearing individuals. This finding suggests that the services required by Hearing world oriented individuals are more readily available in Northern Nevada. This finding is closely related to the fact that Hearing culture competent individuals have higher self-esteem as they are likely to be more satisfied with the services that are

offered to them and that are necessary for their functioning in everyday life. Since the services, such as sign language interpreters and captioning, required by Deaf culture competent individuals are scarce in this area, these deaf and hard of hearing people are likely to have a lower sense of well-being.

The key predictors of earned income in this study are age and becoming deaf after the age of 35; neither of which is a surprising finding. Older individuals have more life experience and a better chance of being in position which offers higher income compared to the younger generations. In addition, those who become deaf later in their lives are likely to have already established careers and can rely on the experiences they have accumulated throughout their lives to continue to be in positions with higher income possibilities. On the other hand, as the previous finding shows, those who become deaf earlier in their lives and require services to have equal access and equal opportunity to function well at the work place are likely to be disadvantaged since those services are often not available for them.

The bivariate analyses and the regression analyses yielded some strong results regarding deafness-related factors influencing cultural competency as well as cultural competency influencing the quality of life of deaf and hard of hearing individuals in Northern Nevada. Both tests supported the assumption that becoming deaf earlier in life and having significant hearing loss tend to be a predictor of Deaf cultural competency. On the other hand, those who have mild or moderate hearing loss, and those who used a spoken language while growing up tend to be more competent in the Hearing world.

While most previous studies claimed that those who are competent in the Deaf culture or possess bicultural competency have higher self-esteem, the tests ran in this study show otherwise. Both the correlational and the regression analyses indicate that those deaf and hard of hearing individuals who are competent in the Hearing world have higher self-esteem and higher satisfaction with life; a finding that can probably be traced back to the very small Deaf community in Northern Nevada. This result can be connected to another finding; that those with Hearing cultural competency have higher civic well-being. Being able to utilize the services needed for succeeding in everyday life can boost self-esteem while the lack of those services may lead to lower self-esteem. Without the necessary support services to function

independently, deaf and hard of hearing people have to rely on others which is likely to give them the feeling that they are not able to get along in the world on their own.

The bivariate and regression analyses presented results that were mainly expected based on the literature review. The findings will be more extensively discussed in Chapter 8. While there were some significant correlations and the regression analyses yielded some results, these are limited in scope mainly because of the relatively small sample size. In addition, each variable is treated as independent so potentially important combinations of causes cannot be tested. The QCA analyses attempt to bypass exactly these limitations. The next chapter presents those results related to competency in the Deaf culture, and Hearing culture, and both cultures (biculturalism).

**CHAPTER 6:**  
**QUALITATIVE COMPARATIVE ANALYSIS RESULTS PART ONE:**  
**COMPETENCY IN THE DEAF AND HEARING CULTURES**

Qualitative comparative analyses (QCA) were conducted on a series of target sets, beginning with cultural competency in the Deaf and then the Hearing cultures as well as bicultural competency, followed by various indicators of quality of life, including self-esteem, life satisfaction, civic well-being, and social well-being. This chapter follows the basic steps of analyzing the fuzzy set truth tables for competency in the Deaf culture, the Hearing culture, and biculturalism. These basic steps are: (1) definition of each fuzzy set with clear explanation of how the scores were calibrated, (2) identification of necessary conditions for each dependent variable, (3) explanation of the truth table, and (4) simplification or minimization process, if applicable, (5) explanation of each path to the dependent variable under analysis. This chapter explains the association between the background factors and cultural competency, while the following chapter focuses on the associations among the background factors, cultural competency and the various indicators of quality of life.

*Competency in Deaf culture*

The calibration of competency in Deaf culture started with setting the target set which was deaf and hard of hearing Northern Nevadans who are highly competent in the Deaf culture. In the original ordinal scale for competency in the Deaf culture, the scores ranged from 1.24 to 4.75 on a 5-point scale. There was no participant that answered each question with “excellent” and felt that they had excellent skills pertaining to every area of Deaf culture. However, the score 4.75 indicates high competency because participants with this score answered most questions with “excellent” with a few “good” selections in-between. There were also no participants in this sample who scored “not at all” competent in various areas of Deaf culture. The score 1.24 indicates rather low competency as it reflects that most answers were “not at all” with a few “a little” regarding competency in Deaf culture. As such these individuals may be considered as fully out of the set of those with high competency in Deaf culture.

The next step in this procedure was to determine the cross-over point which was set at 2.68 in this sample. This score represents an almost equal number of “good” and “excellent” answers on the 5-point scale. These answers reflect that these individuals feel they are competent in various aspects of Deaf culture. The cross-over point in this case leans in the positive direction because competency in Deaf culture is not normally distributed but is higher than the midpoint of the scale. As a result, the cross-over point is more in the “good” territory. Scores above this point tend to lean toward the “excellent” category which means respondents were more likely to have higher competency in Deaf culture. On the other hand, scores below this point tend to present more “little” and “not at all” answers which indicate that respondents were likely to be lower on the competency on the Deaf culture continuum.

The thresholds for full membership and full non-membership were set at 4.03 and 1.99, respectively. Respondents who scored 4.03 or above answered most questions related to competency in Deaf culture with “good” and some with “excellent”. The threshold for full non-membership was set at 1.99. Respondents at and below this score answered most questions with “a little” with some “not at all.” The fuzzy-set scores of the first ten cases of this study can be seen in Table 6.1.

Table 6.1: *Fuzzy Set Scores for dependent variables and degree of hearing loss*

Case Number	High Competency in Deaf Culture	High Competency in Hearing Culture	Bicultural Competency	Degree of Hearing Loss	Low Competency in Deaf Culture	Low Competency in Hearing Culture
1	.93	.63	.75	0	.06	.18
2	.37	.73	.75	.5	.27	.13
3	.2	.19	.5	.5	.28	.56
4	.86	.67	.75	.5	.07	.16
5	.11	.53	.5	.5	.56	.23
6	.01	.94	.25	.5	.98	.04
7	.02	.77	.25	1	.99	.11
8	.68	.21	.5	1	.13	.39
9	.01	.42	.25	.5	.99	.30
10	.06	.16	.25	.5	.83	.63

Table 6.2

*Original Truth Table Configurations for Qualitative Comparative Analysis of High Level of Competency in Deaf Culture among Deaf and Hard of Hearing Individuals in Northern Nevada*

<b>Independent Variables</b>										<b>Number of Cases</b>	<b>Dependent Variable</b>	<b>Consistency Values</b>
<i>Born deaf</i>	<i>Deaf as a child</i>	<i>Deaf as a young adult</i>	<i>Deaf in mid to old age</i>	<i>Use speech without sign</i>	<i>Use sign language</i>	<i>Attend hearing high school</i>	<i>Attend mainstream high school</i>	<i>Attend residential high school</i>	<i>Significant hearing loss</i>		<i>High Competency In Deaf culture</i>	
1	0	1	0	0	1	0	0	1	1	3	1	.95
0	1	0	0	0	1	0	1	0	0	2	1	.91
1	0	1	0	0	1	0	1	0	1	4	0	.65
1	0	0	0	1	0	0	1	0	1	2	0	.51
1	0	0	0	1	0	0	1	0	0	2	0	.48
0	0	1	0	1	0	1	0	0	1	4	0	.40
0	0	0	1	1	0	1	0	0	1	3	0	.15

Since all but one independent variable, the degree of hearing loss, are crisp-set variables, the prime implicants were determined by the minimization process after the truth table with all possible causes was constructed. Table 6.2 represents this original truth table. As was mentioned in Chapter 4, the truth table in its raw form contains all logically possible configurations across the 66 cases, which in this case  $2^9$  since there are ten columns with deafness-related factors. However, instead of listing all those rows that contain even empirically impossible combinations, the original truth tables presented in this chapter contain only those configurations that remained after the statistical procedures mentioned in Chapter 4. As a result, in the case of Deaf culture competency, out of the logically possible 1024 rows, only seven appear in the original truth table.

Reduction of the truth table was based on the paired minimization process and the inferential statistical results which showed positive correlations between being born deaf, using at least some sign language while growing up, attending residential school for the deaf, and having profound hearing loss and the dependent variable competency in Deaf culture. The minimization process was based on paired comparisons. In QCA, if two terms that differ in only one causal condition yield the same outcome, the distinguishing factor is considered irrelevant and is dropped from the pair of configurations (Soulliere, 2005). This is done until no more reduction is possible or if either the consistency or coverage value drops below the acceptable standard. The thus achieved truth table for high level of cultural competency can be seen in Table 6.3.

Table 6.3

*Final Truth Table Configurations for Qualitative Comparative Analysis of High Level of Competency in Deaf Culture among Deaf and Hard of Hearing Individuals in Northern Nevada*

Independent Variables						Number of Cases	Dependent Variable	Consistency Values
<u>Deafness related factors</u>								
<i>Born deaf</i>	<i>Deaf as a child</i>	<i>Use sign language</i>	<i>Attend mainstream high school</i>	<i>Attend residential high school</i>	<i>Significant hearing loss</i>		<i>High Competency In Deaf culture</i>	
1	0	1	0	0	1	2	1	.97
1	0	1	0	1	1	3	1	.95
0	1	1	1	0	0	2	1	.91
1	0	1	1	0	1	4	0	.65
1	0	0	0	1	1	2	0	.55
1	0	0	1	0	1	2	0	.51
1	0	0	1	0	0	2	0	.48
0	0	0	0	0	1	8	0	.33
0	0	0	0	0	0	2	0	.23

The minimization process left six deafness-related factors in the solution as after comparing the rows, the others were identified as irrelevant. The process resulted in higher consistency values and greater number of cases involved. The reason for the better results is the elimination of the variables that did not contribute significantly to the configuration indicating that they do not have an influence on achieving high competency in Deaf culture. The thus achieved rows produced two configurations which can be seen in Table 6.4.

Table 6.4

*Qualitative Comparative Analysis Minimization Results (Prime Implicants) for High Competency in Deaf Culture*

---

HIGH COMPETENCY IN DEAF CULTURE =

BORN DEAF \*deaf as a child\*USE SIGN LANGUAGE\*attend mainstream high school\*SIGNIFICANT HEARING LOSS +

Born deaf\*DEAF AS A CHILD\*USE SIGN LANGUAGE\*ATTEND MAINSTREAM HIGH SCHOOL\*attend residential high school\*significant hearing loss.

---

Solution Coverage: .30

Solution Consistency: .93

These two combinations are shorthand representations summarizing the data in the final truth table that contain only the essential prime implicants. This solution describes parsimoniously the two combinations of deafness-related factors that allow for logically explaining the possible ways to achieving competency in Deaf culture based on this data collected from deaf and hard of hearing individuals in Northern Nevada.

What this solution essentially means is that using sign language when growing up is the sole necessary condition for high level of competency in Deaf culture. Of the two alternative combinations, one designates being born deaf and having significant hearing loss as important factors and the other indicates becoming deaf as a child and attending mainstream school with support services for the deaf as such, in addition to the using sign language while growing up. Attending residential school for the deaf appears only in the second combination and it indicates the absence of it. The final solution consistency is .93 which indicates that the result is highly reliable. In addition, the final solution coverage is .30 which means that the independent variables remaining in the final solution explain thirty percent of all variation in competency in Deaf culture among deaf and hard of hearing individuals in Northern Nevada.

In sum, the qualitative comparative analysis indicates that there are two configurations of conditions that predict high competency in Deaf culture among those deaf and hard of hearing individuals in Northern Nevada who participated in this study: (1) being born deaf, using sign language while

growing up and have significant hearing loss or (2) becoming deaf as a child, using sign language while growing up and attending mainstream high school with some support services for the deaf.

In addition to testing high competency in Deaf culture, the opposite, low competency in Deaf culture was also calibrated. The target set in this case was deaf and hard of hearing Northern Nevadans who have low competency in Deaf culture. The original ordinal scale scores are the same as they were for high competency in Deaf culture but the thresholds were set differently, based on this target set. Since there was no participant answering each Deaf culture related questions with “not at all”, no one had a score of one. However, those who scored below 1.65 can be considered fully in the set of individuals with low competency in Deaf culture as most of their answers regarding competency in Deaf culture was “not at all” with a couple of “a little.” The ordinal scale score of 2.0 was set as the threshold for being fully in the category of low Deaf culture competent individuals as they still answered most of the related questions with “not at all” with a very few “a little.” The crossover point was set at 2.59, which is almost the middle score on a 5-point scale and represents answers to the Deaf culture related questions in the “average” category.

No one reached the maximum score but those with a 4.75 may be considered as fully out of the set of those with low competency in Deaf culture since they answered most of the questions with “excellent” with a few “good” selections in-between. A value of 4.47 was set as the threshold for full non-membership in the set of low competent Deaf individuals as the dominant answer to the questions regarding Deaf culture was “good” with some “excellent” selections as well. The fuzzy set scores of the first ten cases can be seen in Table 6.1. Table 6.5 represents the original truth table with all the deafness-related factors included.

The truth table shows seven configurations but only one of them meets the acceptable consistency level and solution consistency is rather low. The minimization process eliminated several variables, such as becoming deaf as a young adult, using sign language as a mode of communication and having attended residential high school for the deaf as significant influences on low competency in Deaf culture. The thus achieved truth table can be seen in Table 6.6.

Table 6.5

*Original Truth Table Configurations for Qualitative Comparative Analysis of Low Level of Competency in Deaf Culture among Deaf and Hard of Hearing Individuals in Northern Nevada*

<b>Independent Variables</b>										<b>Number of Cases</b>	<b>Dependent Variable</b>	<b>Consistency Values</b>
<i>Born deaf</i>	<i>Deaf as a child</i>	<i>Deaf as a young adult</i>	<i>Deaf in mid to old age</i>	<i>Use speech without sign</i>	<i>Use sign language</i>	<i>Attend hearing high school</i>	<i>Attend mainstream high school</i>	<i>Attend residential high school</i>	<i>Significant hearing loss</i>		<i>Low Competency In Deaf culture</i>	
0	0	0	1	1	0	1	0	0	1	3	1	.91
0	0	1	0	1	0	1	0	0	1	4	0	.70
1	0	0	0	1	0	0	1	0	0	2	0	.69
1	0	0	0	0	0	0	1	0	1	2	0	.65
1	0	0	0	0	1	0	1	0	1	4	0	.41
0	1	0	0	0	1	0	1	0	0	2	0	.29
1	0	0	0	0	1	1	0	1	1	3	0	.10

Table 6.6  
*Final Truth Table Configurations for Qualitative Comparative Analysis of Low Level of Competency in Deaf Culture among Deaf and Hard of Hearing Individuals in Northern Nevada*

Independent Variables					Number of Cases	Dependent Variable	Consistency Values
<u>Deafness related factors</u>							
<i>Born deaf</i>	<i>Deaf as a child</i>	<i>Deaf in mid to old age</i>	<i>Use speech without sign</i>	<i>Attend hearing high school</i>		<i>Low Competency In Deaf culture</i>	
1	0	0	1	1	4	1	.91
0	0	1	1	1	8	1	.86
0	0	1	1	0	3	1	.82
0	1	0	1	1	3	1	.76
0	0	0	1	1	11	0	.70
0	1	0	1	0	3	0	.66
1	0	0	1	0	10	0	.56
1	0	0	0	0	12	0	.22
1	0	0	0	1	3	0	.22
0	1	0	0	0	10	0	.18

The table shows increased numbers of configurations and cases included. The solution coverage also increased to .41 which means that the variables included explain 41% of all variations explaining low competency in Deaf culture. The final solution consistency is .85, which indicates that this result is indeed reliable. The thus achieved rows produced three configurations and can be seen in Table 6.7.

The solution shows that using speech without any kind of sign language as a mode of communication while growing up is the single most important factor in having low competency in the Deaf culture. In addition, those who attended hearing high school with no support services for the deaf also results in a deaf or hard of hearing person's low competency in Deaf culture, at least in the present

sample of Northern Nevadans. Whether someone was born deaf, became deaf a child or in middle to old age, does not seem to be a dominant factor but they become such as they are combined with using speech without sign and having attended hearing high school. In sum, the same factors that tend to lead to high competency in Hearing culture also seem to predict low competency in Deaf culture.

Table 6.7

*Qualitative Comparative Analysis Minimization Results (Prime Implicants) for Low Competency in Deaf Culture*

---

LOW COMPETENCY IN DEAF CULTURE =

Born deaf\*become deaf as a child\*BECOME DEAF IN MID TO OLD AGE\*USE SPEECH WITHOUT SIGN +

BORN DEAF\*become deaf as a child\*become deaf in mid to old age\*ATTEND HEARING HIGH SCHOOL\*USE SPEECH WITHOUT SIGN +

Born deaf\*BECOME DEAF AS A CHILD\*become deaf in mid to old age\*ATTEND HEARING HIGH SCHOOL\*USE SPEECH WITHOUT SIGN

---

Solution Coverage: .41

Solution Consistency: .85

### *Competency in Hearing culture*

The calibration of competency in Hearing culture also started with setting the target set which is deaf and hard of hearing Northern Nevadans who are highly competent in the Hearing culture. In the original ordinal 5-point scale, the scores ranged from 1.53 to 4.47. The distribution was even more skewed in this case than in the case of competency in Deaf culture, the median being 3.43, and most participants answering “good” or “excellent” to the majority of the questions related to Hearing culture, meaning that they felt they were competent in the various areas, such as language skills, tested by the researcher. Although there was no participant who answered each question with “excellent” and as such no one could be regarded as fully competent in Hearing culture, the participant with the 4.47 score was considered as possessing excellent skills to function in the Hearing culture. There was also no participant in this sample who answered “not at all” competent in various areas of Hearing culture, but the sole

participant with a score of 1.52 was considered fully out of the group of individuals with high competency in the Hearing culture.

The next step in this procedure was to determine the cross-over point which was set at 3.43 in this sample. This score represents an almost equal number of “good” and “excellent” answers on the 5-point scale. Since the sample is skewed, the cross-over point is above average and is significantly more in the “good” territory. Scores above this point tended to have at least some answers in the “excellent” category which means the respondents were more likely to have higher competency in Hearing culture. On the other hand, scores below this point tended to present more “average” and “a little” answers which indicate that respondents were likely to be lower on the competency in Hearing culture continuum.

The thresholds for full membership and full non-membership were set at 4.31 and 2.31, respectively. Respondents who scored 4.31 answered most questions regarding competency in Hearing culture as “good” along with some “excellent” selections as well. The threshold for full non-membership was set at 2.31. Respondents at and below this score answered most questions with “a little” with a few “not at all” which means they did not feel competent in the various aspects of Hearing culture tested in this study. The fuzzy-set scores of the first ten cases of this study can be seen in Table 6.1. Since all but one independent variables, degree of hearing loss, are crisp variables, the prime implicants were determined by the minimization process after the truth table with all possible causes was constructed. Table 6.8 represents this original truth table.

Of all the possible configurations, seven of them appear in the original truth table. Reduction of the truth table was based on the paired minimization process and the inferential statistical results which showed positive correlations between becoming deaf as a young adult, using a spoken language while growing up and attending high school with no support services for the deaf and the dependent variable competency in Hearing culture. The resulting truth table can be seen in Table 6.9.

Table 6.8

*Original Truth Table Configurations for Qualitative Comparative Analysis of High Level of Competency in Hearing Culture among Deaf and Hard of Hearing Individuals in Northern Nevada*

<b>Independent Variables</b>										<b>Number of Cases</b>	<b>Dependent Variable</b>	<b>Consistency Values</b>
<i>Born deaf</i>	<i>Deaf as a child</i>	<i>Deaf as a young adult</i>	<i>Deaf in mid to old age</i>	<i>Use speech without sign</i>	<i>Use sign language</i>	<i>Attend hearing high school</i>	<i>Attend mainstream high school</i>	<i>Attend residential high school</i>	<i>Significant hearing loss</i>		<i>Competency In Deaf culture</i>	
1	0	0	0	1	0	0	1	0	0	2	1	.77
0	0	1	0	1	0	1	0	0	1	4	0	.73
0	0	0	1	1	0	1	0	0	1	3	0	.59
1	0	0	0	1	0	0	1	0	1	2	0	.58
0	1	0	0	0	1	0	1	0	0	2	0	.47
1	0	0	0	0	1	0	0	1	1	3	0	.29
1	0	0	0	0	1	0	1	0	1	4	0	.28

Table 6.9

*Final Truth Table Configurations for Qualitative Comparative Analysis of High Level of Competency in Hearing Culture among Deaf and Hard of Hearing Individuals in Northern Nevada*

Independent Variables				Number of Cases	Dependent Variable	Consistency Values
<i>Born deaf</i>	<i>Use speech without sign</i>	<i>Attend mainstream high school</i>	<i>Significant hearing loss</i>			
					<i>Competency In Hearing culture</i>	
0	1	0	0	2	1	.86
0	1	1	1	2	1	.82
1	1	1	0	2	1	.77
0	1	0	1	8	0	.65
1	1	0	1	2	0	.59
1	1	1	1	2	0	.58
0	0	1	0	2	0	.47
1	0	1	1	4	0	.29
1	0	0	1	6	0	.22

The minimization process again resulted in more rows in the truth table, a greater number of cases and higher consistency values. It also produced more combinations, as the original analysis yielded only one while this final one indicated three. The final solution can be seen in Table 6.10. The results reveal that using only speech and relying on lip-reading abilities while growing up is the single most important factor in predicting high competency in the Hearing culture. This variable combines with others to indicate three different possible pathways to high competency in the Hearing culture. In the first configuration, using speech alone is satisfactory but it comes with the absence of being born deaf, attending a different kind of high school rather than mainstream high school with some support services for the deaf and having less than a significant hearing loss. The second configuration presents the combination of being born deaf, attending mainstream high school with some support services for the

deaf and a not so significant hearing loss along with the essential using speech while growing up as a pathway to high competency in Hearing culture. The third combination joins attending mainstream high school with support services for the deaf and significant hearing loss with using speech while growing up as important factors in achieving high competency in the Hearing culture.

Table 6.10

*Qualitative Comparative Analysis Minimization Results (Prime Implicants) for High Competency in Hearing Culture*

---

HIGH COMPETENCY IN HEARING CULTURE =  
born deaf\*USE SPEECH WITHOUT SIGN\*attend mainstream high school\*significant hearing loss+

BORN DEAF\*USE SPEECH WITHOUT SIGN\*ATTEND MAINSTREAM HIGH  
SCHOOL\*significant hearing loss+

Born deaf\*USE SPEECH WITHOUT SIGN\*ATTEND MAINSTREAM HIGH  
SCHOOL\*SIGNIFICANT HEARING LOSS.

---

Solution Coverage: .43

Solution Consistency: .84

The final solution consistency is .84 which indicates that these pathways to competency in Hearing culture are highly reliable. The solution coverage is .43 which means that being born deaf, using speech while growing up, attending mainstream school with some support services for the deaf and having significant hearing loss together explain 43 percent of variance in high competency in Hearing culture.

The original ordinal scale scores were calibrated for individuals with low competency in the Hearing culture; however, the deafness-related factors used in this study did not yield reliable results in this respect and as such they could not be used to determine what leads to low competency in the Hearing culture in this sample. The variable, however, will be used for further analyses to test the various quality of life measures.

#### *Competency in both the Deaf and Hearing cultures*

A measure of bicultural competency was created based on participants' scores in the competency in Deaf and Hearing culture measures. A five-value fuzzy set was created using the cross-over points and

the thresholds for being “fully in” or “fully out” in each set as a starting point. If participants had scores above the threshold of “fully in” the set of high cultural competency in both the deaf and hearing cultures, they would have been considered as “fully in” the set of those with high bicultural competency. However, there were not any such individuals in this sample. If participants had a score above the threshold of “fully in” the set on one measure but only above the cross-over point on the other measure, they were given a score of .75, which means they are “more in than out” of the set of those who have high bicultural competency. If respondents had scores at or around the cross-over point on each scale, they were determined as “neither in nor out” of the set of highly bicultural individuals. If participants had a score below the threshold of being “fully out” of the set in each cultural competency measure, they were given a score of .25, which indicated that they are “more out than in” in the set of those with high bicultural competency. Lastly, those who had scores below the points that indicate low cultural competency on each measure were considered having low bicultural competency. The scores of the first ten participants can be seen in Table 6.1.

All deafness-related factors measured in this study were used to test bicultural competency in this sample of deaf and hard of hearing Northern Nevadans. The thus achieved truth table can be seen in Table 6.11. When testing for necessary conditions in order to look for prime implicants, the minimization process did not result in any significant differences in solution consistency and solution coverage which means that removing any of the deafness-related factors does not make a difference in explaining bicultural competency. The truth table produced only one configuration and the solution coverage is rather low, which means that these variables constitute only a small part of bicultural competency.

Table 6.11

*Original Truth Table Configurations for Qualitative Comparative Analysis of High Level of Bicultural Competency among Deaf and Hard of Hearing Individuals in Northern Nevada*

<b>Independent Variables</b>										<b>Number of Cases</b>	<b>Dependent Variable</b>	<b>Consistency Values</b>
<i>Born deaf</i>	<i>Deaf as a child</i>	<i>Deaf as a young adult</i>	<i>Deaf in mid to old age</i>	<i>Use speech without sign</i>	<i>Use sign language</i>	<i>Attend hearing high school</i>	<i>Attend mainstream high school</i>	<i>Attend residential high school</i>	<i>Significant hearing loss</i>		<i>Bicultural competency</i>	
0	1	0	0	0	1	0	1	0	0	2	1	.72
1	0	0	0	1	0	0	1	0	0	2	0	.71
1	0	0	0	1	0	0	1	0	1	2	0	.71
1	0	0	0	0	1	0	0	1	1	3	0	.62
0	0	1	0	1	0	1	0	0	1	4	0	.56
1	0	0	0	0	1	0	1	0	1	4	0	.48
0	0	0	1	1	0	1	0	0	1	3	0	.43

The final solution can be seen in Table 6.12, and it explains that becoming deaf as a child, attending mainstream high school and using at least some sign language are the important factors leading to bicultural competency. All of these factors give the opportunity to deaf and hard of hearing individuals to move between the two cultures. When someone becomes deaf as a child, they are likely to already be able to speak, in a mainstream high school they can socialize with their hearing peers but they get the support services they need as deaf individuals and using at least some sign language means they can comfortably function in the Deaf world as well.

Table 6.12

*Qualitative Comparative Analysis Minimization Results (Prime Implicants) for High Bicultural Competency*

---

HIGH BICULTURAL COMPETENCY =

born deaf\*DEAF AS A CHILD\*deaf as a young adult\*deaf in mid to old age\*use speech without sign\*USE SIGN LANGUAGE\*attend hearing high school\*ATTEND MAINSTREAM HIGH SCHOOL\*attend residential school for the deaf\*significant hearing loss.

---

Solution Coverage: .43

Solution Consistency: .84

The qualitative comparative analyses regarding cultural competency revealed more fine-tuned details regarding the deafness-related factors that influence cultural competency than regression analyses in the previous chapter. While both methods suggest that using speech without sign language is a core factor in being competent in the Hearing culture, and that significant hearing loss is an important factor in determining competency in either culture, QCA analyses give a more detailed picture as to which factors are important and which are not.

The significant difference between regression analysis and QCA is that, although the former reveals individual factors that might predict a certain outcome, QCA reveals a combination of factors that have to be present in order for an outcome to happen. Although regression analysis showed that having a significant hearing loss is a predictor of being competent in the Deaf culture, QCA revealed that it is the combination of factors that actually matters. Having a significant hearing loss in itself does not make

someone competent in either of these cultures, but if it combines with having born deaf and using at least some sign language while growing up, it leads to high competency in Deaf culture. On the other hand, if it is joined by attending mainstream high school with some support services for the deaf and using only speech while growing up, it leads to high competency in the Hearing culture.

It seems to be clear from both methods that means of communication is a key predictor in cultural competency. Those who used at least some sign language while growing up tend to be competent in Deaf culture while those who used only speech tend to be competent in the Hearing culture. On the other hand, while bivariate analyses showed the significance of attending different schools, QCA showed that attending mainstream high school with some support services for the deaf, while combined with various factors, can be a predictor of competency in either culture and in biculturalism as well.

The next chapter presents the results of qualitative comparative analyses revealing whether and which deafness-related factors and cultural competency variables influence the various quality of life indicators.

**CHAPTER 7:**  
**QUALITATIVE COMPARATIVE ANALYSIS RESULTS PART TWO:**  
**QUALITY OF LIFE**

In this chapter qualitative comparative analyses (QCA) results explaining the association between the background factors, cultural competency and the various indicators of quality of life are presented. The results of analysis for self-esteem were used as example in Chapter 4 and are summarized but not repeated in detail here. This chapter follows the same basic steps of analyzing each fuzzy set truth table as it was done in the previous chapter. These basic steps are: (1) definition of each fuzzy set with clear explanation of how the scores were calibrated, (2) identification of necessary conditions for each dependent variable, (3) explanation of the truth table, (4) simplification or minimization process, if applicable, and (5) explanation of each path to the dependent variable under analysis.

*Self-Esteem*

As the analyses detailed in Chapter 4 showed, the single most important factor in achieving high self-esteem among the deaf and hard of hearing individuals that participated in this study is having a significant hearing loss. Table 4.6 reveals the three possible combinations, all of which contain significant hearing loss as a factor. In the first configuration, having a significant hearing loss combines with becoming deaf as a young adult, using speech without sign language growing up and attending hearing high school with no support services for the deaf, as well as having low competency in Deaf culture as the most common pathway to high self-esteem.

Another combination predicting high self-esteem joins significant hearing loss with being born deaf, using sign language while growing up, and attending mainstream high school with at least some support services for the deaf. These two combinations reflect two different groups of deaf people: one that is more oriented toward the Hearing culture and another that is more oriented toward the Deaf culture. In the third pathway, having low competency in Deaf culture is also an important factor along with significant hearing loss, using speech while growing up and attending mainstream high school with some support services for the deaf.

Finally, Table 4.6 reveals that the solution consistency in the case of self-esteem is .89 which is well above the cut-off point of .75 and shows that the causal combinations are indeed a subset of high self-esteem. The solution coverage is .26 which means that the causal conditions in these combinations explain 26 percent of all variance in self-esteem among the deaf and hard of hearing Northern Nevadans of this sample.

### *Satisfaction with Life*

The calibration of satisfaction with life started with setting the target set which is deaf and hard of hearing Northern Nevadans with high level of satisfaction with their lives. In the original ordinal scale the scores ranged from 1.33 to 3.83 on a 4-point scale. There was no participant that answered each question with “strongly agree” and as such no one could be assigned full membership in the set of individuals with high life satisfaction. While there were also no individuals in this sample who scored “fully disagree” on each satisfaction with life item, those with a score of 1.33 can be deemed as fully out of the set of those with high life satisfaction. Respondents at this score of 1.33 answered all but one question on this scale with the “strongly disagree” which indicates that they are unlikely to be satisfied with their life.

The next step was to determine the cross-over point which was set at 3 in this sample. This score represents an equal number of “agree” and “strongly agree” answers on the 4-point scale. Similarly to the self-esteem construct, the cross-over point in this case also leans somewhat in the positive direction in this sample. Scores above this point tended to lean toward the “strongly agree” category which means the respondents were more likely to have higher satisfaction with life. On the other hand, scores below this point tended to present more “disagree” even leaning toward “strongly disagree” answers which indicate that these respondents were likely to be lower on the satisfaction with life continuum.

The thresholds for full membership and full non-membership were set at 3.83 and 2, respectively. Respondents who scored 3.83 answered all of the satisfaction with life questions, except one, with “strongly agree,” and therefore can be deemed as having high level of life satisfaction. The threshold for full non-membership was set at 2. Respondents at and below this score answered most questions with

“disagree” with several “strongly disagree.” The fuzzy-set scores of the first ten cases of this study can be seen in 7.1.

Testing for necessary conditions eliminated several of the fuzzy sets as the average membership score for them was lower than that of the average fuzzy set scores of high satisfaction with life. Hearing loss and low competency with Deaf culture were the only two that emerged as necessary conditions in determining high satisfaction with life in this sample of deaf and hard of hearing Northern Nevadans. As was explained in Chapter 4, a condition is considered necessary if the scores on the average membership score on the dependent variable are less than or equal to the average membership score on the independent variable.

When testing for necessary conditions, degree of hearing loss produced a score of .76 as opposed to a score of .6 of the dependent variable. In the same test, low competency in Hearing culture had a score of .68 as opposed to a value of .62 of the dependent variable. The original truth table was constructed with all the crisp variables and the above-mentioned two fuzzy-set variables. Table 7.2 presents the original truth table. Applying .75 as a cut-off point yielded two rows as true (one), while five rows were set as remainders (zero) indicating that these causal combinations are false.

*Table 7.1*  
*Fuzzy Set Scores for dependent variables and degree of hearing loss*

<b>Case Number</b>	<b>Self-Esteem</b>	<b>Life Satisfaction</b>	<b>Civic Well-Being</b>	<b>Social Well-Being</b>	<b>Personal Income</b>	<b>High Competency in Deaf Culture</b>	<b>High Competency in Hearing Culture</b>	<b>Bicultural Competency</b>	<b>Degree of Hearing Loss</b>	<b>Low Competency in Deaf Culture</b>	<b>Low Competency in Hearing Culture</b>
1	.52	.77	.07	.63	0	.93	.63	.75	0	.06	.18
2	.45	.92	.41	.45	.5	.37	.73	.75	.5	.27	.13
3	.45	.32	.94	.53	0	.2	.19	.5	.5	.28	.56
4	.86	.77	.5	.82	.5	.86	.67	.75	.5	.07	.16
5	.55	.65	.13	.39	.25	.11	.53	.5	.5	.56	.23
6	.73	.32	.33	.85	0	.01	.94	.25	.5	.98	.04
7	.95	.86	.03	.57	.75	.02	.77	.25	1	.99	.11
8	.25	.18	.13	.57	0	.68	.21	.5	1	.13	.39
9	.86	.32	.09	.4	.75	.01	.42	.25	.5	.99	.30
10	.8	.95	.01	.12	.5	.06	.16	.25	.5	.83	.63

Table 7.2  
*Original Truth Table Configurations for Qualitative Comparative Analysis of High Satisfaction with Life among Deaf and Hard of Hearing Individuals in Northern Nevada*

<b>Independent Variables</b>											<b>Outcome Variable</b>	<b>Number of Cases</b>	<b>Consistency Values</b>
<u>Deafness related factors</u>										<u>Cultural Competency variable</u>	<i>High Life Satisfaction</i>		
<i>Born deaf</i>	<i>Deaf as a child</i>	<i>Deaf as a young adult</i>	<i>Deaf in mid to old age</i>	<i>Use speech without sign</i>	<i>Use sign language</i>	<i>Attend hearing high school</i>	<i>Attend mainstream high school</i>	<i>Attend residential high school</i>	<i>Significant hearing loss</i>	<i>Low competency Deaf culture</i>			
0	0	1	0	1	0	1	0	0	1	1	1	2	.85
1	0	0	0	0	1	0	1	0	1	0	1	3	.78
1	0	0	0	1	0	0	1	0	0	1	0	2	.69
0	1	0	0	0	1	0	1	0	0	0	0	2	.69
0	0	1	0	1	0	1	0	0	1	0	0	2	.59
0	0	0	1	1	0	1	0	0	1	1	0	3	.54
1	0	0	0	0	1	0	0	1	1	0	0	3	.36

The simplification process was based on paired comparisons and the minimization process. The achieved truth table included eight independent variables and produced eight rows with three of them being above the cut-off point. The final truth table can be seen in Table 7.3. The procedure resulted in higher number of cases and higher consistency values. In addition, the solution consistency and the solution coverage were also raised as some of the original independent variables were left out. The solution indicates three different paths to achieve a high level of satisfaction with life among deaf and hard of hearing individuals in Northern Nevada:

Table 7.4

*Qualitative Comparative Analysis Minimization Results (Prime Implicants) for High Satisfaction with Life*

---

HIGH SATISFACTION WITH LIFE =

BORN DEAF \*deaf as a young adult\*use speech without sign\*USE SIGN LANGUAGE\*attend hearing high school\*ATTEND MAINSTREAM HIGH SCHOOL\*HAVE SIGNFICANT HEARING LOSS\*have low competency in Deaf culture +

Born deaf\*deaf as a young adult\*USE SPEECH WITHOUT SIGN\*use sign language\*attend hearing high school\*ATTEND MAINSTREAM HIGH SCHOOL\*HAVE SIGNIFICANT HEARING LOSS\*HAVE LOW COMPETENCY IN DEAF CULTURE+

Born deaf\*DEAF AS A YOUNG ADULT\*USE SPEECH WITHOUT SIGN\*use sign language\*ATTEND HEARING HIGH SCHOOL\*attend mainstream high school\*HAVE SIGNIFICANT HEARING LOSS\*HAVE LOW COMPETENCY IN DEAF CULTURE.

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Solution Coverage: .26

Solution Consistency: .84

Table 7.3

*Final Truth Table Configurations for Qualitative Comparative Analysis of High Satisfaction with Life among Deaf and Hard of Hearing Individuals in Northern Nevada*

Independent Variables								Outcome Variable	Number of Cases	Consistency Values
<u>Deafness related factors</u>							<u>Cultural competency variable</u>			
<i>Born deaf</i>	<i>Deaf as a young adult</i>	<i>Use speech without sign</i>	<i>Use sign language</i>	<i>Attend hearing high school</i>	<i>Attend mainstream high school</i>	<i>Significant hearing loss</i>	<i>Low Competency Deaf culture</i>	<i>High Life Satisfaction</i>		
0	0	1	0	0	1	1	1	1	2	.89
0	1	1	0	1	0	1	1	1	2	.86
1	0	0	1	0	1	1	0	1	3	.78
1	0	1	0	0	1	0	1	0	2	.69
0	0	0	1	0	1	0	0	0	2	.68
0	1	1	0	1	0	1	0	0	2	.59
0	0	1	0	1	0	1	1	0	3	.58
1	0	0	1	0	0	1	0	0	4	.36

Having a significant hearing loss emerged as the single most important factor leading to high life satisfaction among the deaf and hard of hearing of Northern Nevada. This is a somewhat surprising finding but it supports most recent arguments by deaf scholars that the level of hearing loss does not seem to have a significant negative effect on subjective well-being and satisfaction with life. These pathways revealed what was already found in the analysis of cultural competency variables. Deaf people who are competent in the Deaf culture have different characteristics, such as being born deaf and using sign language as a preferred mode of communication. The characteristics of those who are not competent in the Deaf culture are different as they tend to become deaf later in life, use speech with no sign language as their preferred mode of communication and they often attend schools with no support services for the deaf. This qualitative comparative analysis, however, showed that both pathways can lead to high satisfaction with life.

The solution consistency is .84 which means these combinations are subsets of the dependent variable, high satisfaction with life. Solution coverage is .26 which indicates that the factors in the final solution explain 26 percent of all variation in high satisfaction with life among this sample of deaf and hard of hearing Northern Nevadans.

#### *Civic well-being*

Civic well-being refers to civic responsibilities, such as social participation in various events, and the protection under law to be able to participate in those activities. The calibration of civic well-being started with setting the target set which is deaf and hard of hearing Northern Nevadans with high level of civic well-being. In the original ordinal scale the scores ranged from 1.66 to 5 on a 5-point scale. There were two participants with the highest possible score and as such they comprised the fully in the set of deaf and hard of hearing individuals with high civic well-being group. While there were no individuals in this sample who scored “never” on each civic well-being item, those with a score of 1.66 were determined as fully out of the set of those with high civic well-being. Respondents at this score of 1.66 answered all but two questions on this scale with “never” which indicates that they are unlikely to have high civic well-being.

The next step was to determine the cross-over point which is set at 3 in this sample. This score is the median in the inferential statistical analysis, and it represents an approximately equal number of “sometimes” and “often” answers on the 5-point scale. This construct was somewhat more evenly distributed than self-esteem and satisfaction with life, but it still leaned somewhat in the positive direction in this sample.

The thresholds for full membership and full non-membership were set at 4.6 and 2, respectively. Respondents who scored 4.6 answered most civic well-being questions with “always” with some “often” replies, and therefore can be still considered having a higher level of civic well-being. The threshold for full non-membership was set at 2. Respondents at and below this score answered most questions with “seldom”. The fuzzy-set scores of the first ten cases of this study can be seen in Table 7.1.

Testing for necessary conditions resulted in three fuzzy sets being included in further analyses: competency in Hearing culture, low competency in Deaf culture and degree of hearing loss. Degree of hearing loss produced an average fuzzy set membership score of .76 as opposed to .58 of the civic well-being fuzzy set membership score. Competency in the Hearing culture had an average fuzzy set membership score of .71 which equaled that of the dependent variable. The low competency in Deaf culture average fuzzy set membership score was .65 which is slightly higher than the average score of .57 in the fuzzy set of civic well-being.

The truth table was constructed with these factors as well as the crisp set variables. Table 7.5 presents this original truth table showing that there are five causal combinations with at least one case with greater than .5 membership. The consistency value of each combination states whether membership in the combination of conditions in the given row is a subset of membership in the outcome, high civic well-being. Applying .75 as a cut-off point yielded three rows as true (one), while two rows were set as remainders (zero) indicating that these causal combinations are false.

Table 7.5

*Original Truth Table Configurations for Qualitative Comparative Analysis of High Civic Well-Being among Deaf and Hard of Hearing Individuals in Northern Nevada*

Independent Variables												Outcome Variable	Number of Cases	Consistency Values
Deafness related factors										Cultural Competency variable				
<i>Born deaf</i>	<i>Deaf as a child</i>	<i>Deaf as a young adult</i>	<i>Deaf in mid to old age</i>	<i>Use speech without sign</i>	<i>Use sign language</i>	<i>Attend hearing high school</i>	<i>Attend mainstream high school</i>	<i>Attend residential high school</i>	<i>Significant hearing loss</i>	<i>Hearing culture</i>	<i>Low Competency in Deaf culture</i>	<i>Civic Well-being</i>		
1	0	0	0	0	1	0	0	1	1	0	0	1	3	.88
0	0	1	0	1	0	1	0	0	1	0	0	1	2	.81
1	0	0	0	0	1	0	1	0	1	0	0	1	3	.76
0	0	1	0	1	0	1	0	0	1	1	1	0	2	.74
0	0	0	1	1	0	1	0	0	1	0	1	0	3	.67

Simplification procedures were applied based on paired comparisons and the bivariate analysis which indicated positive correlation between competency in the Hearing culture and civic well-being. The thus achieved truth table was without two crisp-set variables: became deaf as a child and became deaf in middle to old ages, and it produced more paths to higher civic well-being and higher solution consistency and solution coverage results. The final truth table can be seen in Table 7.6.

Table 7.6

*Final Truth Table Configurations for Qualitative Comparative Analysis of High Civic Well-Being among Deaf and Hard of Hearing Individuals in Northern Nevada*

Independent Variables											Number of Cases	Consistency Values
Deafness related factors								Cultural competency variables		Outcome Variable		
<i>Born deaf</i>	<i>Deaf as a young adult</i>	<i>Use speech without sign</i>	<i>Use sign language</i>	<i>Attend hearing high school</i>	<i>Attend mainstream high school</i>	<i>Attend residential school</i>	<i>Significant hearing loss</i>	<i>Hearing culture</i>	<i>Low Competency in Deaf culture</i>	<i>Civic Well-Being</i>		
1	0	0	1	0	0	1	1	0	0	1	3	.88
0	1	1	0	1	0	0	1	0	0	1	2	.81
0	0	1	0	0	1	0	1	1	1	1	2	.78
1	0	0	1	0	1	0	1	0	0	1	3	.76
0	1	1	0	1	0	0	1	1	1	0	2	.74
0	0	1	0	1	0	0	1	0	1	0	3	.62

The four causal combinations revealed that there is not one clear pathway to civic well-being among this sample of deaf and hard of hearing Northern Nevadans. Again, the single most important factor is having a significant hearing loss and the four pathways can be broken down into two different categories: one reveals the characteristics of deaf individuals competent in the Deaf culture and the other the characteristics of those competent in the Hearing culture. Deaf people who were born deaf, used sign language with some speech while growing up, attended a high school with at least some support services for the deaf, have significant hearing loss can achieve high civic well-being, that is they can receive the services that are necessary for them to succeed in their everyday lives. At the same time, deaf people who were not born deaf

but became deaf as young adults, used speech and lip-reading as their preferred way of communication, attended public hearing school with no or minimal services for the deaf and reveal high competency in the Hearing but low competency in the Deaf culture can also achieve high civic well-being.

Table 7.7 reveals the exact pathways:

Table 7.7

*Qualitative Comparative Analysis Minimization Results (Prime Implicants) for High Civic Well-Being*

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HIGH CIVIC WELL-BEING =

Born deaf\*DEAF AS A YOUNG ADULT\*USE SPEECH WITH NO SIGN\*use sign language\*ATTEND HEARING HIGH SCHOOL\*attend mainstream high school\*attend residential school for the deaf\*SIGNIFICANT HEARING LOSS\*competent in Hearing culture\*low competency in Deaf culture+

born deaf\*deaf as a young adult\*USE SPEECH WITH NO SIGN\*use sign language\*attend hearing high school\*ATTEND MAINSTREAM HIGH SCHOOL\*attend residential high school for the deaf\*SIGNIFICANT HEARING LOSS\*COMPETENT IN HEARING CULTURE\*HAVE LOW COMPETENCY IN DEAF CULTURE+

BORN DEAF\*deaf as a young adult\*use speech with no sign\*USE SIGN LANGUAGE\*attend hearing high school\*ATTEND MAINSTREAM HIGH SCHOOL\*attend residential school for the deaf\*SIGNIFICANT HEARING LOSS\*competent in Hearing culture\*have low competency in Deaf culture+

BORN DEAF\*deaf as a young adult\*use speech and no sign\*USE SIGN LANGAUGE\*attend mainstream high school\*attend hearing high school\*ATTEND RESIDENTIAL SCHOOL FOR THE DEAF\*SIGNIFICANT HEARING LOSS\*competent in Hearing culture\*low competency in Deaf culture.

---

Solution coverage: .23

Solution consistency: .81

The solution consistency is .81 which is above the cut-off point and shows that all of these configurations are a subset of the dependent variable. The solution coverage is .23 which means that the independent variables used in the final solution explain 23 percent of all variation in civic well-being.

### *Social Well-Being*

The calibration of social well-being started with setting the target set which is deaf and hard of hearing Northern Nevadans with high social well-being. High social well-being indicates that individuals

have a good social support network and have friends and family with whom they can share their happiness and sorrows. The original scale was the composite of two different scales: the social support network scale and the number of deaf friends that participants have. These two were collapsed using Z-scores and as such the scale ranged from -3.75 to 3.59. There were two participants who achieved that highest possible score, and they were assigned as having full membership in the set of individuals with high social well-being. There was one individual who had the lowest score, -3.75 and was considered as being fully out of the set of those with high social well-being.

The next step was to determine the cross-over point which was set at .12 in this sample. This score represents the median and was considered appropriate for this type of a scale. The thresholds for full membership and full non-membership were set at 3.06 and -3.75, respectively. The threshold for non-membership is the same as the full non-membership score since the rest of the respondents had much higher score than the sole one at the bottom of the scale and therefore no one else could have been deemed as out of the set of individuals with high social well-being. The fuzzy-set scores of the first ten cases of this study can be seen in 7.1.

Testing for necessary conditions eliminated several of the fuzzy sets as the average membership score for them was lower than that of the average fuzzy set scores of high social well-being. Hearing loss, competency in Hearing culture and low competency with Deaf culture were the only three that emerged as necessary conditions in determining high social well-being in this sample of deaf and hard of hearing Northern Nevadans.

When testing for necessary conditions, degree of hearing loss produced a score of .80 as opposed to a score of .62 of the dependent variable. In the same test, low competency in the Dearing culture had a score of .64 as opposed to a value of .56 of the dependent variable. The average score of fuzzy set membership in competency in Hearing culture was the same as the average score of fuzzy set membership in high social well-being (.74). The original truth table was constructed with all the crisp variables and the above-mentioned three fuzzy set variables.

Table 7.8  
*Original Truth Table Configurations for Qualitative Comparative Analysis of High Social Well-Being among Deaf and Hard of Hearing Individuals in Northern Nevada*

Independent Variables											Outcome Variable	Number of Cases	Consistency Values	
Deafness related factors										Cultural Competency variable				
<i>Born deaf</i>	<i>Deaf as a child</i>	<i>Deaf as a young adult</i>	<i>Deaf in mid to old age</i>	<i>Use speech without sign</i>	<i>Use sign language</i>	<i>Attend hearing high school</i>	<i>Attend mainstream high school</i>	<i>Attend residential high school</i>	<i>Significant hearing loss</i>	<i>Hearing culture</i>	<i>Low Competency in Deaf culture</i>	<i>Social Well-being</i>		
0	0	1	0	1	0	1	0	0	1	1	1	1	2	.86
1	0	0	0	0	1	0	1	0	1	0	0	1	3	.83
0	0	1	0	1	0	1	0	0	1	0	0	1	2	.81
1	0	0	0	0	1	0	0	1	1	0	0	1	3	.78
0	0	0	1	1	0	1	0	0	1	0	1	0	3	.71

Table 7.8 presents the original truth table. Applying .75 as a cut-off point yields four rows as true (one), while one row was set as remainder (zero) indicating that this is the only causal combination that is false. Simplification procedures were applied based on paired comparisons which eliminated two crisp-set variables: became deaf as a child and became deaf in middle to old ages. The thus achieved truth table produced six possible casual combinations, included more cases and led to higher solution consistency and solution coverage. The final truth table can be seen in Table 7.9.

Table 7.9

*Final Truth Table Configurations for Qualitative Comparative Analysis of High Social Well-Being among Deaf and Hard of Hearing Individuals in Northern Nevada*

Independent Variables											Number of Cases	Consistency Values
Deafness related factors								Cultural competency variables		Outcome Variable		
<i>Born deaf</i>	<i>Deaf as a young adult</i>	<i>Use speech without sign</i>	<i>Use sign language</i>	<i>Attend hearing high school</i>	<i>Attend mainstream high school</i>	<i>Attend residential school</i>	<i>Significant hearing loss</i>	<i>Hearing culture</i>	<i>Low Competency in Deaf culture</i>	<i>Social Well-Being</i>		
0	0	1	0	0	1	0	1	1	1	1	2	.89
0	1	1	0	1	0	0	1	1	1	1	2	.86
1	0	0	1	0	1	0	1	0	0	1	3	.83
0	1	1	0	1	0	0	1	0	0	1	2	.81
1	0	0	1	0	0	1	1	0	1	1	3	.78
0	0	1	0	1	0	0	1	0	0	0	3	.67

The five possible pathways to high social well-being revealed much the same that were seen in the case of the previous quality of life indicators. While the actual combinations may differ from indicator to indicator, the general message is the same: there are two main pathways to high social well-being; either by possessing the characteristics that indicate competency in Deaf culture or possessing the characteristics that indicate competency in Hearing culture. The single most important factor is yet again having significant hearing loss, while the other variables combine in various ways to create a pathway to high social well-being. These pathways can be seen in Table 7.10.

Table 7.10

*Qualitative Comparative Analysis Minimization Results (Prime Implicants) for High Social Well-Being*

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HIGH SOCIAL WELL-BEING =

Born deaf\*DEAF AS A YOUNG ADULT\*USE SPEECH WITH NO SIGN\*use sign language\*ATTEND HEARING HIGH SCHOOL\*attend mainstream high school\*attend residential school for the deaf\*SIGNIFICANT HEARING LOSS\*competent in Hearing culture\*have low competency in Deaf culture +

BORN DEAF\*become deaf as a young adult\*use speech with no sign\*USE SIGN LANGUAGE\*attend hearing high school\*ATTEND MAINSTREAM HIGH SCHOOL\*attend residential school for the deaf\*SIGNIFICANT HEARING LOSS\*competent in Hearing culture\*have low competency in Deaf culture+

born deaf\*deaf as a young adult\*USE SPEECH WITH NO SIGN\*use sign language\*attend hearing high school\*ATTEND MAINSTREAM HIGH SCHOOL\*attend residential high school for the deaf\*SIGNIFICANT HEARING LOSS\*COMPETENT IN HEARING CULTURE\*HAVE LOW COMPETENCY IN DEAF CULTURE+

Born deaf\*DEAF AS A YOUNG ADULT\*USE SPEECH WITH NO SIGN\*use sign language\*ATTEND HEARING HIGH SCHOOL\*attend mainstream high school\*attend residential school for the deaf\*SIGNIFICANT HEARING LOSS\*COMPETENT IN HEARING CULTURE\*HAVE LOW COMPETENCY IN DEAF CULTURE+

BORN DEAF\*deaf as a young adult\*use speech and no sign\*USE SIGN LANGAUGE\*attend mainstream high school\*attend hearing high school\*ATTEND RESIDENTIAL SCHOOL FOR THE DEAF\*SIGNIFICANT HEARING LOSS\*competent in Hearing culture\*low competency in Deaf culture.

---

Solution coverage: .32

Solution consistency: .84

The solution consistency is .84 which means these combinations are subsets of the dependent variable, high social well-being. Solution coverage is .32 which indicates that the factors in the final solution explain 32 percent of all variation in high social well-being among this sample of deaf and hard of hearing Northern Nevadans.

### *Personal Income*

In the original format, the total personal income was indicated on a scale of various brackets ranging from below \$10,000 to \$90,000 and above. To convert these into a 5-value fuzzy set, the average personal income and the minimum wage for the year of 2007 were utilized. According to the U.S. Department of Commerce: Bureau of Economic Analysis, the average personal income in Nevada was \$39,649 while the minimum wage was \$10,712 in that year.<sup>17</sup> Individuals who indicated they made less than the minimum wage were assigned a value of zero, those with a personal income between the minimum wage and the average income were assigned a value of .25, those who made approximately the average income had a value of .5, those with a personal income between \$60,000 and \$80,000 were allotted the value of .75, while those with a personal income over \$80,000 were considered fully in the set of those with high personal income.

Once the values were converted in fuzzy scores, qualitative comparative analyses began. When testing for necessary conditions, all fuzzy set variables were considered significant as they all had a higher number of average fuzzy set membership score than the dependent variable. Thus, the original truth table included all fuzzy-set and crisp variables. The analysis produced only two casual combinations, out of which only one could be considered true (1) and the other had to be set as a remainder (0) as it did not research the cut-off value of .75.

The minimization process was based on paired comparisons which eliminated two crisp-set variables; became deaf as a young adult and became deaf in middle to old ages. All the other variables remained because their removal would have resulted in lower consistency and solution coverage values. While the thus achieved truth table produced one more causal combination and as such included more cases and led to higher solution consistency and solution coverage, there remained only one true pathway to high personal income. The final truth table can be seen in Table 7.11 and the final pathway in Table 7.12.

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<sup>17</sup> This information from the U.S. Department of Commerce was found on the internet at the following website: <http://research.stlouisfed.org/fred2/series/NVPCPI?rid=151>.

Table 7.11

*Final Truth Table Configurations for Qualitative Comparative Analysis of High Personal Income among Deaf and Hard of Hearing Individuals in Northern Nevada*

Independent Variables													Outcome Variable	Number of Cases	Consistency Values
Deafness related factors							Cultural Competency variables								
<i>Born deaf</i>	<i>Deaf as a child</i>	<i>Use speech without sign</i>	<i>Use sign language</i>	<i>Attend hearing high school</i>	<i>Attend mainstream high school</i>	<i>Attend residential high school</i>	<i>Significant hearing loss</i>	<i>Hearing culture</i>	<i>Deaf culture</i>	<i>Biculture</i>	<i>Low Hearing culture</i>	<i>Low Deaf culture</i>	<i>Personal Income</i>		
0	0	1	0	1	0	0	1	0	0	0	0	1	1	2	.80
0	0	1	0	1	0	0	1	1	0	0	0	1	1	2	.62
0	0	1	0	1	0	0	0	1	0	0	0	1	1	2	.60

Table 7.12

*Qualitative Comparative Analysis Minimization Results (Prime Implicants) for High Social Well-Being*

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HIGH PERSONAL INCOME =

Born deaf\*deaf as a child\*USE SPEECH WITH NO SIGN\*use sign language\*ATTEND HEARING HIGH SCHOOL\*attend mainstream high school\*attend residential school for the deaf\*HAS SIGNIFICANT HEARING LOSS\*has bicultural competency\*competent in Deaf culture\*competent in Hearing culture\*HAS LOW COMPETENCY IN DEAF CULTURE\*has low competency in Hearing culture.

---

Solution Coverage: .21

Solution Consistency: .80

This pathway shows that those who mainly reveal the characteristics attributed to being competent in Hearing culture; that is they used speech without sign language, attended hearing high school with no support services for the deaf and are not competent in the Deaf culture, generally have higher personal income. In addition to these characteristics, having significant hearing loss is also a factor. The solution consistency is .80 which means that this combination is indeed a subset of the dependent variable, high personal income. Solution coverage is .21 which indicates that the factors in the final solution explain 21 percent of all variation in high personal income among this sample of deaf and hard of hearing Northern Nevadans.

#### *Level of Education*

In the original format, level of education was an ordinal Likert-type scale in which the categories were ranked from no formal education to graduate school. To convert these into a fuzzy set, some of the categories were collapsed. No formal education and elementary school education were assigned the value of zero, high school education and vocational school education were assigned the value of .5 and college graduate and graduate school were assigned the value of one. Since the target set is high level of education, the categories of no formal education and elementary school education can be considered non-members while college education can be considered full members in the set. High school education and vocational school education were both considered as neither in, nor out of the set of those with high level of education.

Once the values were converted in fuzzy scores, qualitative comparative analyses began. When testing for necessary conditions, none of the fuzzy set variables were considered significant as they all had a lower number of average fuzzy set membership score than the dependent variable. However, since high level education is a three-value set, which is different from all the other fuzzy sets, the researcher decided to keep all of them in for further analyses and to just eliminate them in the process of paired minimization, if necessary. The thus created original truth table included all fuzzy-set and crisp variables. The analysis produced only two casual combinations, both of which could be considered true (1) as they were both above the cut-off value of .75.

The minimization process was based on paired comparisons which eliminated two crisp-set variables: became deaf as a young adult and became deaf in middle to old ages. Out of the fuzzy set variables, only high and low competency in Deaf culture remained. The thus achieved truth table produced a total of fourteen causal combinations with a lot more cases, and it also led to a similar solution consistency but considerably higher solution coverage. Out of the 14 causal combinations, ten could be considered as true (1) while four had to be treated as remainders (0) as they did not reach the cut-off value of .75. The final truth table can be seen Table 7.13 while the final pathways are in Table 7.14.

These pathways show that there is not one significant factor that has to be present in order to achieve high level of education. There are several different ways to be highly educated, at least among this sample of deaf and hard of hearing Northern Nevadans. The pathways, however, revealed the same tendency that can be seen throughout the analyses: one clear path is to have at least some of the factors present that lead to high competency in Hearing culture or have at least some of the factors that lead to high competency in Deaf culture present. Most of those deaf individuals who are highly competent in Deaf culture were born deaf, used sign language as a primary mode of communication while growing up and either attended residential school for the deaf or mainstream school with at least some supporting services for the deaf. Having these characteristics can lead one to higher level of education. On the other hand, those deaf individuals who are highly competent in Hearing culture used speech with no sign language while growing up and attended either a regular hearing school or a mainstream school with some support services for the deaf.

The solution consistency is outstanding, .86 which means that these combinations are subset of the dependent variable. While the numerous pathways show that there is no clear-cut way that would provide high level of education among the deaf and the hard of hearing, the solution coverage is the highest of all quality of life indicators which means that these variables indeed constitute most of the relevant factors in determining level of education.

Table 7.13

*Final Truth Table Configurations for Qualitative Comparative Analysis of High Level of Education among Deaf and Hard of Hearing Individuals in Northern Nevada*

Independent Variables									Outcome Variable	Number of Cases	Consistency Values
<u>Deafness related factors</u>							<u>Cultural Competency variables</u>				
<i>Born deaf</i>	<i>Deaf as a child</i>	<i>Use speech without sign</i>	<i>Use sign language</i>	<i>Attend hearing high school</i>	<i>Attend mainstream high school</i>	<i>Attend residential high school</i>	<i>Deaf culture</i>	<i>Low Deaf culture</i>	<i>Level of Education</i>		
0	1	1	0	0	1	0	0	1	1	2	1
0	0	1	0	0	1	0	0	1	1	2	1
1	0	1	0	0	1	0	0	1	1	4	1
0	0	1	0	1	0	0	1	0	1	5	.98
1	0	1	0	1	0	0	0	1	1	4	.91
1	0	0	1	0	1	0	1	0	1	4	.85
1	0	0	1	1	0	0	1	0	1	3	.83
1	0	1	0	0	1	0	1	0	1	4	.82
0	0	1	0	1	0	0	0	1	1	14	.80
1	0	0	1	0	0	1	1	0	1	4	.78
0	1	0	1	0	0	1	1	0	0	3	.73
0	1	1	0	1	0	0	0	1	0	2	.57
0	1	0	1	0	1	0	1	0	0	4	.55
1	0	0	1	0	0	0	1	0	0	2	.32

Table 7.14

*Qualitative Comparative Analysis Minimization Results (Prime Implicants) for High Level of Education*

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HIGH LEVEL OF EDUCATION =

Deaf as a child\*USE SPEECH WITH NO SIGN\*use sign language\*ATTEND HEARING HIGH SCHOOL\*attend mainstream high school\*attend residential school for the deaf\*have high competency in Deaf culture\*HAVE LOW COMPETENCY IN DEAF CULTURE +

Deaf as a child\*USE SPEECH WITH NO SIGN\*use sign language\*attend hearing high school\*ATTEND MAINSTREAM HIGH SCHOOL\*attend residential school for the deaf\*have high competency in Deaf culture\*HAVE LOW COMPETENCY IN DEAF CULTURE +

born deaf\*deaf as a child\*USE SPEECH WITH NO SIGN\*use sign language\*attend hearing high school\*ATTEND MAINSTREAM HIGH SCHOOL\*attend residential high school for the deaf\*HAVE LOW COMPETENCY IN DEAF CULTURE\*have high competency in Deaf culture+

born deaf\*deaf as a child\*USE SPEECH WITH NO SIGN\*use sign language\*ATTEND HEARING HIGH SCHOOL\*attend mainstream high school\*attend residential school for the deaf\*HAVE HIGH COMPETENCY IN DEAF CULTURE\*have low competency in Deaf culture+

BORN DEAF\*deaf as a child\*use speech and no sign\*USE SIGN LANGUAGE\*attend mainstream high school\*ATTEND HEARING HIGH SCHOOL\*attend residential school for the deaf\*HAVE HIGH COMPETENCY IN DEAF CULTURE\*have low competency in Deaf culture+

BORN DEAF\*deaf as a child\*USE SPEECH AND NO SIGN\*use sign language\*attend hearing high school\*ATTEND MAINSTREAM HIGH SCHOOL\*attend residential school for the deaf\*HAVE HIGH COMPETENCY IN DEAF CULTURE\*have low competency in Deaf culture+

BORN DEAF\*deaf as a child\*use speech and no sign\*USE SIGN LANGUAGE\*attend hearing high school\*ATTEND MAINSTREAM HIGH SCHOOL\*attend residential school for the deaf\*HAVE HIGH COMPETENCY IN DEAF CULTURE\*have low competency in Deaf culture+

BORN DEAF\*deaf as a child\*use speech and no sign\*USE SIGN LANGUAGE\*attend hearing high school\*attend mainstream high school\*ATTEND RESIDENTIAL SCHOOL FOR THE DEAF\* HAVE HIGH COMPETENCY IN DEAF CULTURE\*have low competency in Deaf culture.

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Solution coverage: .72

Solution consistency: .86

### *Discussion of results*

The QCA results of how deafness-related factors and the cultural competency variables influence quality of life indicators are a lot more fine-tuned than what the bivariate and regression analyses revealed. While the QCA results did not contradict findings from bivariate and regression analyses

regarding the influence of competency in Hearing culture and could not claim the relevance of being competent in Deaf culture on the self-esteem and life satisfaction of deaf and hard of hearing Northern Nevadans, it did show that individuals who were born deaf, used at least some sign language while growing up, attended mainstream high school with some support services for the deaf and have significant hearing loss can have high self-esteem and higher satisfaction with life as well.

The results were similar in the case of civic well-being and social well-being as well. While QCA analyses provided more possible pathways to achieve higher civic and social well-being, they essentially underscored the bivariate and regression analyses findings; those who are competent in the Hearing culture tend to have higher civic well-being, while the pathway to higher social well-being leads both through higher competency in either the Hearing or the Deaf culture.

The QCA results regarding achieving higher income clearly support the findings of bivariate and regression analyses. While QCA did not reveal age as an important factor, it indicated that being competent in the Hearing culture leads to higher personal income.

The next chapter will summarize the results of each analysis; bivariate, regression analysis and qualitative comparative analysis, attempting to synthesize them in such a way as to explain the factors that contribute to cultural competency and to high quality of life among deaf and hard of hearing Northern Nevadans that participated in this study.

## CHAPTER 8: DISCUSSION

### *Summary of objectives and results*

The focus of the present study was twofold: to determine the factors that influence cultural competency in a sample of deaf and hard of hearing Northern Nevadans, and to determine whether and how the deafness-related factors and cultural competency variables have an impact on their quality of life. A typology was proposed to study four acculturation styles: Deaf acculturated, Hearing acculturated, Marginal and Bicultural.

It was anticipated that certain deafness-related factors: becoming deaf early in life, using sign language as a primary mode of communication, attending residential school for the deaf and having significant lead to higher competency in Deaf culture, while becoming deaf later in life, using speech as a primary mode of communication, attending hearing school with no support services for the deaf and having moderate or mild hearing loss will lead to higher competency in Hearing culture. People who are marginally attached to either culture were predicted to be those who are non-functional in either of these cultures while Biculturals were predicted to be those who are functional in both.

It was predicted that the deafness-related factors and the cultural competency variables would influence each quality of life indicators. Since there is scarce literature regarding the quality of life of deaf and hard of hearing individuals, this part of the study was largely exploratory and it was hoped that the findings would shed some light on this issue and would help pave ways for further analyses.

### Deafness-related factors and cultural competency

The findings of the first part of the study are in line with current studies, and reinforced expectations. In the case of *age of onset of hearing loss*, bivariate analysis revealed that those who were born deaf are more likely to be Deaf culture oriented and those who were not born deaf are more likely to be Hearing culture oriented. However, regression analysis did not bring any significant result and qualitative comparative analysis showed that those who were born deaf can be either Deaf or Hearing cultural competent but other deafness-related factors, such as using sign language while growing up and

having significant hearing loss in the case of Deaf culture, and using speech without sign language and attending mainstream high school with some support services for the deaf in the case of Hearing culture, also have to be present in order for this factor to have influence.

Further bivariate analysis suggested that those who became deaf as young adults, some time after the age of ten but before the age of 35 tend to be Hearing culture oriented. While the construct becoming deaf in middle to old age (after the age of 35) did not show significant correlation with competency in Hearing culture, it did show negative correlation with Deaf culture meaning that these individuals are not competent in that minority culture. Regression analysis again did not show significant results but qualitative comparative analysis revealed that some individuals who became deaf during their childhood tend to be either highly Deaf culture oriented or biculturally competent if using sign language while growing up and attending mainstream high school with support services for the deaf were also present. On the other hand, if using speech without sign and attending hearing school with no support services for the deaf were present, it led to low competency in Deaf culture.

The construct, *type of schooling* attended in high school also showed significant effects. Bivariate analysis revealed that those who attended hearing high school with no support services for the deaf tended to be competent in the majority Hearing but not in the minority Deaf culture. On the other hand those deaf and hard of hearing individuals who attended residential high school for the deaf showed Deaf cultural competency. While this construct was not proven significant in the regression analysis, it did show some effect in qualitative comparative analysis. Although attending residential school for the deaf or hearing high school with no support services for the deaf did not have to be present in any combination, the analysis showed that attending mainstream high school with some support services for the deaf can lead to competency in either the Deaf or the Hearing culture, when joined by other deafness-related factors. This was the only type of schooling proven significant in the path to high bicultural competency as well.

In the case of *degree of hearing loss*, bivariate analysis revealed that those who have severe to profound hearing loss tend to be Deaf culture oriented while those who have mild to moderate hearing loss are likely to be competent in the Hearing culture. Regression analysis supported this thesis although it did not show significant relationship between having mild to moderate hearing loss and Hearing culture competency. It did, however, reveal that those who have severe to profound hearing loss tend not to be competent in this majority culture.

Qualitative comparative analysis showed that deaf and hard of hearing individuals with significant hearing loss can be either Deaf or Hearing culture oriented but combined with different other deafness-related factors. In the case of Deaf culture competency, having been born deaf and using sign language while growing up also had to be present, while in the case of Hearing culture competency, attending mainstream high school and using speech with no sign language at all were the other key factors.

In looking at the construct, *mode of communication while growing up*, all three kinds of analyses revealed strong effects. Bivariate analysis showed strong results: those who used at least some language while growing up were Deaf and not Hearing culture oriented, while those who used only speech tended to be competent in the Hearing but not in the Deaf culture. Regression analysis also proved the significant effect of using speech in leading to deaf and hard of hearing individuals' competency in the Hearing culture. In qualitative comparative analysis, using at least some sign language was the single most important factor in being competent in the Deaf culture; just as using speech was the single most important factor in being competent in the Hearing culture. While using sign language and using speech had to combine with other factors, they were present in all possible pathways leading to Deaf or Hearing cultural competency, respectively. In addition, using at least some sign language was a significant factor leading to high bicultural competency when combined with becoming deaf as a child and attending mainstream high school with support services for the deaf.

One interesting finding that may influence further research and possibly professionals working with deaf and hard of hearing children is the strong significance of the construct, mode of communication

while growing up. Language, and the ability to communicate fully with those around us, is important for socialization; learning the norms and values of the society and community we live in, as well as for expressing our feelings and ideas.

In sum, when looking at the deafness-related factors' influence on cultural competency, no surprising effects were found. All of these factors were significant, and based on the different statistical analyses it can be concluded that being born deaf, having severe to profound hearing loss, using sign language while growing up and attending residential high school for the deaf are the factors that prepare deaf and hard of hearing individuals to become highly competent in the Deaf culture. On the other hand, becoming deaf later in life, having mild to moderate hearing loss, using speech while growing up and attending hearing high school with no support services for the deaf are generally the factors deaf and hard of hearing individuals need in order to become competent in the Hearing culture.

While the testing of the construct bicultural competency was only partially successful, it seems that becoming deaf as a child, some time before the age of 10, using at least some sign language while growing up and attending mainstream high school with some support services for the deaf are the factors that need to be present. These factors presuppose the possibility of being able to switch back and forth between the Deaf and the Hearing cultures. If people become deaf later in life, they are likely to have at least some understanding of the norms and values of Hearing culture; learn and retain the ability to speak but they are still young enough to learn to sign for communication when they become deaf; and they attend a mainstream school where most other students are hearing but they possibly have deaf peers as well and they get some support services needed for full understanding of the curriculum.

#### Deafness-related factors, cultural competency and quality of life indicators

In looking at the various quality of life indicators, while all statistical analyses revealed fairly consistent directions, only a few conclusions can be attempted. In the case of *self-esteem*, bivariate analysis revealed that those who became deaf relatively young, some time between the age of ten and 35, tend to have higher level of self-esteem. In addition, those who attended hearing high school with no support services for the deaf also seem to have higher self-esteem. Since the analyses of deafness-related

factors revealed that these tend to be associated with competency in Hearing culture, it is not a surprising finding that those who are Hearing culture oriented tend to have higher self-esteem. This finding was supported by the regression analysis as well, and it was partially supported by qualitative comparative analysis. While in the QCA, competency in Hearing culture did not prove to have a dominant influence, its polar opposite, low competency in Deaf culture showed up in several pathways that could lead to higher self-esteem. The QCA showed that when low competency in Deaf culture is combined with using speech without sign, attending hearing high school and having a significant hearing loss, or when it is joined by all of these factors as well as becoming deaf at a young age, it indeed could lead to high self-esteem.

Being competent in the Hearing culture also showed significant impact on having high *satisfaction with life* in the case of deaf and hard of hearing Northern Nevadans of this study, at least in the bivariate analysis. Its significance was not revealed in the regression analysis, and the construct did not have enough power to be used in qualitative comparative analysis. However, the QCA did reveal that having low competency in Deaf culture is a significant factor in achieving high life satisfaction. In addition to cultural competency, the bivariate analysis showed that those who attended residential school for the deaf had lower satisfaction with life. While this factor did not show significant effect in QCA, the analysis did show that either those who attended mainstream high school with support services or those who attended hearing high school with no support services had higher satisfaction with life.

Other factors, however, had to be present in each case in order to lead to high life satisfaction. Those who attended a hearing high school, also became deaf as young adults, some time between the ages of ten and 35, used speech as a mode of communication while growing up, had significant hearing loss and had low competency in Deaf culture tend to have higher life satisfaction. From previous analyses it seems clear that these are the characteristics of those who are competent in Hearing culture. Having attended mainstream high school proved to be the divider again: it had to combine with either other Deaf culture competency factors, such as born deaf and using some sign language while growing up or it had to combine with Hearing culture competency factors, such as used speech while growing up.

Overall, while the QCA analysis showed a possible path to higher life satisfaction for those who possessed characteristics generally attributed to having competency in Deaf culture, there is a stronger tendency to suggest that those who are competent in the Hearing culture have higher satisfaction with life.

The findings of this study supported the existing literature which suggested that those who were competent in the Hearing culture had higher *civic well-being*. All three kinds of analyses ran in this study showed positive relationship between Hearing culture competency and civic well-being which seems to aid the claim that our current society is not set to accommodate the deaf and the hard of hearing unless they do not require complex assistance to be able to participate in civic activities. This finding might have important implication for those authorities in Northern Nevada that are responsible to provide all citizens with equal access to public and private entities regardless of their special needs.

The QCA showed that, in order to achieve high civic well-being, those who were competent in the Hearing culture also used speech while growing up, attended mainstream high school with some support services for the deaf, had significant hearing loss and showed low competency in Deaf culture. Having a significant hearing loss is a curious finding that was supported by the regression analysis as well. Those who have severe to profound hearing loss tend to be Deaf culture oriented and tend to require special accommodations, such as sign language interpreters in order to fully participate in civic activities. Further research is needed to clarify this matter.

While the currently existing literature seemed to suggest that those who are competent in the Hearing culture have higher *social well-being*, the current analyses claimed otherwise. While both the regression analysis and the qualitative comparative analysis showed a positive influence of Hearing cultural competency on social well-being, regression analysis and bivariate analysis showed support for the thesis that those who were competent in the Deaf culture could achieve social well-being as well.

The QCA revealed the same tendency as in the case of other quality of life indicators: there are two main pathways to high social well-being; either by possessing the characteristics that indicate competency in Deaf culture or possessing the characteristics that indicate competency in Hearing culture. Those who were competent in the majority Hearing culture also used speech with no sign language,

attended mainstream high school and had low competency in Deaf culture. The bivariate analysis, however, showed a positive correlation between attending residential school for the deaf and higher social well-being. Qualitative comparative analysis suggested that those who attended this kind of school also were born deaf, had significant hearing loss and used sign language while growing up. The combination of these factors led to high social well-being.

Analyses about the effects of deafness-related factors and cultural competency on *personal income* level demonstrated some specific results. Both the bivariate and the regression analyses showed the hardly surprising result of positive relationship between age and level of income, meaning that those who are older tend to have higher level of personal income. In addition, these analyses showed that those who became deaf later in their life, some time after the age of 35 also tend to have higher level of personal income. Based on the literature review this is again not a surprising finding as it seems palpable that those who are already well planted in the Hearing culture with all of its norms and values and have an already established career when becoming deaf have a higher chance of succeeding in the Hearing world. Indeed the qualitative comparative analysis showed that the only viable path to high level of personal income in this sample of deaf and hard of hearing Northern Nevadans is to use speech without sign language, attending hearing high school and having low level of competency in the Deaf culture. Based on previous findings in this study, all of these characteristics point toward being competent in the Hearing culture.

While the existing literature claims that deaf and hard of hearing individuals tend to have lower *level of education* compared to their hearing counterparts, this study did not support this proposition. However, this sample was overwhelmingly Hearing culture oriented with a higher level of education than the average deaf population in the United States. The majority of this sample had normal to moderate hearing loss, grew up using a spoken language, attended hearing schools and was college educated. The bivariate analysis only yielded significant correlation with using speech while growing up, indicating that those who used this kind of communication method had higher level of education. The regression analysis showed no significant effect whatsoever, and while the qualitative comparative analysis indicated

that the factors included in the analysis explained an outstanding 72% of variations in level of education, it showed no clear pathway to achieve a higher level in academics. The participants who climbed higher on the educational level did so in a lot of various ways; whether it was through using speech and attending schools with no support services or through using sign language, attending mainstream schools while being competent in Deaf culture or in some other way. As a result, this study did not yield any conclusive results in this respect.

#### *Limitations and strengths*

This study was conducted among deaf and hard of hearing Northern Nevadans. While there were several attempts made at finding as diverse a population as possible, the data reveal that the majority of individuals who were willing to participate were Hearing culture oriented and highly educated. Contacting agencies working with deaf and hard of hearing individuals and sending out letters to contact them with the help of these informants seemed the best way to reach as many participants as possible but not many Deaf people responded to this method. Most Deaf culture oriented individuals were recruited by personal contact. The majority of them did get the invite from agencies but they chose not to respond to it until personal inquiry. This suggests that in order to reach individuals who are competent in the Deaf culture, a more personal, foot-in-the-door approach is necessary.

The sample was also limited in a way that it could not reach a sufficient number of individuals who are low functional in both cultures, or marginal. They either did not understand the letter of invitation and the nature of the study or they did not want to participate. It is also possible that some individuals who decided to be a part of the study gave socially desirable answers and influenced the results to yield toward higher competency. In addition, the majority of measures required the participants to report how they see themselves and some of them might have answered more favorably rather than giving their actual competencies and circumstances. Therefore, it is unknown how well this sample represents the deaf and hard of hearing population of Northern Nevada as it is possible that those with the lowest quality of life were not reached.

In addition, several of the deafness-related factors, such as type of school attended or preferred mode of communication while growing up, do not vary among people who become deaf in adulthood as these are not relevant for their life experience. Although these factors are considered relevant, in a future study a separate group analysis should be conducted for those who were born deaf or became deaf very early in life versus the late-deafened.

Conducting research using the interactive video questionnaire (IVQ) is one of the major strengths of this study. It gave participants the opportunity to follow the questions in the language they are most comfortable with, and it eliminated the problems of understanding written or spoken English that many deaf individuals struggle with. Most participants found the IVQ easy to use and had no problems answering the questions using the researcher's laptop. The technique combined the advantages of self-administered surveys and personal interviews as it gave participants privacy but at the same time was conducted in the preferred language of the participant in more relaxed settings. While the use of this technique is more time consuming than survey questionnaires, it is believed that it would provide an excellent tool to conduct further research among the deaf and the hard of hearing.

No previous studies have taken so many indicators of quality of life into consideration. This is a comprehensive study with multiple indicators and multiple methods which also proved to be a major strength as it yielded several notable results. When comparing bivariate, regression and comparative qualitative analysis results, consistent results emerged, which show their validity and usefulness for further research. While the researcher was not able to create constructs to measure the influence of marginalism and biculturalism, this could be attributed to the nature of the sample discussed above. However, the multi-methods yielded some impressive results regarding the relationship among deafness-related factors, the cultural competency variables and the quality of life variables.

#### *Conclusions and recommendations for future research*

All in all, the findings of this study seem to suggest that those deaf and hard of hearing individuals who have higher level of competency in the Hearing culture tend to have higher level of quality of life. While the study was highly explorative and as such clear-cut generalizations cannot be

drawn beyond the sample participated in it, it showed some implications for current policies regarding the education and overall well-being of deaf and hard of hearing individuals in Northern Nevada. It seems that being able to function well in the Hearing world is key to a successful life, therefore the educational system should make sure that deaf and hard of hearing children gain competency in it and the State of Nevada should strive to provide equal access for them so they can fully participate in all of its civic and social activities. The Americans with Disabilities Act of was ratified in 1990 and has been amended several times ever since in order to ensure equal access for deaf and hard of hearing individuals in every walk of life, such as employment, communication and participation in social activities. However, it seems that these legal provisions are not upheld to the fullest extent in the case of deaf and hard of hearing Northern Nevadans. The State should provide more education to both the deaf and the hearing populations to understand the provisions of the law thereby helping individuals with hearing loss gain better access to services and entities readily available for their hearing counterparts.

Although this study had important findings regarding the specific deafness-related factors leading to either Deaf or Hearing cultural competency, future studies should be conducted with larger and more diverse deaf populations in order to gain stronger statistical power. It would likely allow more insight into the complexities of acculturational types as the current small sample did not allow for viable categorization for bicultural and marginal individuals. With a larger and more diverse population that would more likely to be achieved and it could reveal more about the quality of life of a unique segment of our society. However, it is also possible that biculturalism among individuals with hearing loss is not a viable option. Since deafness is a communication problem that is difficult to overcome, for many people with hearing loss being fully competent in the Hearing culture is simply impossible. Many of them are likely have to decide whether they want to be associated with the Deaf or the Hearing world but it is incredibly hard to be integrated in neither or be a member of both. It is another area that future studies should look into.

Continuing research is needed in finding how cultural competency influences the various quality of life indicators. This study suggests that Hearing culture oriented individuals have higher quality of life

but there might be other factors that may have impact. For example, parents' hearing status, the benefits of hearing aids and other technological innovations, living in rural or metropolitan areas might also make a difference. Relying on the findings of this research and taking some more factors into considerations could further explore the differential needs of deaf and hard of hearing individuals in an effort to help them enjoy higher quality of life.

## APPENDIX A:

### PROTOCOL

#### Quality of life of deaf and hard of hearing people in Northern Nevada

This survey is being conducted to gain insight into the quality of life of deaf and hard of hearing Northern Nevadans. Results from this study should provide valuable information and increased awareness about the current circumstances of deaf and hard of hearing people in this state. Your participation is highly valued.

You will be asked to answer several questions about your background, your thoughts and feelings related to your deafness or hearing loss, your relationship with the Deaf and the hearing world as well as about your satisfaction with your current life experiences. This should not take more than half an hour of your time. Please complete the questionnaire as best as you can. There are no right or wrong answers and your responses to these questions will remain strictly confidential.

#### You and the Deaf and Hearing World

The following section contains questions about your feelings and thoughts about the Deaf culture and the hearing society. Please circle the response that best reflects your opinion. Please select only one answer to each statement.

1. I call myself Deaf.

STRONGLY AGREE      AGREE      DISAGREE      STRONGLY DISAGREE

2. My deafness or hearing loss is **not** an important part of who I am.

STRONGLY AGREE      AGREE      DISAGREE      STRONGLY DISAGREE

3. I feel that I am part of the Deaf community.

STRONGLY AGREE      AGREE      DISAGREE      STRONGLY DISAGREE

4. If someone criticizes hearing people or hearing values, I feel they are criticizing me.

STRONGLY AGREE      AGREE      DISAGREE      STRONGLY DISAGREE

5. I call myself hearing impaired.

STRONGLY AGREE      AGREE      DISAGREE      STRONGLY DISAGREE

6. I am comfortable socializing with hearing people.

STRONGLY AGREE    AGREE    DISAGREE    STRONGLY DISAGREE

7. I **do not** feel that I am part of the hearing world.

STRONGLY AGREE    AGREE    DISAGREE    STRONGLY DISAGREE

8. I never wish I were hearing.

STRONGLY AGREE    AGREE    DISAGREE    STRONGLY DISAGREE

9. If someone criticizes deaf people or deaf values, I feel that they are criticizing me.

STRONGLY AGREE    AGREE    DISAGREE    STRONGLY DISAGREE

10. My Deaf identity is an important part of who I am.

STRONGLY AGREE    AGREE    DISAGREE    STRONGLY DISAGREE

11. I am proud to be deaf or hard of hearing.

STRONGLY AGREE    AGREE    DISAGREE    STRONGLY DISAGREE

12. I feel comfortable socializing with deaf people.

STRONGLY AGREE    AGREE    DISAGREE    STRONGLY DISAGREE

Sometimes life is not as we really want it to be. If you could have it your way, how would you prefer the following situations in your life to be? Please answer the following questions by circling the response that best describes how you feel.

13. I would want to work in an environment with other deaf employees.

COMPLETELY TRUE    SOMEWHAT TRUE    SOMEWHAT UNTRUE    COMPLETELY UNTRUE

14. I would prefer my partner/spouse to be hearing.

COMPLETELY TRUE    SOMEWHAT TRUE    SOMEWHAT UNTRUE    COMPLETELY UNTRUE

15. I would prefer my closest friends to be deaf.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

16. I would want my children to be hearing.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

17. I would want to work in an environment with a lot of hearing people.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

18. I would prefer my closest friends to be hearing.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

19. I would prefer my partner/spouse to be deaf.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

20. I would prefer my children to be deaf.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

The following questions ask you how familiar you are with the practices and language of the Deaf culture as well as the hearing society. Please circle the answer that you feel best describes your knowledge. Please provide only one answer to each statement.

21. How well do you sign?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

22. How well do you understand other people signing?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

23. How well do you speak English, using your voice?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

24. How well do you know favorite jokes from Deaf culture?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

25. How well do hearing people understand your speech?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

26. How well do you know the names of popular songs?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

27. How well do you read lips?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

28. How well do other deaf people understand you when you are signing?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

29. How well do you know traditions and customs from Deaf schools?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

30. How well do you read English?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

31. How well do you know the names of popular newspapers and magazines?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

32. How well do you know the names of famous deaf people?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

33. How well do you fingerspell?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

34. How well do you know organizations that promote better hearing and speech?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

35. How well do you know current ASL slang and popular expressions in ASL?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

36. How well do you know important events in Deaf history?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

37. How well do you write in English?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

38. How well do you know nursery rhymes and children's stories?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

39. How well do you know Deaf newspapers and magazines?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

40. How well do you know the names of famous political leaders?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

41. How well do you know the names of deaf actors/actresses or comedians?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

42. How well you can read other people's fingerspelling?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

43. How well do you know organizations run for deaf people?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

44. How well do you know important events in American history?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

45. How well do you know the names of political leaders in the Deaf community?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

46. How well do you know the names of famous actors/actresses or comedians?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

47. How well do you know the names of American heroes?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

48. How well do you know English idioms or English expressions?

NOT AT ALL   A LITTLE   AVERAGE   GOOD   EXCELLENT

### **Your thoughts about your life**

The following questions ask you to agree or disagree with the statements you might make about yourself and your life. Please circle the answer that best reflects your opinion.

49. In most ways my life is close to my ideals.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

50. The conditions of my life are **not** great.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

51. I am **not** satisfied with my life.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

52. So far I have gotten the important things I want in life.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

53. If I could live my life over, I would change almost nothing.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

54. On the whole, I am satisfied with myself.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

55. At times I think I am no good at all.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

56. I feel that I have good qualities.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

57. I am able to do things as well as most other people.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

58. I feel I do not have much to be proud of.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

59. I certainly feel useless at times

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

60. I feel that I am a person of worth at least on an equal basis with others.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

61. I wish I could have more respect for myself.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE

62. All in all I am inclined to feel that I am a failure.

COMPLETELY TRUE   SOMEWHAT TRUE   SOMEWHAT UNTRUE   COMPLETELY UNTRUE



72. ....give you good advice?

NEVER                      SELDOM                      REGULARLY                      OFTEN

73. ...confide in you?

NEVER                      SELDOM                      REGULARLY                      OFTEN

74. ....ask you for help or advice?

NEVER                      SELDOM                      REGULARLY                      OFTEN

75. ...emphasize your strong points?

NEVER                      SELDOM                      REGULARLY                      OFTEN

The following set of questions will ask you about the services that are to assist you get around in the hearing world during your everyday life. Please circle the answer that best reflects your own personal experiences.

76. The information I need to get along in my everyday life is available to me.

NEVER                      SOMETIMES                      SELDOM                      OFTEN                      ALWAYS

77. The services, such as interpreters or captioning, for obtaining the information I need to get along my everyday life are available to me.

NEVER                      SOMETIMES                      SELDOM                      OFTEN                      ALWAYS

78. I am satisfied with the quality of services I get to get along in my everyday life.

NEVER                      SOMETIMES                      SELDOM                      OFTEN                      ALWAYS

79. I get the services, such as interpreters or captioning, I need to communicate with my colleagues at the workplace or at school.

NEVER                      SOMETIMES                      SELDOM                      OFTEN                      ALWAYS

80. Assistive support, such as an interpreter or captioning, is available to me for a doctor's or court appointment.

NEVER                      SOMETIMES                      SELDOM                      OFTEN                      ALWAYS

81. Assistive support, such as an interpreter or captioning, is available to me when I go to the theatre, movie theatre or performance center for a show.

NEVER

SOMETIMES

SELDOM

OFTEN

ALWAYS

### Your Background

The last few questions ask you about your background. Please check the answer that reflects your situation. All responses remain confidential.

82. What is your gender?

Male

Female

83. What is your ethnicity?

White/Caucasian

Black/African-American

Hispanic

Asian/Asian American

Indian/Native American

Other \_\_\_\_\_ (please specify)

84. In what year were you born?

\_\_\_\_\_

85. Were you born with hearing loss?

Yes → Skip to question #87

No

86. How old were you when you lost your hearing?

\_\_\_\_\_

87. What caused your deafness?

I was born with it

Illness \_\_\_\_\_ (please specify)

Accident

- Aging
- Unknown
- Other \_\_\_\_\_ (please specify)

88. How would you characterize your degree of hearing loss without a hearing aid?

- Profound hearing loss (cannot hear anything)
- Severe hearing loss (able to hear only really loud or high-pitched sounds)
- Moderate hearing loss (able to hear a conversation with difficulty)
- Mild hearing loss (able to hear much of a conversation)
- Normal hearing (can hear everything)

89. How would you characterize your degree of hearing loss with a hearing aid?

- Profound hearing loss (cannot hear anything)
- Severe hearing loss (able to hear only really loud or high-pitched sounds)
- Moderate hearing loss (able to hear a conversation with difficulty)
- Mild hearing loss (able to hear much of a conversation)
- Normal hearing (can hear everything)

90. What language was used in your home when you were growing up?

- Sign language only
- Spoken English (or other spoken language)
- Sign and speech at the same time
- Other \_\_\_\_\_ (please specify)

91. What is the highest educational level that you have completed?

- Elementary school → Skip questions #93 and 94
- High school → Skip question #94
- Technical/vocational school → Skip question #94
- College
- Graduate school
- None of the above → Go to question #95

92. What kind of program did you attend in elementary school?

- Hearing school with no support services
- Oral school for the deaf
- Mainstream school with support services
- Self-contained classroom in a hearing school
- Residential school for the deaf
- Other \_\_\_\_\_ (please specify)

93. What kind of school program did you attend in high school?

- Hearing school with no support services
- Oral school for the deaf
- Mainstream school with support services
- Self-contained classroom in a hearing school
- Residential school for the deaf
- Other \_\_\_\_\_ (please specify)

94. What kind of school program did you attend at college?

- Hearing school with no support services
- Oral school for the deaf
- Mainstream school with support services
- Self-contained classroom in a hearing school
- Residential school for the deaf
- Other \_\_\_\_\_ (please specify)

95. How many deaf or hard of hearing friends do you have?

- All of my friends are deaf or hard of hearing
- Most of my friends are deaf or hard of hearing
- Some of my friends are deaf or hard of hearing
- A very few of my friends are deaf or hard of hearing
- I do not have friends there are deaf or hard of hearing

96. What was your total **personal** income before taxes for the year 2004?

- Below \$10,000
- \$10,000 to \$19,999
- \$20,000 to \$29,999
- \$30,000 to \$39,999
- \$40,000 to \$49,999
- \$50,000 to \$59,999
- \$60,000 to \$69,999
- \$70,000 to \$79,999
- \$80,000 to \$89,999
- \$90,000 and above

97. What is your total **household** income before taxes for the year 2004?

- Below \$10,000
- \$10,000 to \$19,999
- \$20,000 to \$29,999
- \$30,000 to \$39,999
- \$40,000 to \$49,999
- \$50,000 to \$59,999
- \$60,000 to \$69,999

- \$70,000 to \$79,999
- \$80,000 to \$89,999
- \$90,000 and above

98. What is your employment status? (Please select all that apply)

- Employed full time
- Employed part time
- Student → Skip to question #101
- Unemployed with supplemental security income → Skip to question #101
- Unemployed without supplemental security income → Skip to question #101

99. Which occupational category do you belong to?

- Professional-managerial-technical
- Sales-clerical
- Service
- Crafts-machine operation
- Transportation-production-material moving
- Construction-extraction-maintenance
- Other \_\_\_\_\_ (Please specify)

100. What is your job title?

---

101. What is your current housing arrangement?

- Own a house
- Own a condominium
- Own a mobile home
- Rent a house
- Rent an apartment
- Rent a room
- Living with relatives/friends
- Other

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