FAMILY AND SOCIAL CONTEXT IN UNDERSTANDING SUICIDE ATTEMPTS AMONG INDIVIDUALS WHO ARE DEAF

By

JENNIFER SHERAY FREESE

Bachelor of Arts in Deaf Education

University of Tulsa

Tulsa, Oklahoma

2005

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
July, 2014

FAMILY AND SOCIAL CONTEXT IN UNDERSTANDING SUICIDE ATTEMPTS AMONG INDIVIDUALS WHO ARE DEAF

Thesis Approved:

Dr. Joseph Grzywacz

Thesis Adviser

Dr. Michael Criss

Dr. Amy Tate

Name: JENNIFER SHERAY FREESE

Date of Degree: JULY, 2014

Title of Study: FAMILY AND SOCIAL CONTEXT IN UNDERSTANDING SUICIDE ATTEMPTS AMONG INDIVIDUALS WHO ARE DEAF

Major Field: HUMAN DEVELOPMENT AND FAMILY SCIENCE

Abstract: The goal of this study was to develop a better understanding of the role communication plays in poor mental health experienced by deaf and hard of hearing individuals. The accomplish this goal, data from the 2008 Deaf Health Survey were used to delineate variation in suicidal behavior (i.e., suicide ideation, planning, and attempts) by demographic characteristics, and determine if indicators reflecting enhanced communication (e.g., family member deafness or attending a school for the deaf) and presumed deaf socialization were protective factors for suicide behaviors. The sample consisted of 317 deaf individuals who used sign language in the catchment area surrounding Rochester, New York. The results indicate that non-Whites report more suicide planning and that non-Whites and women have higher rates of suicide attempts during the past 12 months. In addition, married and married-like couples were less likely to attempt suicide during their lifetime. Deaf individuals with higher educational attainment had greater odds of reporting lifetime suicide attempts than those with a high school degree or less. Having a deaf parent or sibling were not associated with suicide behavior outcomes, but school attendance was associated with lifetime suicide attempts. Specifically, suicide attempts are higher for individuals who attended both a hearing school and a deaf school relative to those who only attended a hearing school. Implications of study findings and suggestions for further study are discussed.

TABLE OF CONTENTS

Chapter Page

Chapter Page

LIST OF TABLES

Table Page

CHAPTER I

INTRODUCTION

Deafness and hearing loss is a common condition frequently underappreciated in research, particularly Human Development and Family Science research. Very little research exists on issues related to deafness and hearing loss in the United States (US) with even the prevalence of hearing loss being understudied (Mehra, Eavey, & Keamy, 2009). In one of the few prevalence studies of hearing loss in the US, Agrawal and colleagues (2008) reported that 16.1% of adults had hearing loss that affected the ability to hear speech. Hearing loss can be present at birth; approximately 2-6 of every 1,000 children are born deaf or with a hearing loss in the US (American Speech Language Association [ASHA], 2014; National Institute on Deafness and Other Communication Disorders [NIDCD], 2010). The low rate of children born deaf or with hearing loss relative to the adult prevalence suggests hearing loss is predominantly acquired (Gallaudet Research Institute, 1994). The Centers for Disease Control (CDC) and ASHA concur, the reported rate of deafness and hearing loss increases each year, and it has doubled in the last 30 years (ASHA, 2014; CDC, 2013).

Individuals who are deaf or have hearing loss confront a number of unique challenges. Communication using spoken language can be difficult or impossible for individuals who are deaf or hard of hearing, thereby creating language barriers between the affected individual, and his/her family and the broader society (Eriks-Brophy, Durieux-Smith, Olds, Fitzpatrick, Duquette, & Whittingham, 2012). Deafness and hearing loss often coexists as part of a broader syndrome or is comorbid with other conditions such as Turner, Waardenburg, or Usher Syndromes (Felzien & MacKinnon, 2009; Oysu, Baserer, & Tinaz, 2000; Parkin & Walker, 2009; Turner, Windfuhr, & Kapur, 2007). Hearing loss and deafness have been associated with elevated risk for mental health problems in adolescence and adulthood (Coll, Cutler, Thobro, Haas, & Powell, 2009; Wallis, Musselman, MacKay, 2004). The source of elevated mental health risk among deaf adolescents and adults remains under-researched.

Mental health is a specific concern among deaf individuals. Very little mental health research has been conducted with children, adolescents, and adults who are deaf or have hearing loss (Hogan, Shipley, Strazdins, Purcell & Baker, 2011). Research that has been done indicates a disproportionate burden of mental health problems among adolescents with hearing loss and deafness (Coll, et al., 2009; Wallis et al., 2004). Research from other regions of the world expands upon the few U.S.-based studies by reporting higher rates of mental health problems among children and adolescents who are deaf or having hearing impairments (Remine & Brown, 2010; van Gent, Goedhart, & Treffers, 2007). Remine and Brown (2010), for example, reported that 42.6% of children who used Auslan Sign Language for communication reported mental health problems, compared to 18.9% for the hearing adolescent population. Fellinger, Hollzinger, and Pollard (2012) reviewed the literature internationally for studies on mental health in deaf adults and found higher instances of problems in the deaf groups than the control groups. The few studies that have sought to explain mental health outcomes among individuals who are deaf or hard of hearing conclude that deafness alone does not lead to psychopathology (van Gent et al., 2007; van Gent et al., 2011). Unfortunately, very little is known about the factors contributing to the excess burden of poor mental health among children and adolescents with deafness or hearing loss.

Communication problems likely lie at the core of poor mental health among individuals who are deaf or hard of hearing. It is estimated that 90% of deaf children are born to parents with normal hearing: these parents frequently have no or limited previous exposure to deafness or hearing problems (Lederberg & Mobley, 1990; Wallis et al., 2004). Consequently, a deaf or hard of hearing child likely experiences substantial difficulties conveying basic needs like "I am hungry" or "I don't feel well," much less understanding parental instructions or attempts on the part of the parent to console the child. Likewise, without a shared language, adolescents who are deaf or have difficulty hearing may confront substantial difficulty developing social relationships with peers or other meaningful adults like teachers. Compromised ability to communicate can leave children and adolescents socially disconnected, which can lead to feelings of isolation or thwarted belongingness and possibly mental health problems like depression (Landsberger, Diaz, Spring, Sheward & Sculley, 2014; Sheppard & Badger, 2010) and suicide ideation (Gvion & Apter, 2012; Sheppard & Badger, 2010).

Suicide ideation and suicidal behavior (i.e., planning and attempts) provides a concrete foundation for understanding the role of communication in mental health among individuals who are deaf. Communication barriers may limit the deaf or hard of hearing individual's interactions within the family and community causing feelings of isolation that may grow as they age. These feelings of isolation could lead to depression and potentially suicidal thoughts (Morrison, 2008). Later in life, language barriers can limit opportunities for employment for deaf individuals as some companies may not want to hire a person needing an interpreter, or may consider the hearing loss a risk for injury (Houston, Lammers, & Svorny, 2010). Deaf individuals may then have to rely on government programs such as social security insurance (SSI) or social security disability insurance (SSDI) for income and may need additional financial support from family, creating a feeling of being a burden (Houston et al., 2010). Both feelings of isolation and burdensomeness have been linked to suicide attempts (Hill & Pettit, 2014; Ledgerwood, 1999; Van Orden, Lynam, Hollar, & Joiner, 2006).

The overall goal of this project is to develop a better understanding of the role communication plays in poor mental health experienced by deaf and hard of hearing individuals. To accomplish this goal, this project focuses on one indicator of poor mental health; that is, suicide (ideation, planning, and attempts). Other manifestations of poor mental health, such as symptoms of depression or anxiety are abstract and challenging to translate into major languages, including English (Buxton, 2010) and American Sign Language (Cornes & Napier, 2005). There are often no specific signs for mental health issues and one English word may need many signs to help describe the concept (Cornes & Napier, 2005). By contrast, suicide related signs are more iconic (i.e., taking pills, using a gun), thereby creating greater clarity in conveying meaning. Therefore, this extreme outcome may be an avenue through which to better understand how deafness or difficulty hearing may contribute to poorer mental health outcomes.

This study uses a sample of deaf adults who communicate using American Sign Language or a form of Signed English. The study has two aims: 1) to describe differences in suicide behaviors (last 12 month suicide ideation, last 12 month suicide planning and suicide rates (in the last 12 months and lifetime) among deaf individuals by age, gender, race, ethnicity, education, marital status, and age at onset of deafness; and 2) to describe differences in suicide behavior by indications of deaf socialization (i.e., deaf family members, attending a deaf school) to determine if access to fluent communication through these exposures could be a potential protective factor for suicide behaviors.

CHAPTER II

REVIEW OF LITERATURE

It is well documented that early intervention and access to language through a family-centered approach are essential for better social, emotional, and educational outcomes for children who are deaf and hard of hearing (Holzinger, Fellinger, & Beitel, 2011; Moeller, 2000; Moeller et al., 2013). However, accessing intervention and language is filled with difficult decisions parents of deaf children must make. Decision-making is complicated by the experience of grief from discovering the child has a permanent hearing loss. Further, decision-making is unfamiliar because more than 90% of deaf children are born to hearing parents, who often have no experience with deafness (Lederberg & Mobley, 1990; Mason & Mason, 2007; Wallis, Musselman, & MacKay, 2004). Still, the decisions that are made can impact communication within the family and in society for the child’s lifetime. Communication is the basis for interpersonal relationships (Punyanunt-Carter, 2008; Ramaraju, 2012) and attachment (Leibowitz, Ramos-Marcuse, & Arsenio, 2010; Rees, 2008). Some level of attachment is possible without a shared language or in situations with communication disorder such as Autism (Seskin et al., 2010). However, the sharing of deeper and more complex ideas, and the ability to understand and to be understood is vital for attachment and strong interpersonal relationships across the life course (Sillars, Koerner, & Fitzpatrick, 2005).

Part of typical childhood development includes learning social-emotional skills and forming relationships (Baker et al., 2007). Children learn socialization first through interactions with their parents, other family members, and caregivers (Baker, et al., 2007). Language, social skills and emotion regulation results from even basic play between parents and the infant (Leibowitz et al., 2010). They learn about emotions by watching and interacting with their parents and other family members and friends (Leibowitz et al., 2010). These and other forms of learning are stymied in the absence of a shared language; children may not fully develop the skills needed for family, peer, and community socialization (Pennington, 2010). Skill sets that are particularly important to the hearing culture, such as turn taking, may fail to develop.

The inability to fully participate in and communicate with the family and peer groups can lead to feelings of thwarted belongingness and isolation. Thwarted belongingness refers to the inability to form close bonds with others and an accompanying feeling of alienation (Gunn et al., 2012). Over time, feelings of not belonging can lead to depression and other mental health disorders and may ultimately lead to thoughts of suicide (Gunn et al., 2012; O’Keefe et al., 2014). To fully appreciate the magnitude of this problem, and the difficulty many parents face as they try to choose the best communication options for their deaf child, it is necessary to understand some basic information on hearing loss, options in amplification and communication, and choices in education placement.

This literature review covers many topics. First, an overview of hearing loss and deafness will be provided to introduce the reader to relevant background information including types and degrees of hearing loss. This review will include the prevalence and epidemiology of hearing loss in the United States, as well as some known etiologies for hearing loss. In addition, a brief discussion about comorbidity in persons who are deaf and hard of hearing will be presented. Next, a review of the ways communication is impacted by hearing loss, including brief information on the implications of communication problems for social and mental health is described. A more step by step presentation of the choices hearing parents face when they learn their child has a hearing loss will be given to give the reader insight into the complexity of raising a deaf child. This section also includes information on amplification choices, communication choices, and educational placement options. Deaf parents of deaf children will be discussed next, as their reaction to a deaf child is often unique. Finally, a more in depth discussion on mental health outcomes in deaf and hard of hearing children, including potential suicide links to communication, is discussed.

Hearing Loss and Deafness Overview

Hearing loss is a common condition that affects people of all races, all ages, and all economic levels, worldwide. Hearing loss and deafness may be present at birth, or it may occur at any time during an individual's life. Early Hearing Detection and Intervention (EHDI) programs were established to allow earlier diagnosis and to allow for earlier intervention services (Joint Committee on Infant Hearing, 2007). Most states now have requirements for newborns to undergo hearing screening before leaving the hospital after birth, or within the first month of their lives (Joint Committee on Infant Hearing, 2007). Of the infants who are referred for further testing, only about 45% follow up with an audiologist according to EHDI reports (Ross & Visser, 2012). Possibly as a result of delayed follow-up, hearing loss may go undiagnosed until it is apparent as a toddler begins to miss language milestones, or does not react to speech or sound. Sometimes hearing loss goes undetected into later childhood. Hearing loss can also develop at any point in time later in the individual's life, and it becomes more common in late adulthood, with changes in ear function due to age and exposure to noise (Liu & Yan, 2007). Approximately half of adults over the age of 85 self-report hearing loss (Liu & Yan, 2007).

Types of hearing loss. There are three types of hearing loss: conductive, sensorineural, and mixed. Conductive hearing loss occurs when sounds do not travel through the ear canal and into the middle ear. This can happen for a number of reasons, such as fluid in the ears from a cold or allergies, ear infection, ear wax impaction, or a foreign object in the ear. Conductive hearing loss can usually be corrected with treatment or surgery (ASHA, 2014a). Sensorineural hearing loss is caused by damage to the inner ear or cochlea that usually cannot be reversed. This damage causes sounds to be unclear or muffled. Some causes for sensorineural loss include exposure to ototoxic drugs, illness, aging, trauma, genetic or hereditary reasons, and noise exposure (ASHA, 2014b). In addition to conductive and sensorineural hearing loss, a combination of the two can be present. This mixed hearing loss occurs when there is damage in the middle or outer ear in addition to damage to the auditory nerve.

Degrees of hearing loss. The degree of hearing loss refers to the severity of the loss and is better understood when being compared to normal hearing. Hearing is considered to be in normal limits when sound can be detected between -10 and 15 dB. When an individual has a slight hearing loss, they have up to a 25 dB loss. Hearing loss is frequently classified into mild, moderate, severe, and profound categories. Mild loss ranges from 26-40 dB, Moderate 41- 55 dB, Moderately Severe 56-70 dB, Severe 71 to 90 dB, and anything over 90 dB hearing loss is considered profound (ASHA, 2014a). When an individual can use their residual hearing and speak intelligibly, they are often called “hard of hearing.” A person is usually considered deaf when their hearing loss is greater than 90 dB. Additionally, people may identify themselves as culturally Deaf (big D intended) at any level of hearing loss if they have adopted the culture and language of American Sign Language (ASL).

Other components. There are several other components that must be considered when discussing hearing loss. Hearing loss can occur bilaterally (in both ears) or unilaterally (in one ear). It can be the same degree of loss in each ear, or may be different (called asymmetrical). Hearing loss may be present at birth (congenital), or may develop at any time during the lifespan (acquired). It can be sudden in onset, or be progressive over time. Sometimes hearing loss fluctuates while other times it remains stable. All of these factors make hearing loss difficult to research due to wide heterogeneity in presentation.

Prevalence and epidemiology of hearing loss. Little research has been conducted in the United States to determine prevalence of hearing loss and deafness. Some national surveys ask general questions about hearing loss, but do not have a common definition or measurement for reporting. Mehra and colleagues (2009), using information for several national data sets, reported that 1.1 of every 1000 infants had hearing loss. According to Fellinger and colleagues (2012), approximately seven out of 10,000 people experience hearing loss pre-lingually or before the development of language. The National Institute on Deafness and other Communication Disorders (NIDCD) reports that about 17% of adults in the United States have hearing loss of some degree (NIDCD, 2010).

The Center for Assessment and Demographic Studies at Gallaudet University has compiled demographic information from the National Center for Health Statistics data collected in 1990 and 1991 to provide insight into demographic information for individuals who are deaf or hard of hearing. According to this research, Whites are two times more likely to have hearing loss than Blacks, and hearing loss is twice as likely in non-Hispanic populations. In addition, males are more likely to have hearing loss than females, with a widening discrepancy after the age of 18. Hearing loss increases with age, with the majority of hearing loss and deafness affecting those over 65 years of age; elderly persons are eight times more likely to have a hearing loss than people ages 18-34 (Gallaudet Research Institute, 1994). Hearing loss is more frequently found in adults who are not high school graduates and those in low-income households (Mehra et al., 2009). There is a need for updated information on epidemiology and prevalence of hearing loss in the United States, but as Gallaudet acknowledges in the compilation of the findings, state and local data are rarely available, making this information difficult to obtain (Gallaudet Research Institute, 1994).

Etiology of hearing loss. The etiology of hearing loss is often uncertain (Walch et al., 2000). It is known that hearing loss may be congenital (present at birth) or acquired. Approximately 4% of individuals with hearing loss reported it was present at birth, according to a report by Gallaudet Research Institute (1994) (based on data from the 1994 National Health Interview Survey), which highlights that most cases are acquired or of unknown etiology. As an example, Walch and colleagues (2000) found that in a group of 106 children, ages 4 months to 11 years, with bilateral hearing loss, 18% had genetic causes, 38% had acquired hearing loss, and 44% had an unknown cause.

Genetic hearing loss. It is estimated that approximately half of the profound congenital sensorineural cases of deafness have a genetic etiology (American College of Medical Genetics, 2002; Huang, Zdanski, & Castillo, 2012). More than 100 genetic diseases are known to cause hearing loss (Hudspeth, 2000). In a recent study, Mehra and colleagues (2009) concluded that 23% of the hearing loss cases were attributed to genetic reasons (Mehra et al., 2009). Heredity is the leading reported cause of hearing loss at birth according to a report done by Gallaudet University of a collection of 1990-91 data from the National Interview Survey.

Acquired hearing loss. As indicated previously, hearing loss can occur throughout life from conception to old age. About 25% of congenital hearing loss is due to non-genetic factors such as maternal infections (e.g., cytomegalovirus, rubella), premature birth, toxin exposure (e.g., drugs or alcohol) during gestation, maternal diabetes, and lack of oxygen (ASHA, 2014b). In addition, some medications used to treat serious infection in mothers or infants cause damage to hearing (ASHA, 2014b; Hudspeth, 2000). Noise exposure is another leading cause of hearing loss, especially for adults working in industry or military settings (Daniell et al., 2006). Trauma may also affect hearing. This may include a physical impact to the ear or the brain, or repeated exposure to infection, such as otitis media (ASHA, 2014b; MacAndie & O’Reilly,1999). Estimates from the National Health Interview Survey (1990-1991) indicate that 12.2% of adults listed ear infection, and 4.9% listed ear injury as the reason for their hearing loss (Gallaudet Research Institute, 1994).

Comorbidity. Hearing loss is frequently comorbid with other chronic health conditions. Usher Syndrome, Waardenburg Syndrome, and Turner Syndrome are common syndromes that often exist with hearing loss (Felzien & MacKinnon, 2009; Nunes, 2006; Oysu et al., 2000; Parkin & Walker, 2009). Turner Syndrome is chromosomal abnormality that impacts only females that is often accompanied by middle ear disease and hearing loss (Parkin & Walker, 2009). Waardenburg Syndrome is a genetic disorder presenting with hearing loss and characteristic skin, eye, and hair color differences (i.e. white forelock of hair) (Madden et al., 2003). Usher Syndome is an inherited condition that includes both hearing loss and progressive vision loss (Felzien & MacKinnon, 2009). Hearing loss may be present in individuals with Autism, blindness, intellectual deficiencies and physical challenges (Szymanski et al., 2012). About one-fourth of deaf individuals have additional disabilities (Fellinger, Holzinger, & Pollard, 2012). These additional disabilities may add to the communication challenges, especially in instances such as cerebral palsy, which impact the individual's ability to control movement and may hinder signing ability (Colver, Fairhurst, & Pharoah, 2014; Torpy, Lynm, & Glass, 2010).

Communication and Hearing Loss

Deafness and hearing loss inherently impact oral communication. Hearing parents of deaf and hard of hearing children must make choices regarding their child's communication soon after diagnosis. These decisions have long lasting consequences shown by research which indicates that early language access leads to stronger attachment (Asberg, Vogel, & Bowers, 2008) and improved educational outcomes (Ritter-Brinton & Stewart, 1992). Some preliminary research also indicates lower reports of psychopathology in adolescence and adulthood (Fellinger, et al., 2012). This task of choosing a communication method is made more difficult when considering that 90% of these parents have no previous exposure to hearing loss and communication options (Lederberg & Mobley, 1990; Mason & Mason, 2007; Wallis, et al., 2004). However, it is during this initial diagnosis period that parents are expected to make decisions that will affect the child's social, emotional, and educational outcomes.

Outcomes for communication problems. Deaf and hard of hearing children in general, regardless of level of hearing loss, may struggle socially. Even young children with hearing loss (under the age of 13 years) have an almost four times greater instance of psychosocial problems, regardless of hearing level (Fellinger et al., 2012). Inhibited language development (in the form of poor sign language or oral skills) in deaf children has been associated with greater psychosocial difficulties (Fellinger et al., 2012). Ongoing problems communicating with peers and socializing within the majority culture can lead to feelings of inadequacy and low self-esteem. Left unaddressed, these issues can develop into serious mental health problems (Young, Green, & Rogers, 2008).

Inability or difficulty communicating effectively in the home likely contributes to and compounds deaf children's social development. Consider a situation in which the parents of a deaf child do not learn to sign or can only sign minimally. When the deaf child has emotional needs and goes to their parent for comfort, their needs remain unmet because of the parent's inability to communicate (Sheppard & Badger, 2010). In addition, these deaf children are left out during conversations that happen in the car or around the kitchen table. Their opinions and input are not solicited when family decisions are made. These things can lead to withdrawal, isolation, self-blame, and depression (Sheppard & Badger, 2010).

Choices in Communication

The weight of the choices a parent must make regarding communication are apparent when viewing the results from a lifetime perspective and considering mental health outcomes. Every parent wants their child to be successful and develop strong social relationships. To better understand the choices available for children who are deaf and hard of hearing, the following sections will review choices parents face upon learning their child has a hearing loss. For ease of consideration, the choices will be presented as if the hearing loss were discovered at birth and follow through the first several years of development. Parents must carefully weigh each option, determining what is best for the child and the family.

Amplification. One of the first steps after diagnosing a hearing loss is determining what, if any, type of amplification options are available to improve auditory function. Which option is best depends on the degree and type of hearing loss, and, in the case of a cochlear implant, the family's commitment to follow up.

Hearing aids. There are a number of hearing aids available including behind the ear (BTE), in the ear (ITE), in the canal (ITC), and completely in the canal (CIC) (McKay, Gravel, & Tharpe, 2008). Hearing aids can amplify the sound, but do not restore hearing completely. They are often used in individuals with mild and moderate hearing loss to allow the wearer to hear within the speech range, but are not usually effective for hearing speech for those with severe and profound loss. Hearing aids can only be used when the cochlea and hairs in the cochlea are intact.

Cochlear implants. Cochlear implants are used in individuals with more severe hearing loss and those without a working cochlea because the electrodes bypass the cochlea and go directly to the nerve in the inner ear. Cochlear implantation requires a surgery to insert an internal receiver into the skull, which is connected magnetically to both a microphone and transmitter on the outer ear, and an electrode array that transmits digital signals to the auditory nerve (O'Donoghue, 2013). Cochlear implants are successful in some individuals, allowing the individual to hear and learn speech, but do not seem to work for others. It is important to note that the sound that is transmitted with the cochlear implant is not the equivalent of sound a hearing person hears, and a cochlear implant does not restore an individual's hearing ability; when the individual removes the processor, he or she has no hearing (O'Donoghue, 2013).

Communication methods. After choosing amplification methods, parents must decide which method of communication they will use with their child: oral, manual (sign language, cued speech), lip reading, or a combination. Choosing a communication mode is difficult and every method comes with its own challenges.

Oral/Aural communication. Oral and auditory approaches to communication utilize residual hearing and promote the importance of lip reading. These methods stress enhancing listening skills and using speech, while using assistive technology (such as hearing aids and cochlear implants) and sometimes support such as cued speech, which uses hand shape "cues" in specific locations around the face to aid in lipreading (Heracleous, Beautemps, & Aboutabit, 2010), to promote oral and auditory communication skills (Lim & Sinser, 2005). Oral and auditory training is strenuous, not only for the child, but for the parent as well. This communication method requires intensive therapy and practice both in the therapy setting and at home (Lim & Sinser, 2005). Though most parents want their child to be able to communicate through speech and be able to easily interact with the hearing world, many children with hearing loss struggle with oral communication. There are many words that appear the same on the mouth when spoken, which makes lip reading difficult (Alegria & Lechat, 2005). Learning to clearly pronounce words that have never been heard is difficult as well (Alegria & Lechat, 2005). Some individuals succeed using the oral or aural methods and interact well with hearing individuals using their residual hearing and speech skills. Oral/Aural communication options are often chosen for children who are classified as hard of hearing, who are able to use their residual hearing to aide in both receptive and expressive oral skills (Lim & Sinser, 2005). Some families use a combination of an oral/aural approach and the use of sign language or cued speech to support language development.

Sign language. For parents who choose to use sign language with their child, learning a new language can be a daunting task (Napier, Leigh, & Nann, 2007). American Sign Language has been accepted as a distinct language with a unique syntax and grammar (Rosen, 2008), which needs to be learned along with the actual signs. In addition, parents need to be able to learn sign language immediately applicable to use with their young child. This can be a challenge, as most sign language programs are offered through universities and are aimed for students wanting to become sign language interpreters for deaf adults (Napier, Leigh, & Nann, 2007). Parent-friendly courses are harder to find, as are signing role models. For these reasons, many parents struggle to develop even marginal signing skills (Napier, Leigh, & Nann, 2007).

Research documents the benefits of using sign language with deaf children. Stronger attachment (Asberg, Vogel, & Bowers, 2008), positive educational outcomes (Ritter-Brinton & Stewart, 1992), and better social development (Hadadian & Rose, 1991; Harris, 2001) have been reported with early language access. When parents can sign, even marginally, communication improves and the deaf child may feel more accepted as a member of the family. If everyone in the family signs fluently the deaf child can learn information incidentally, similar to the way hearing children learn by “overhearing” conversations. Children with an early language base, whether through spoken or signed language, are able to communicate needs and wants and ask questions about the world around them; all of these activities are necessary for typical development. Sign language is believed to enhance feelings of support felt by parents with children who sign than parents who choose an oral method or cochlear implants (Asberg, Vogel, & Bowers, 2004).

Educational Options. Educational placement is another hard decision that parents must face in the first few years of their child’s life. For deaf and hard of hearing children, this means considering both the available placement options and the communication method of the child. In addition, it can mean choosing to send the child to a day school or residential school.

Public school. Larger school districts have programs in place to support deaf and hard of hearing students. These programs, however, can vary greatly based on language and education philosophies. Children who are using an oral approach may be mainstreamed into general education classrooms with itinerant Deaf Education teacher support. This means that the child is educated in the hearing classroom, but the Deaf Education teacher provides consultation and support for both the teacher and the child, including education on hearing aids, the use of captioning, and other helpful tips. Other students may use an interpreter or team of interpreters to provide sign language access while they are in a general education classroom. Larger school systems also may have self-contained classrooms for deaf and hard of hearing students, with a Deaf Education teacher providing educational instruction in sign language. Some children may remain in the Deaf Education classroom all day, while others might mainstream to general education classes as well.

Philosophies of Deaf Education may be different and may determine the type of Deaf Education services provided. Oral language programs often exclude sign language use and focus on using residual hearing, lip reading, and supportive technology. Signed English programs use manually coded English signs, rather than American Sign Language. Bilingual programs focus on American Sign Language as a first language and English as the second. Parents must research the available programs in their area to determine the best placement for their child.

***Residential schools for the Deaf*.** In addition to the public school system, schools for the deaf exist in each state. These schools provide sign rich environments and support services for children who are deaf or hard of hearing and most have both day school and residential school options. Schools for the Deaf are able to focus on the language needs of children using American Sign Language. Most of the staff and students sign, so the child is able to fully participate in conversations and their education with no language barrier. Because there is only one State School for the Deaf in each state, day school options are often not available and parents must decide to send their child to live at the school, often visiting home on the weekends. This can be a difficult choice, especially when children are younger.

Differences in Deaf Parents/Deaf Child Dyads

It is important to note that deaf parents with deaf children may be more readily able to accept and embrace a diagnosis of deafness for their child. Deaf parents are often already skilled at communicating through sign language and have highly developed visual communication strategies. For example, touch is used by deaf parents to prompt visual attention, to alert an infant of upcoming signed communication, to help with emotion regulation achievement, and to maintain contact when eye contact has been broken (Koester, Brooks & Traci, 2000; Loots & Devise′, 2003). These advantages allow deaf children with deaf parents to develop at comparable rates to those of hearing children with hearing parents, linguistically (Harris, 2001; Vaccari & Marschark, 1997), academically (Ritter-Brinton & Stewart, 1992) and socially (Hadadian & Rose, 1991; Harris, 2001). Overall, studies have indicated that deaf mother and deaf infants develop fluent, easy communication when compared to hearing parents and their infants (Loots & Devise’, 2003).

Deafness and Mental Health Outcomes

The mental health of adolescents and adults, and possible resiliency factors that may reduce incidence, have been an area of research interest in the general population for the last 20 years (van Gent et al., 2011). Research on this issue among deaf adolescents and adults is comparably sparse (Hogan, et al., 2011). This is distressing when the reported occurrence of psychopathology in deaf individuals is drastically higher than that of the hearing population (Coll, et al., 2009; Wallis et al., 2004). Remine and Brown (2010) reported that the report rate of mental health problems was double for children who used Auslan Sign Language, when compared to the overall hearing adolescent population. Research shows that deaf individuals have much higher rates of psychopathology in adolescence and adulthood than their hearing peers; however, studies have found that deafness alone does not lead to mental health problems (van Gent et al., 2011). This leads to the question of what issues cause this higher rate of psychopathology in deaf individuals.

Attachment. Ainsworth and Bowlby's Attachment theory (1991) may be helpful in explaining the link between communication and mental health and suicide outcomes in deaf individuals. Mason and Mason (2007) define attachment as the emotional bond developed between parents and infants during the first year of life. The emotional bond is further described as a strong feeling that elicits joy and pleasure and the ability to be soothed during stressful times (Mason & Mason, 2007). Attachment occurs when an infant's needs, both physical and emotional, are met. Children with secure attachments are able to flexibly manage distress (Howe, 2006a). When parents and caregivers are emotionally attuned and are able to openly communicate, children also feel more accepted and understood (Howe, 2006b). Deaf children have been found to have more stable and higher social skills and emotional regulation when they have a secure attachment as toddlers (Lederberg & Mobley, 1990).

Insecure attachment results when this secure connection does not form. Studies have shown that hearing children with secure attachments have positive outcomes: more successful peer relationships, fewer behavior problems and better school performance than those with infantile insecure attachments (Mason & Mason, 2007; Snyder, Shapiro, & Treleaven, 2011). Research has also shown that children with disabilities have generally lower rates of attachments that are secure (Howe, 2006a). Howe (2006a) reported that deaf children with hearing parents were at an increased risk for attachment problems, particularly in cases where parents have poor opinions of deafness. The inability or difficulty for a hearing parent to communicate fluently with a deaf child may lead to these early attachment issues. When the attachment suffers, mental health problems can develop as the child feels they are not accepted and do not belong fully within the family (Maimon, Browning, & Brooks-Gunn, 2010).

Family communication. A possible factor in this higher occurrence of mental health problems in deaf teens and adults is family communication level. Deaf children who struggle to be understood in their family environment are four times more likely to face mental health disorders than children who are able to fluently communicate (Fellinger et al., 2012). As previously mentioned, deaf children with deaf parents (who are therefore exposed to language from birth and surrounded with opportunity for fluid communication) have less instance of psychopathology in adulthood (Jambor & Elliot, 2005). This seems to lend support to the idea that fluent familial communication is one of the foundations for better mental health. When that communication fails to occur, the deaf individual may feel unimportant, unaccepted (Bat-Chava, 1993), and unsure of where or if they fit into the family and community (Lamis & Malone, 2011). The barrier of communication with peers can lead to feelings of isolation. These deep feelings of depression, isolation, and lack of belonging can lead to suicidal ideation.

Peer communication. As a child grows, his or her peer group becomes an integral part of their life. The relationships developed and maintained through childhood and adolescence lay the ground work for future bonds. Research has shown that positive peer interactions can promote feelings of belonging and pro-social behavior (Chen, 2012). Negative relationships can perpetuate negative self-image and isolation (Chen, 2012). Deaf children may be at an increased risk for poor peer socialization due to communication differences (Martin, et al., 2010). Children with disabilities are often shunned at school, and with the added language differences, forming close friendships can be difficult for deaf children in public schools (Keating & Mirus, 2003; Martin et al., 2010). Feelings of isolation increase as deaf children are excluded from social groups (Martin et al., 2010). Thwarted belongingness both at school and home can lead to hopelessness and feelings of isolation, which may lead to suicide behaviors.

Deafness, Communication, and Suicide

Suicide has been studied in the general hearing population for years, with a primary focus on determining what leads to suicidal thoughts and ways to intervene (Overholsen, Braden, & Dieter, 2012; Zayas et al., 2000). Researchers found that feelings of thwarted belongingness and feelings of isolation predicted suicide ideation, a precursor to suicide attempts (Hill & Petitt, 2014; Lamis & Malone, 2011; McLaren & Challis, 2009). Thwarted belongingness refers to negative psychological feelings resulting from a failure to form connected relationships or a sense of connection within a group (Baumeister & Leary, 1995, Van Orden, et al., 2008). This feeling of not belonging may lead to social isolation. Suicide ideation covers a continuum of thoughts from wanting to die to detailed plans for ending one’s own life (Bhar et al., 2008). Suicide ideation may lead to actual attempts of ending one’s life.

Suicide in the deaf and hard of hearing. Research is lacking in how deaf and hard of hearing individuals are affected by suicide ideation, and attempts of suicide. A review of literature by Turner and colleagues (2007) indicated a need for assessing suicide ideology and risk in samples of individuals who are deaf and hard of hearing due to higher perceived risk levels, and especially because of conflicting and wide ranges in reports of suicide attempt rates. For example, 1.7%-18% of students in deaf schools and colleges reported attempting suicide within the last year and up to 30% have attempted suicide in their lifetime (Tuner, et al., 2007). By contrast 0.5% of the population of adults in the United States reported suicide attempts during the past 12 months (CDC-VP, 2005) and 4.6% of the general population reported lifetime suicide attempts (Suicide Prevention Action Network, 2007). Without further research it is difficult to ascertain whether suicide ideation and attempt rates are higher for individuals who are deaf and hard of hearing than those with typical hearing.

Joiner’s (2005) Interpersonal Theory of Suicide (ITS) may be useful in examining the connections between deafness, communication, and suicide. In 2005, Joiner’s theory posited that for suicidal behavior to happen, the individual must both desire to commit suicide and have the capability for suicide. He broke the concept of desire for suicide into two parts: thwarted belongingness and perceived burdensomeness. When both components are present, a motivational force is created (Joiner, 2005). The capability for suicide refers to the ability to become self-destructive shown through a diminished fear of dying and high tolerance for pain, for example (Van Orden et al., 2010).

Communication problems may contribute to both feelings of thwarted belongingness and perceived burdensomeness for individuals who are deaf and hard of hearing. The inability to communicate fluently within the family setting may cause the person with hearing loss to feel less a member of the family. This continual feeling of not being accepted or not belonging, in addition to the lack of communication, may lead to feelings of isolation. As the deaf or hard of hearing child grows, he or she may become dependent on others to make choices and essentially “speak” for them in a variety of situations. This learned dependency can also develop into a feeling of being a burden on the family or society as a whole. With this motivational force, and the possible presence of capability, deaf and hard of hearing individuals may be at increased risk for suicide attempts.

Suicide behaviors are understudied when considering deaf individuals. In addition, communication between deaf children and their families and peers and these links have yet to be considered in research. The goals of this project were to 1) describe differences in suicide ideation (last 12 months), suicide planning (last 12 months), and suicide attempts (last 12 months and lifetime) of deaf individuals by age, gender, race, ethnicity, educational attainment, marital status, and age of onset of deafness; and 2) describe differences in suicide behaviors (ideation, planning, and attempts) by indications of deaf socialization (i.e., deaf family members, attending a deaf school). It was hypothesized that being Non-White, never married, older, and having lower educational attainment would predict higher suicide attempt behaviors than other groups. In addition, it was hypothesized that having a deaf family member or attending a deaf school would reduce the odds for suicide ideation, suicide planning and suicide attempts (lifetime and last 12 months).

CHAPTER III

METHODOLOGY

Participants and Procedure

The data for this study was provided by the Rochester Prevention Research Center's National Center for Deaf Health Research based on the 2008 Deaf Health Survey. A community participatory research approach was used to create and administer a health survey that is accessible to individuals using American Sign Language (ASL). This health study focused on three areas: partner violence, obesity, and suicide. This innovative survey is the first with data gathered directly from a deaf community and which collects information on health priorities. Collaboration between deaf and hearing researchers and members of the community produced a survey based on the Behavioral Risk Factor Surveillance System (BRFSS). Additional deaf-related information on demographics (e.g., age at onset of deafness) was added. Adaptation of the existing English-language survey into ASL was done through translation, back-translation, and cognitive interviews with individuals to ensure appropriate interpretation. The survey questions were presented to interviewers on a computer interface showing both the sign language and English print version of the 98 questions.

Deaf individuals were recruited through various organizations in the deaf community using emails, posters, and face-to-face recruitment during events in the community. In 2008, 339 deaf adults from the metropolitan statistical area of Rochester, New York were recruited and participated in the the survey during a 6-month period of time. The results were compared with BRFSS data that had been collected in 2006 through random digit dialing in the Rochester community. Health inequities for the deaf were then identified for future research. Due to the sensitive nature of some of the questions related to suicide, the LifeLine TTY and Voice access numbers were offered at the close of the section on suicide.

The 2008 Deaf Heath Survey was started by 339 deaf adults between the ages of 18-88 years (M Age = 46.4 years; 85.7% White, 4.4% African American, 2.5% Asian/Pacific Islander, 1.3% American Indian/Alaska Native, 6.0% Other or multiple races; 3.2% Hispanic; 45.5% male, 54.5% female). The majority of participants (82.2%), had at least 2 years of college education. Most (69.8%) reported being deaf since birth. Fifty percent of participants were married, 17.1% were divorced or widowed, 3.8% were separated, 24.7% had never been married, and 4.4% reported being part of an unmarried couple. Many of the demographic reports for the deaf sample were similar to the 2006 Rochester telephone results from the BRFSS, conducted with the hearing sample in Monroe County, New York.

Measures: Demographics

Participants were asked basic demographic information as part of the survey. Demographic information collected included: age, gender, race, ethnicity, education level, and marital status. For the purpose of this study age of onset of hearing loss was included as a demographic variable.

Age. Age at the time of survey was considered a continuous variable in the logistic regression analyses, and was also categorized into 3 groups: “18-39”=1; “40-60”=2; “61+”=3 for reporting sample descriptive statistics.

Gender. Gender was assessed by asking “Are you male or female?” Results were recoded to, 0=male and 1=female.

Race. Race was assessed by asking “What is your race?” with one or more of the following answer choices: “White, Black/African-American, Asian, Pacific Islander, American

Indian or Alaska Native, or Other (please describe)". These were coded as White=0, Black/African American=1, Asian=2, Pacific Islander=3, American Indian or Alaska Native =4, Other=5, and More than One Race=6. For parsimony, these categories were subsequently collapsed such that 0=Non-White and 1= White.

Ethnicity. Ethnicity was assessed by asking "Are you Hispanic/Latino" with No=0 and Yes=1 coding.

Education level. Educational attainment level was determined through a series of questions, including "Did you graduate high school or get your GED?", "Did you attend a vocational or technical program after high school? If yes, did you complete this program?", "After high school, did you go to college? If yes, what degree do you have: I took classes, but did not get a degree; AAS, AOS, etc. (2 year degree); BA, BS (4 year degree); Graduate degree". These answers were coded as "High School or Less"=1 and "Some College or More"=2.

Marital Status. Marital status was determined based on answers to "Are You: Married, Divorced, Widowed, Separated, Never Been Married, or A Member of an Unmarried Couple" and were recoded to "Married/Member of an Unmarried Couple"=1, "Divorced/Separated/Widowed"=2, and "Never Been Married"=3 .

Measures: Suicide Behavior

Suicide ideation. Suicide ideation refers to the thought of taking one's own life in any fashion (Gvion & Apter, 2012) and was assessed over the past 12 months. The question, "In the last 12 months, did you ever think about killing yourself?" was asked. A dichotomous variable was created such that "No" was set to 0 and "Yes" was set to 1.

Suicide planning. Suicide planning refers to the thought put into what steps one might take to commit suicide (Gvion & Apter, 2012) and was assessed with the question, "During the past 12 months have you made a plan for killing yourself?" with yes/no response options. These items were coded No=0 and Yes=1.

Suicide attempts. Suicide attempts refer to the actions taken toward ending one's own life (Gvion & Apter, 2012). These were assessed by first asking "Have you ever tried to kill yourself?" which measures attempts over lifetime. These were coded No=0 and Yes=1. If the participant answered affirmatively, they were then asked "During the past 12 months, have you tried to kill yourself?" with yes/no choices.   These were coded No=0 and Yes=1. If the participant gave a "yes" response to trying in the last 12 months, an additional question, "How many times did an attempt result in a trip to the hospital for treatment?" was asked. These were coded as "None"=0, "1"=1 and "2 or more"=2.

Measures: Hearing Level and Communication

The following variables were created by the research group at the National Center for Deaf Health Research specifically for the Deaf Health Survey 2008, to enable assessment of deaf related variables.

Age of onset. Participant's age of hearing loss/deafness onset was determined through the question "How old were you when you became deaf or hard of hearing?". The participants chose from four answer choices: "I don't know", "I was born deaf/hard of hearing", "I became deaf/hard of hearing when I was younger than one year old", and "I became deaf/hard of hearing at_____years old (which allowed the participant to write in an age)". The answers were recoded into the following categories: "Born deaf"=0, "Pre-lingual (<3 years)"=1, and "Post-lingual (>3 years)= 2, and "I don't know"=7. Groups were based on theorized differences between being born deaf, developing deafness pre-lingually, and becoming deaf post-lingually (Barnett & Franks, 1999). Previous research has defined pre-lingual deafness as occurring before 3 years of age and post-lingual as occurring after 3 years of age (Barnett & Franks, 1999).

Deaf family member. The inclusion of another deaf family member was measured with three questions. The first two questions ask for information on the parents: "Is your mother deaf?" and "Is your father deaf?" These were all presented with categorical choices "yes", "no", and "I don't know".   These were coded as "No" and "I don't know"=0 and "Yes"=1. The third question asks, “If you have brothers and sisters, are any of them deaf?” with the following answer choices: “Yes, I have deaf brothers and/or sisters”, “No, I do not have deaf brothers and/or sisters” and “I don't know; I’m not sure if I have deaf brothers and/or sisters”. The questions were coded as “No” and “I don’t know”=0 and “Yes”=1.

Attendance at school for the deaf. To determine further socialization possibilities with others using sign language, participants were asked, “Did you attend a school for the deaf?” Answer choices included: “I attended only a school(s) for the deaf”, “I attended both a deaf school(s) and a mainstream school(s)”, and “I never attended a school for the deaf”. These questions were recoded as “only school for the deaf”=1, “both deaf school and a hearing school”=2, and “hearing school only”=3.

CHAPTER IV

RESULTS

Analytic Plan

First, descriptive statistics were run to determine the sample make-up. Next, to explore Goal #1, a series of bivariate analyses were run to determine which demographic variables (race, age, gender, marital status, education, ethnicity and age of onset of deafness) were significantly related to the suicide outcomes (ideation, planning, last 12 month attempts, and lifetime attempts). Cross-tabulations were computed along with chi-square statistics to test between-group differences because all outcomes were binary. Demographic variables that were significant at the bivariate level ($p < 0.10$) were then analyzed at the multivariate level through logistic regressions. Finally, deaf family member and deaf school attendance variables were then added to the "demographics only" logistic regression model for each dependent variable.

Descriptive Statistics

Individuals in this study were all deaf participants who completed the entire 2008 Deaf Health Survey (N=317). The sample consisted primarily of females (n=175, 55.4%) and Whites (n=270, 87.5%) (Table 1). Participants were, on average, 45.5 years of age, and more than half (54.4%) were married. The vast majority of participants (82.2%) had completed some college or obtained a college degree. Most of study participants (n=217; 69.8%) reported being deaf since birth (Table 2). Fifty-seven (18.3%) reported being diagnosed as deaf during a pre-lingual stage of development (operationalized as younger than 3 years of age) and 18 (5.8%) reported being diagnosed as deaf post-lingually (3 years or older). The remaining 15 (4.8%) did not know the age at which they become deaf. Forty individuals (12.7%) reported having a mother who was deaf and 39% reported having a deaf father. Eighty-nine participants (28.3%) disclosed they had a deaf sibling. Most of the participants had attended a deaf school at some point with 43.2% (n=134) reporting only attending a deaf school, and 34.8% (n=108) attending both a deaf school and a hearing school. Another 21.9% (n=68) never attended a school for the deaf.

Nearly one in ten (n=30; 9.6%) participants indicated they had thought of suicide in the last year, eight (2.5%) reported having planned to commit suicide in the past year (Table 2). Seven (2.2%) individuals reported having attempted suicide in the last 12 months, with four of that number (57.2% of the 7) indicating a hospital trip was necessary after the attempt. Forty-six individuals (14.6%) reported they had attempted suicide at some point during their lifetime.

Research Goal #1

The first research goal in this study was to describe differences in suicide ideology (in the last 12 months), suicide planning (in the last 12 months), and suicide attempts (in the last 12 months and lifetime) by age, gender, race, ethnicity, education, marital status, and age of onset. The first step in this goal was a series of bivariate analyses examining demographic variation in suicide ideation and suicide planning in the past 12 months (Table 3). There was no bivariate evidence that suicide ideation in the past 12 months varied by age, gender, marital status, education, race, ethnicity, or age of onset of deafness. Similarly, there was no robust evidence of demographic variation in suicide planning in the past 12 months. However, there was trend-level evidence ($p < 0.10$) suggesting that suicide planning was more common among non-Whites than Whites.

Similar bivariate analyses were undertaken for suicide attempts in the past 12 months and lifetime suicide attempts (Table 4). Race was the only demographic characteristic associated with attempted suicide in the past12-months such that a greater proportion of non-Whites than Whites attempted suicide in the past 12 months. Additionally, there was trend-level evidence that 12-month suicide attempt differed by age and gender, such that females and younger adults were more likely than males and older adults to attempt suicide. Age, marital status and education were statistically associated with lifetime suicide attempt.

The second step in answering the first research question was a set of multivariate analyses predicting each suicidal behavior outcome. Two multivariate models were fit for each outcome. Of relevance to the current question, every demographic characteristic that was associated with an outcome at a p-value of <0.10 was simultaneously entered into a logistic regression equation for definitive testing of demographic variation in suicide outcomes. None of the demographic variables were associated with suicide ideation in the past 12 months, so consequently no model was fit. Race was the only demographic characteristic associated with suicide planning during the past 12 months (Table 5). After further adjustment for deaf family members and attendance at a deaf school, the association for race with suicide planning in the past 12 months grew stronger, but remained non-significant at conventional levels (i.e., p<0.05). Age, gender and race were all entered simultaneously in the model for 12-month suicide attempt with the deaf variables. Gender and race remained significant at a trend level (p<0.10) suggesting that men have 89% lower odds than women to have reported a suicide attempt in the past 12 months. Non-Whites are 6 times more likely than Whites to report attempting suicide in the past 12 months (Table 6). Age, marital status and education were assessed for lifetime suicide attempts and it was found that for every one-unit increase in age, the odds of reporting a lifetime suicide attempt decreased by 3% (Table 7). In addition, the odds of reporting a suicide attempt during lifetime is 59% lower for individuals who are married or in a marriage-like relationship relative to those who never married. Education was not found to have a significant link to lifetime suicide attempts at traditional significance levels, however trend-level evidence (p<0.10) suggests a possible connection between higher education levels and higher attempts.

Research Goal #2

The second goal of this project was to describe differences in suicide ideation, planning, last 12 month attempts and lifetime attempts by indicators of deaf socialization (i.e., deaf family members, attending a deaf school). This was achieved through multivariate analyses controlling for demographic variables that were significant at trend-level ($p<0.10$). No demographic variables were significant for suicide ideation, thus the deaf family member and deaf school variables were entered simultaneously for a logistic regression model. There was no evidence that having a deaf family member or school attendance was associated with suicide ideation in the past 12 months (Table 6). In analyzing suicide planning, race was controlled for, and again no significant family or schooling results were indicated. Then, last 12 month suicide attempts were assessed, controlling for age, gender, and race. Again, no significant results were found. Finally, a logistic regression was run for lifetime suicide attempts and the deaf family and deaf school variables. In this model age, marital status, and education were controlled and results indicated a significant difference between attending a hearing school only and attending both a hearing and deaf school ($p<.05$). This finding suggests that the odds of reporting a lifetime suicide attempt was 2.5 times greater for individuals who attended both a hearing and deaf school in contrast to those who attended only a hearing school.

CHAPTER V

DISCUSSION

Research on deaf issues in general is sparse (Mehra et al., 2009) and information on deafness and suicide is even harder to find. While studies on mental health issues in the deaf community are increasing, studies focusing on suicide behavior, a possible outcome of psychopathology, are lacking. Current literature indicates that deaf individuals are at a higher risk for mental health problems (Coll, et al., 2009; Wallis et al., 2004) than their hearing counterparts. What is not yet understood is the reason behind this trend and the long-term outcomes for these individuals. Research has shown that mental health issues such as depression and poor self-esteem may lead to suicidal behaviors (Bhar, et. al, 2008; Cipriani, Barbui, & Geddes, 2005). To date, little is known of the prevalence of suicide behavior in this unique population, and studies that have considered the issue have mixed findings. In an attempt to contribute to literature on the topic of deafness and suicide, this study used information directly from deaf adults on suicide thoughts and planning during the past 12 months, and suicide attempts both in the last 12 months and over the lifetime.

This study had two main aims. The first was to add to the literature on what is known about the deaf population and suicide by determining whether deaf individuals of a certain gender, race, marital status, education level, or age of onset are more at risk for suicidal behavior. Research with the general population has shown that Whites and males tend to have higher suicide rates (AFSP, 2014; CDC-VP, 2012). It is important to determine whether these findings hold true in a deaf population, or if there are differences. The second aim was to determine if having a deaf family member (mother, father, or sibling) or attending a deaf school provides protection against these suicide behaviors. Communication is an integral part of forming and maintaining relationships (Baker, et. al, 2007); therefore, it was hypothesized that having a deaf family member or attending a deaf school (presumably with others who share a common language) would decrease suicide thoughts, planning and attempts.

The results of this study suggest there is demographic variation in several suicidal behaviors. Some evidence suggests that non-Whites are at higher odds to report suicide planning than Non-Whites. In addition, non-Whites and females are at higher risk for suicide attempts during the past 12 months. These findings are in contrast to reports of the general U.S. population, which indicates that Whites have higher suicide rates (AFSP, 2014; CDC-VP, 2012).
This difference may be attributed to differences between attempting suicide and suicide completion such that non-Whites may use more lethal forms of suicide (CDC-VP, 2012). Married couples or members of an unmarried couple were less likely than those who had never been married to attempt suicide during their lifetime. This finding was expected because of the assumption that having a partner may provide more support (both emotional and financial) through life, making things seem more manageable than doing it on one’s own. In some past research, marriage has been shown to be a protective factor against suicide, with divorced individuals being at higher risk (Corcoran & Nagar, 2010). In addition, there was evidence suggesting that deaf individuals with higher educational attainment are more likely than those with a high school education or less to attempt suicide during their lifetime (Table 7). A national study of hearing individuals conducted by Nock and Kessler (2006) found that persons with lower educational attainment were at higher risk for suicide attempts. Perhaps well-educated individuals who are deaf feel unable or blocked from upward advancement (Fellinger et al., 2012; Ladd & Lane, 2013), resulting in poorer mental health. This is an important area for further research.

The second research goal focused on socialization and communication as a potential protective factor for suicide behavior. As discussed previously, deafness fundamentally affects communication. A lack of communication could cause feelings of thwarted belongingness and isolation among deaf individuals (Martin et al., 2010). It was hypothesized that deaf individuals who had a deaf family member (mother, father, or sibling) would have lower reports of suicide behavior because of an assumed increase in ability to communicate fluently (presuming that the deaf family member and deaf individual would share sign language communication abilities). While this is not, admittedly, the case in all instances, it provided an avenue to explore these potential effects. In addition, it was hypothesized that attending a deaf school (also assuming access to fluent communication with peers) would lower suicide behavior in deaf individuals. Interestingly, having a deaf family member was not found to be a significant factor for any of the suicide behavior outcomes. Type of school attended, as an indicator of possible deaf socialization, was not a significant factor in suicide ideation, planning or attempts in the last 12 months; however, in looking at lifetime suicide attempts, individuals who attended a deaf school part of the time and attended a hearing school part of the time were at 2.5 times greater odds for reporting a suicide attempt during their lifetime than those who only attended a hearing school. It is possible that an individual who attends both a hearing school and a deaf school does not form solid connections at either place or with either group of peers (deaf or hearing). This is an area for further exploration to determine what factors are involved in these differences.

Implications

The results of this study have implications for deaf individuals and their families, educators and mental health specialists, and policymakers. The results indicate that there is a higher prevalence of suicide behavior in the deaf population, with about 15% of this sample reporting a suicide attempt during their lifetime in contrast to reports by the Suicide Prevention Action Network (2007) that 4.6% of adults in the general population have reported attempting suicide during their lifetime. Specific causes for these differences are not yet clear, but indicate a need for further research. Families of deaf children, teachers, and health professionals need to be aware of the increased risk for mental health problems and suicide and educated on possible warning signs.

Support for families of deaf individuals is an avenue to promote change. One way to support families is by promoting the need for fluent communication, which enables a parent to better understand their child's emotional and mental state (Sheppard & Badger, 2010). In tandem, parents must learn how to teach children to identify, regulate, and express their emotions effectively. It is possible that the inability to effectively identify and communicate emotions (i.e., sadness, fear, anger) exacerbates the feeling, causing lasting effects (Pisani et al., 2013). Due to the challenges in learning to communicate with a child who has a hearing loss, these services need to be provided immediately and continuously throughout the child's life.

Schools and educators working with deaf children need to be made aware of the findings of this study and others like it. Deaf children need access to school counseling programs that provide information on emotion regulation, peer relationships, mental health, and self-confidence issues specific to deafness. Counselors in hearing schools may not be aware of the ways deafness impacts individuals socially and emotionally. Suicide education and prevention programs are needed in schools and communities to teach deaf individuals and their family members the "red flag" indicators of problems and where to go for help. In addition, medical professionals and mental health specialists need to be educated on the apparent additional risk within the deaf community and assess deaf individuals for mental health problems (including depression) and then refer for treatment and help when needed. Access to certified sign language interpreters in medical situations is vital for this communication to happen between health care providers and patients who sign (Cornes & Napier, 2005). When these services are not provided, deaf individuals do not receive the help they need to overcome mental health problems.

Policymakers can benefit from these findings as well. They can advocate funding for early intervention and family programs supporting families of deaf children. Policymakers need to also advocate for deaf individuals to have access to qualified interpreters for all doctor and counseling appointments and establish programs encouraging mental health specialists to become at least knowledgeable of deaf issues if not proficient in sign language.

More research is needed for understanding deaf individuals' unique communication, cultural, and experiential differences. A focus on communication challenges between deaf children and their hearing parents and the long-term effects of the struggle may give insight into new ways to support families. These new support methods may also provide ways to improve mental health outcomes for deaf individuals throughout their lives. The current study provides information previously lacking, regarding suicide behavior rates within a deaf sample and takes a cursory look at some indicators of communication and socialization that might impact those rates.

Limitations and Future Directions

It is important to note that there were several limitations to the current study. The study was cross-sectional, relying on self-report and recall of events, thoughts, or situations that happened in the past. In addition, the sample in this study was derived from deaf individuals in Rochester, New York, an area close to the only two colleges specifically for deaf students in the United States (Gallaudet University in Washington D.C., and the National Technical Institute for the Deaf in Rochester). The extremely high percentage of this sample who have at least some college education is likely not representative of or generalizable to a national group of deaf adults. Higher levels of educational attainment may indicate higher levels of language proficiency in both American Sign Language and English, which may lead to biased estimates of association. Regional differences in support services, such as educational options, parent supports, and access to health care may also be different in this area of the United States.

It is also important to note that this study was conducted with deaf adults communicating mostly in American Sign Language. Findings may vary with deaf adults using mostly speech for communication. With these factors in mind, it is important to replicate the study in other parts of the United States with a more diverse sample of deaf adults with various communication modes.

Inclusion of early family communication would better enable a researcher to consider the effects of fluent communication on later mental health outcomes.

While this study did not produce results indicating, as hypothesized, that having a deaf family member could be a protective factor for suicide behaviors, it is possible that this sample, with the majority being educated above a college level, is unique in that the parents of children (even those who were not deaf themselves) reached a proficient level of communication with their deaf child. Fluent communication between deaf children and their parents has been shown to increase academic success in children (Ritter-Brinton & Stewart, 1992). Because this study did not consider the parents' communication proficiency directly, using the deaf family member status may not have accurately pinpointed the communication aspect. Exploring this aspect further by including a measure for parent ability to communicate could be beneficial.

An important first point of interest in determining future directions of research is noted in the prevalence of suicide behaviors within this sample. The greater prevalence of suicide behavior in the deaf population than in the general population, and points to a need for further investigation to determine why the burden of suicidal behavior is elevated among individuals who are deaf or hard of hearing.

In addition, this study has indicated that where a deaf child receives his or her education may later influence lifetime suicide attempts. While the reasons for this link were not explored in the current study, there is evidence to support considering these factors further. It is possible that attending a hearing school part time and a deaf school part time does not allow a deaf individual the opportunity to fully fit in anywhere. It is unclear whether the results are indicative of language, educational opportunities, cultural, or self-esteem related factors, but provides a good starting place for determining the "best" placement for deaf students.

Conclusions

In conclusion, this study attempted to delineate demographic differences and socialization differences in suicidal behavior in a deaf sample. While the findings were mixed, it does appear that some demographic differences exist with some of the suicide behaviors. While these differences do not hold in each area of suicide behavior, when analyzed further, they may provide more insight into why deaf individuals appear to have higher level of suicidal thoughts, planning, and attempts, than their hearing counterparts. In addition, while it does not appear that having a deaf family is a protective factor for suicide behaviors, it is possible the communication aspect, if studied in a different way, may provide more information. Further research to determine why attending both a hearing and deaf school might lower suicide behavior could also help expand the understanding of suicide in deaf individuals.

REFERENCES

Agrawal, Y., Platz, E. A., & Niparko, J. K. (2008). Prevalence of hearing loss and differences by demographic characteristics among US adults: Data from the National Health and Nutrition Examination Survey, 1999-2004. *Archives of Internal Medicine, 168,* 1522-1530.

Ainsworth, M. &Bowlby, J. (1991). An ethological approach to personality development. *American Psychologist, 46,* 333–41.

Alegria, J., & Lechat, J. (2005). Phonological processing in deaf children: When lipreading and cues are incongruent. *Journal of Deaf Studies and Deaf Education, 10,* 122-133.

American College of Medical Genetics. (2002). Genetics evaluation guidelines for the etiologic diagnosis of congenital hearing loss. *Genetics in Medicine, 4,* 162–171.

American Foundation for Suicide Prevention. (2014). *Facts and figures*. Retrieved from www.afsp.org/understanding-suicide/facts-and-figures.

American Speech Language Hearing Association (ASHA). (2007). Causes of hearing loss in children. Audiology Information Series. Retrieved from http://www.asha.org/public/hearing/Causes-of-Hearing-Loss-in-Children/

American Speech Language Hearing Association (ASHA). (2014a). *Conductive hearing Lloss*. Retrieved from http://www.asha.org/public/hearing/Conductive-Hearing-Loss/

American Speech Language Hearing Association (ASHA). (2014b). *Permanent childhood hearing loss*. Retrieved from http://www.asha.org/PRPSpecific Topic.aspx?folderid=8589934680&section=Causes

American Speech Language Hearing Association (ASHA). (2014c). *The prevalence and incidence of hearing loss in children*. Retrieved from http://www.asha.org/public/ hearing/ hearing/Prevalence-and-Incidence-of-Hearing-Loss-in-Children/

Asberg, K. K., Vogel, J. J., & Bowers, C. A. (2008). Exploring correlates and predictors of stress in parents of children who are deaf: Implications of perceived social support and mode of communication. *Journal of Child and Family Studies*, *17*, 486-499.

Baker, J.K., Fenning, R. M., Crnic, K. A., Baker, B. L., Blacher, J., & MacLean, Jr, W. E.. (2007) Prediction of social skills in 6-Year-old children with and without developmental delays: Contributions of early regulation and maternal scaffolding. *American Journal on Mental Retardation, 112,* 375-391.

Barnett, S. & Franks, P. (1999). Deafness and mortality: Analyses of linked data from the National Health Interview Survey and National Death Index. *Public Health Reports, 114,* 330-336.

Bat-Chava,Y. (1993). Antecedents of self-esteem in deaf people: A meta-analytic review. *Rehabilitation Psychology, 38*, 221-234.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117,* 497-529.

Bhar, S., Ghahramanlou-Holloway, M., Brown, G., & Beck, A. T. (2008). Self-esteem and suicide ideation in psychiatric outpatients. *Suicide & Life - Threatening Behavior, 38,* 511-516.

Buxton, M. (2010). Interpreting children's mental health problems. *Mental Health Practice, 14*, 16-20.

Centers for Disease Control and Prevention (CDC). (2013). Hearing loss in children: Data and statistics. Retrieved from http://www.cdc.gov/ncbddd/hearingloss/data.html

Centers for Disease Control and Prevention Division of Violence Prevention (CDC-VP). (2014). Injury center violence prevention. Retrieved from www.cdc.gov/ violenceprevention/suicide/statistics/trends01.html

Centers for Disease Control and Prevention, Division of Violence Prevention (CDC-VP). (2012). Suicide facts at a glance.

Chen, X. (2012). Culture, peer interaction, and socioemotional development. *Child Development Perspectives*, *6*, 27-34.

Cipriani, A., Barbua, C., & Geddes, J. R. (2005). Suicide, depression, and antidepressants. *British Medical Journal, 330,* 373-374.

Coll, Kenneth M., Cutler, Martin M., Thobro, Patti, Haas, Robin, & Powell, Stephanie. (2009). An exploratory study of psychosocial risk behaviors of adolescents who are deaf or hard of hearing: comparisons and recommendations. *American Annals of the Deaf, 154,* 30-35.

Colver, A., Fairhurst, C., & Pharoah, P. (2014). Cerebral palsy. *Lancet, 383*, 1240–1249.

Corcoran, P., & Nagar, A. (2010). Suicide and marital status in Northern Ireland. *Social Psychiatric Epidemiology, 45*, 795-800.

Cornes, A., & Napier, J. (2005). Challenges of mental health interpreting when working with deaf patients. *Australasian Psychiatry, 13*, 403-407.

Daniell, W. E., Swan, S. S., McDaniel, M. M., Camp, J. E., Cohen, M. A., & Stebbins, J. G. (2006). Noise exposure and hearing loss prevention programmes after 20 years of regulations in the United States. *Occupational and Environmental Medicine, 63*, 343-351.

Eriks-Brophy, A., Durieux-Smith, A., Olds, J., Fitzpatrick, E. M., Duquette, C., & Whittingham, J. (2012). Communication, academic, and social skills of young adults with hearing loss. *The Volta Review*, *112*, 5-35.

Fellinger, J., Holzinger, D., & Pollard, R. (2012). Mental health of deaf people. *The Lancet, 379*, 1037–1044.

Felzien, M., & MacKinnon, G. (2009). Usher syndrome and hearing loss. *Volta Voices, 16*, 30.

Gallaudet Research Institute. (1994). Demographic aspects of hearing impairment: Questions and answers, Third Edition. Retrieved from http://research.gallaudet.edu/Demographics/factsheet.php.

Gunn III, J. F., Lester, D., Haines, J., & Williams, C. L. (2012). Thwarted belongingness and perceived burdensomeness in suicide notes. *Crisis: The Journal of Crisis Intervention and Suicide Prevention, 33*, 178-181.

Gvion, Y. & Apter, A. (2012). Suicide and suicidal behavior. *Public Health Reviews, 34*, 1-20.

Hadadian, A., & Rose, S. (1991). An investigation of parents' attitudes and the communication skills of their deaf children. *American Annals of the Deaf, 136*, 273-277.

Harris, M. (2001). It's all a matter of timing: Sign visibility and sign reference in Deaf and hearing mothers of 18-month-old children. *Journal of Deaf Studies and Deaf Education, 6,* 177-183.

Heracleous, P., Beautemps, D., & Aboutabit, N. (2010). Cued speech automatic recognition in normal-hearing and deaf subjects. *Speech Communication, 52*, 504-512.

Hill, R. M., & Pettit, J.W. (2014). Perceived burdensomeness and suicide-related behaviors in clinical samples: Current evidence and future directions. *Journal of Clinical Psychology*, [epublished ahead of print]. doi: 10.1002/jclp.22071

Hogan, A., Shipley, M., Strazdins, L., Purcell, A., & Baker, E. (2011). Communication and behavioural disorders among children with hearing loss increases risk of mental health disorders. *Autralian and New Zealand Journal of Public Health, 35,* 377-383.

Holzinger, D., Fellinger, J., & Beitel, C. (2011). Early onset of family centered intervention predicts language outcomes in children with hearing loss. *International Journal of Pediatric Otorhinolaryngology, 75*, 256–260.

Houston, K., Lammers, H. B., & Svorny, S. (2010). Perceptions of the effect of public policy on employment opportunities for individuals who are deaf or hard of hearing. *Journal of Disability Policy Studies, 21*, 9-21.

Howe, D. (2006a). Disabled children, maltreatment and attachment. *British Journal of Social Work, 36*, 743-760. doi:10.1093/bjsw/bch419

Howe, D. (2006b). Disabled children, parent-children interaction and attachment. *Child and Family Social Work, 11,* 95-106.

Huang, B. Y., Zdanski, C., & Castillo, M. (2012). Pediatric sensorineural hearing loss, Part 2: Syndromic and acquired causes. *American Journal of Neuroradiology, 33*, 399-406.

Hudspeth, A. J. (2000). Hearing and deafness. *Neurobiology of Disease 7*, 511–514. doi:10.1006/nbdi.2000.0343

Jambor, E., & Elliott, M. (2005). Self-esteem and coping strategies among deaf students. *Journal of Deaf Studies and Deaf Education, 10*, 63-81. DOI: 10.1093/deafed/eni004.

Joiner, T. E., Jr. (2005). Why people die by suicide. Cambridge, MA: Harvard University Press.

Joint Committee on Infant Hearing. (2007). Detection and intervention programs Year 2007 position statement: Principles and guidelines for early hearing. *Pediatrics, 120,* 898-921.

Keating, E., & Mirus, G. (2003). Examining interactions across language modalities: Deaf children and hearing peers at school. *Anthropology and Education Quarterly, 34,* 115-135.

Koester, L. S., Brooks, L., & Traci, M. A. (2000). Tactile contact by deaf and hearing mothers during face-to-face interactions with their infants. *Journal of Deaf Studies and Deaf Education, 5*, 127-139.

Ladd, P., & Lane, H. (2013). Deaf ethnicity, deafhood, and their relationship. *Sign Language Studies, 13,* 565-579.

Lamis, D. A., & Malone, P. S. (2011). Alcohol-related problems and risk of suicide among college students: The mediating roles of belongingness and burdensomeness. *Suicide and Life-Threatening Behavior, 41,* 543-553.

Landsberger, S. A., Diaz, D. R., Spring, N. Z., Sheward, J., & Sculley, C. (2014). Psychiatric diagnoses and psychosocial needs of outpatient deaf children and adolescents. *Child Psychiatry Hum Dev, 45,* 42-51. DOI 0.1007/s10578-013-0375-9

Lederberg, A. R., & Mobley, C. E. (1990). The effect of hearing impairment on the quality of attachment and mother-toddler interaction. *Child Development, 61,* 1596-1604.

Ledgerwood, D. M. (1999). Suicide and attachment: Fear of abandonment and isolation from a developmental perspective. *Journal of Contemporary Psychotherapy, 29,* 65-73.

Leibowitz, J., Ramos-Marcuse, F., & Arsenio, W. F. (2010). Parent-child emotion communication, attachment, and affective narratives. *Attachment & Human Development, 4,* 55-67. DOI: 10.1080/14616730210123157

Lim, S. Y. C., & Simser, J. (2005). Auditory-verbal therapy for children with hearing impairment. *Annals Academy of Medicine, 34*, 307-312.

Loots, G., & Devise', I. (2003). The use of visual-tactile communication strategies by deaf and hearing fathers and mothers of deaf infants. *Journal of Deaf Studies and Deaf Education, 8,* 31-42.

Liu, X.Y., & Yan, D. (2007). Ageing and hearing loss. *Journal of Pathology, 211,* 188–197.

MacAndie, C. & O'Reilly, B. F. (1999). Sensorineural hearing loss in chronic otitis media. *Clinical Otolaryngology & Allied Sciences, 24,* 220-222.

Madden, C., Haltsted, M. J., Hopkin, R. J., Choo, D. I., Benton, C., & Greinwald, J. H. (2003). Temporal bone abnormalities associated with hearing loss in Waardenburg Syndrome. *The Laryngoscope, 113*, 2035-2041.

Maimon, D., Browning, C. R., & Brooks-Gunn, J. (2010). Collective efficacy, family attachment, and urban adolescent suicide attempts. *Journal of Health and Social Behavior, 51*, 307-324.

McKay, S., Gravel, J.S., & Tharpe, A. M. (2008). Amplification considerations for children with minimal or mild bilateral hearing loss and unilateral hearing loss. *Trends in Hearing Winter, 12*, 43-54.

Martin, D., Bat-Chava, Y., Lalwani, A., & Waltzman, S. B. (2010). Peer relationships of deaf children with cochlear implants: Predictors of peer entry and peer interaction success. *Journal of Deaf Studies and Deaf Education*, *16*, 108-120.

McLaren, S., & Challis, C. (2009). Resilience among men farmers: The protective roles of social support and sense of belonging in the depression-suicidal ideation relation. *Death Studies, 33*, 262-276.

Mehra, S., Eavey, R. D., & Keamy Jr., D. G. (2009). The epidemiology of hearing impairment in the United States: Newborns, children, and adolescents. *Otolaryngology - Head and Neck Surgery, 140*, 461-472.

Moeller, M. P. (2000). Early intervention and language development in children who are deaf and hard of hearing. *Pediatrics, 106*, e43.

Moeller, M. P., Carr, G., Seaver, L., Stredler-Brown, A., & Holzinger, D. (2013). Best practices in family-centered early intervention for children who are deaf or hard of hearing: An international consensus statement. *Journal of Deaf Studies and Deaf Education*, *18*, 429-445.

Morrison, B. (2008). Depression: Disease, loneliness, social isolation, suicide, negative thoughts. *Social Alternatives*, *27*, 51-53.

Napier, J., Leigh, G., & Nann, S. (2007). Teaching sign language to hearing parents of deaf children: An action research process. *Deafness and Education International, 9,* 83-100.

National Institute on Deafness and Other Communication Disorders (NIDCD). (2010). Quick Statistics. Retrieved from https://www.nidcd.nih/gov/health/statistics/Pages/quick.aspx

Nock, M. K., & Kessler, R. C. (2006). Prevalence of and risk factors for suicide attempts versus suicide. *Journal of Abnormal Psychology, 115,* 616-623.

Nunes, R. (2006). Deafness, genetics and dysgenics. *Medicine, Health Care and Philosophy*, *9*, 25–31.

O'Donoghue, G. (2013). Cochlear Implants — Science, Serendipity, and Success.

O'Keefe, V. M., Wingate, L. R., Tucker, R. P., Rhoades-Kerswill, S., Slish, M., & Davidson, C. L. (2014). Interpersonal suicide risk for American Indians: Investigating thwarted belongingness and perceived burdensomeness. *Cultural Diversity and Ethnic Minority Psychology, 20*, 61-67.

Overholsen, J. C., Braden, A., & Dieter, L. (2012). Understanding suicide risk: identification of high-risk groups during high-risk times. *Journal of Clinical*

Psychology, 68, 349-361.

Oysu, C., Baserer, N., & Tinaz, M. (2000). Audiometric manifestations of Waardenburg's syndrome. *ENT: Ear, Nose, & Throat Journal, 79,* 704.

Parkin, M. & Walker, P. (2009) Hearing loss in Turner syndrome. *International Journal of Pediatric Otorhinolaryngology, 73,* 243-247.

Pennington, L. (2010). Measuring communication outcomes. *Developmental Medicine and Child Neurology, 52,* 7-8.

Pisani, A. R., Wyman, P. A., Petrova, M., Schmeelk-Cone, K., Goldston, D. B., Xia, Y., & Gould, M. S. (2013). Emotion regulation difficulties, youth–adult relationships, and suicide attempts among high school students in underserved communities. *Journal of Youth and Adolescence, 42,* 807-820.

Punyanunt-Carter, N. M. (2008). Father-daughter relationships: Examining family communication patterns and interpersonal communication satisfaction. *Communication Research Reports, 25,* 23-33, DOI: 10.1080/08824090701831750

Ramaraju, S. (2012). Psychological perspectives on interpersonal communication. *Researchers World Journal of Arts, Science & Commerce, 4*, 68-73.

Reagan, T. (2011). Ideological barriers to American Sign Language: Unpacking linguistic resistance. *Sign Language Studies, 11*, 606-636.

Rees, C. (2008). Children's attachment. *Paediatrics and Child Health, 18*, 219–226.

Remine, M. D. & Brown, M. P. (2010). Comparison of the prevalence of mental health problems in deaf and hearing children and adolescents in Australia. *Australian and New Zealand Journal of Psychiatry, 44,* 351-357.

Ritter-Brinton, K., & Stewart, D. (1992). Hearing parents and deaf children: Some perspectives on sign communication and service delivery. *American Annals of the Deaf, 137,* 85-92.

Rosen, R. S. (2008). American Sign Language as a foreign language in U.S. high schools: State of the art. *The Modern Language Journal, 92*, 10-38.

Ross, D. S., & Visser, S. N. (2012). Pediatric primary care physicians' practices regarding newborn hearing screening. *Journal of Primary Care & Community Health, 3,* 256–263.

Seskin, L., Feliciano, E., Tippy, G., Yedloutschnig, R., Sossin, K. M., & Yasik, A. (2010). Attachment and autism: Parental attachment representations and relational behaviors in the parent-child dyad. *Journal of Abnormal Child Psychology, 38*, 949-60. doi:http://dx.doi.org/10.1007/s10802-010-9417-y

Sheppard, K., & Badger, T. (2010). The lived experience of depression among culturally Deaf adults. *Journal of Psychiatric and Mental Health Nursing, 17*, 783–789.

Sillars, A., Koerner, A., & Fitzpatrick, M. A. (2005). Communication and understanding in parent–adolescent relationships. *Human Communication Research, 31,* 102–128.

Snyder, R., Shapiro, S., & Treleaven, D. (2011). Attachment theory and mindfulness. *Journal of Child and Family Studies, 21*, 709-717.

Suicide Prevention Action Network. (2007). Suicide Among Black Americans

Szymanski, C. A., Brice, P. J., Lam, K. H., & Hotto, S. A. (2012). Deaf children with Autism Spectrum Disorders. *Journal of Autism Developmental Disorders, 42,* 2027-2037.

Torpy, J. M., Lynm, C., Glass, R. M. (2010). Cerebral Palsy. *JAMA, 304*, 1028. doi:10.1001/jama.304.9.1028.

Turner, O., Windfuhr, K., & Kapur, N. (2007). Suicide in deaf populations: a literature review. *Annals of General Psychiatry, 6*, 26.

Vaccari, C., & Marschark, M. (1997). Communication between parents and deaf children: Implications for social-emotional development. *Journal of Child Psychology and Psychiatry, 38*, 793-801.

Van Gent, T., Goedhart, A.W., Hindley, P.A., & Treffers, P.D.A. (2007). Prevalence and correlates of psychopathology in a sample of deaf adolescents. *Journal of Child Psychology and Psychiatry, 48,* 950–958.

Van Gent, T., Goedhart, A. W., & Treffers, P. D.A. (2011). Self-concept and psychopathology in deaf adolescents: preliminary support for moderating effects of deafness-related characteristics and peer problems. *Journal of Child Psychology and Psychiatry, 52*, 720-728. DOI: 0.1111/j.1469-7610.2011.02392.x.

Van Orden , K.A., Lynam, M. E., Hollar, D., & Joiner Jr, T.E. (2006). Perceived Burdensomeness as an Indicator of Suicidal Symptoms. *Cognitive Theory and Research*, *30,* 457–467.

Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A.,&Joiner, T. E., Jr. (2010). The interpersonal theory of suicide. *Psychological Review, 117,* 575–600.

Van Orden, K. A., Witte, T. K., James, L. M., Castro, Y., Gordon, K. H., Braithwaite, S. R., Hollar, D. L., & Joiner, T. E. (2008). Suicidal ideation in college students varies across semesters: The mediating role of belongingness. *Suicide and Life-Threatening Behavior, 38,* 427-435.

Walch, C., Anderhuber, W., Kole, W., & Berghold, A. (2000). Bilateral sensorineural hearing disorders in children: etiology of deafness and evaluation of hearing tests. *International Journal of Pediatric Otorhinolaryngology, 53*, 31–38.

Wallis, D., Musselman, C., MacKay, S. (2004). Hearing mothers and their deaf children: The relationship between early, ongoing mode match and subsequent mental health functioning in adolescence. *Journal of Deaf Studies and Deaf Education, 9*, 3-14. DOI: 10.1093/deafed/enh014

Young, A., Green, L., & Rogers, K. (2008). Resilience and deaf children: a literature review. *Deafness and Education International, 10*, 40-55.

Zayas, L., Kaplan, C., Turner, S., Romano, K., & Gonzalez-Ramos, G. (2000). Understanding suicide attempts by adolescent Hispanic females. *Social Work, 45*, 53-63.

APPENDICES

Table 1. *Sample Descriptive Statistics*

Characteristics	*M* (SD)	N	%	Range
Age	45.54 (12.75)	317		18-82
Gender				
Male		141	44.6	
Female		175	55.4	
Marital Status				
Married/Unmarried		172	54.4	
Couple				
		66	20.9	
Divorced/Separated/Widowed				
Never Been Married		78	24.7	
Education				
HS or less		56	17.8	
Some college or more		258	82.2	
Race				
White		270	85.7	
Non-White		45	14.3	
Hispanic ***(Yes/No)***		10	3.2	

Table 2. *Descriptive Statistics characterizing hearing/communication and suicide*

Characteristics	N	%
Hearing/Communication		
Age of Onset		
Born deaf	217	69.8
Prelingual (<3 years)	57	18.3
Postlingual(>3 years)	18	5.8
I Don't Know	15	4.8
Deaf Family Member£		
Mom	40	12.7
Dad	39	12.3
Sibling(s)	89	28.3
None	213	67.2
Deaf School Attendance		
Only Deaf School	134	43.2
Both Deaf and Hearing School	108	34.8
Never Deaf School	68	21.9
Suicide		
Ideation		
Last 12 Months	30	9.6
Planning		
Last 12 Months	8	2.5
Attempt		
Lifetime	46	14.6
Last 12 Months	7	2.2
Resulting in Hospital visit†	4†	57.2†

Note: £=Deaf Family Member groups % total may be >100% if some have more than one deaf family member. †=Attempt in last 12 months resulting in hospital trip denominator is 7, based on those reporting attempts during the last 12 months.

Table 3. *Differences in past 12 month suicide ideation and suicide planning during the past 12 months among deaf adults by demographics*

	Suicide Ideation			Suicide Planning		
	N	%	p-value	N	%	p-value
Age			.235			.188
18-39	13	12.3		5	4.8	
40-60	16	9.5		2	1.2	
61+	1	2.7		1	2.7	
Gender			.517			.690
Male	15	10.8		3	2.2	
Female	15	8.6		5	2.9	
Marital Status			.496			.474
Married/Unmarried Couple	14	8.2		3	1.8	
Divorced/Separated/Widowed	6	9.1		3	4.5	
Never Been Married	10	13.0		2	2.6	
Education			.483			.681
High School or Less	4	7.1		1	1.8	
Some College or More	26	10.2		7	2.7	
Race			.713			.060
White	25	9.4		5	1.9	
Non-White	5	11.1		3	6.7	
Hispanic	1	10.0	.947	1	10.0	.314
Age at Onset			.678			.754
Born deaf	23	10.7		6	2.8	
Prelingual (<3 years)	4	7.0		2	3.6	
Postlingual (>3 years)	1	4.8		0	0.0	
I Don’t Know	2	13.3		0	0.0	

Table 4. *Differences in past 12 month and lifetime suicide attempts among deaf adults by demographics*

	12 Month			Lifetime		
	N	%	p-value	N	%	p-value
Age			.078			.006
18-39	5	4.7		25	23.6	
40-60	1	0.6		18	10.7	
61+	1	2.7		3	8.1	
Gender			.105			.271
Male	1	0.7		17	12.2	
Female	6	3.4		29	16.7	
Marital Status			.355			.004
Married/Unmarried Couple	2	1.2		17	9.9	
Divorced/Separated/Widowed	2	3.1		9	13.8	
Never Been Married	3	3.9		20	26.0	
Education			.462			.028
High School or Less	2	3.6		3	5.4	
Some College or More	5	2.0		43	16.9	
Race			.030			.535
White	4	1.5		38	14.2	
Non-White	3	6.7		8	17.8	
Hispanic	0		.878	2	20.0	.819
Age at Onset			.506			.252
Born deaf	4	1.9		37	17.1	
Prelingual (<3 years)	2	3.5		4	7.0	
Postlingual (>3 years)	0	0.0		2	10.0	
I Don’t Know	1	6.7		2	13.3	

Table 5. *Results from logistic regression predicting classification in categories of suicide ideation and suicide planning*

	Suicide Ideation			Suicide Planning					
	Model 1			Model 1			Model 2		
Demographic	Odds Ratio	95% CI	p-val	Odds Ratio	95% CI	p-val	Odds Ratio	95% CI	p-val
Race (White-reference)†				3.743	.862-16.245	.078	4.123	.917-18.542	.065
Deaf Family									
Deaf Mother	4.932	.460-52.888	.187				1.111	.005-267.300	.970
Deaf Father	.232	.024-2.212	.204				.842	.003-226.543	.952
Deaf Sibling(s)	1.151	.438-3.028	.775				1.139	.183-7.083	.889
Deaf School Attendance									
Only Deaf School	1.479	.497-4.403	.482				1.243	.107-14.372	.862
Deaf and Hearing School	1.665	.552-5.020	.365				4.066	.446-37.058	.214
Hearing School Only	Ref		.662				Ref		.244

Note: †=Race was not included in the Suicide Ideation model because it was only found to be significant at the bivariate level for Suicide Planning.

Table 6. *Results from logistic regression predicting classification in categories of past 12 months suicide attempts*

	Past 12 Months Attempts					
	Model 1			Model 2		
Demographic	Odds Ratio	95% CI	p-value	Odds Ratio	95% CI	p-value
Age (continuous)	.943	.876-1.014	.115	.949	.880-1.024	.180
Gender (Female-reference)	.127	.014-1.146	.066	.106	.011-1.012	.051
Race (White-reference)	4.754	.926-24.404	.062	6.161	1.022-37.149	.047
Deaf Variables						
Deaf Family						
Deaf Mother				1.988	.016-243.064	.779
Deaf Father				.741	.006-97.517	.904
Deaf Sibling(s)				.412	.070-2.426	.327
Deaf School Attendance						
Deaf School Only				2.820	.208-38.248	.436
Deaf and Hearing School				4.747	.447-50.435	.196
Hearing School Only				Reference		.425

Table 7. *Results from logistic regression predicting classification in categories of lifetime suicide attempts*

	Lifetime Attempts					
	Model 1			Model 2		
	Odds Ratio	95% CI	p-value	Odds Ratio	95% CI	p-value
Demographics						
Age (continuous)	.972	.944-1.001	.055	.968	.939-.999	.042
Marital Status						
Married/Unmarried Couple	.423	.194-.926	.031	.411	.182-.925	.032
Divorced/Seperated/Widowed	.756	.290-1.971	.568	.848	.313-2.302	.747
Never Been Married	Reference		.084	Reference		.069
Education (College + reference)	.307	.089-1.054	.061	3.109	.859-11.259	.084
Deaf Variables						
Deaf Family						
Deaf Mother				3.998	.432-37.011	.222
Deaf Father				.847	.104-6.871	.876
Deaf Sibling(s)				.717	.312-1.646	.433
Deaf School Attendance						
Deaf School Only				1.601	.603-4.246	.345
Deaf and Hearing School				2.522	1.017-6.255	.046
Hearing School Only				Reference		.118

VITA

Jennifer Sheray Freese

Candidate for the Degree of

Master of Science

Thesis: FAMILY AND SOCIAL CONTEXT IN UNDERSTANDING SUICIDE ATTEMPTS AMONG INDIVIDUALS WHO ARE DEAF

Major Field: Human Development and Family Science

Biographical:

Education:

Completed the requirements for the Master of Science in Human Development and Family Science at Oklahoma State University, Tulsa, Oklahoma in July, 2014.

Completed the requirements for the Bachelor of Arts in Deaf Education at the University of Tulsa, Tulsa, Oklahoma in 2005.

Completed the requirements for the Associate of Arts in Liberal Arts at Tulsa Community College, Tulsa, Oklahoma in 2003.

Experience:

August 2012-July 2014: Graduate Research Assistant/Teaching Assistant, Department of Human Development and Family Science, Oklahoma State University, Tulsa, Oklahoma