PENN STATE BRANDYWINE
JANE E. COOPER HONORS PROGRAM

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THE PREVALENCE OF ADVERSE CHILDHOOD EXPERIENCES IN THE DEAF AND HARD OF HEARING POPULATION

DANIELLE GUTH
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Reviewed and approved* by the following:

Daniela Martin, Ph.D.
Associate Professor of Psychology
Thesis Supervisor

Hans Schmidt, Ph.D.
Associate Professor of Communications
Jane E. Cooper Honors Program Coordinator
Thesis Reader

* Signatures are on file with the Cooper Honors Program.

ABSTRACT

The primary goal of the present study is to examine whether Adverse Childhood Experiences (ACEs), examined specifically among members of the deaf and hard of hearing population, have an impact on mental and physical health outcomes, and whether the rates of ACE's are higher than in the general population. Additionally, the study aims to investigate whether potential buffers or supportive factors may increase levels of resilience and/or mitigate negative outcomes to some degree. Although more data is being collected, preliminary findings do in fact support these hypotheses. The results demonstrated that the severity of the negative impacts of exposure to ACEs is a dose-dependent relationship and that the higher number of ACEs are closely associated with more negative impacts. Additionally, the prevalence of ACEs is associated with less-than-optimal health outcomes. Finally, the presence of potential buffers such as supportive relationships and resources was shown to mitigate the negative impacts of ACEs as well.

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Chapter 1

Introduction and Literature Review

Studies have shown that individuals diagnosed with a hearing loss or deafness can be susceptible to various, unique forms of trauma (Archer & Zöller, 2018; Schild & Dalenberg 2012; Kushalnagar, Moreland, Simons, & Holcomb, 2018; Blum, McNeely, &, Nonnemaker, 2001; Schenkel, Rothman-Marshall, Schlehofer, Towne, Burnash, &, Priddy, et al., 2014; & Øhre, Perly, ,von Tetzchner, Falkum, 2015). While any individual from any background, culture, population, age, gender, etc. can experience any kind of trauma at some point in their lives, there is reason to believe that individuals of the deaf and hard of hearing community may be more susceptible to certain types of trauma and risk factors compared to other groups. Specifically, Information Deprivation Trauma along with communication barriers, and social isolation, appear to be the most common forms of trauma among deaf and hard of hearing individuals (Archer & Zöller, 2018; Schenkel, Rothman-Marshall, Schlehofer, Towne, Burnash, &, Priddy, 2014). This comes without surprise due to the fact that deaf and hard of hearing individuals often have greater communication challenges and barriers due to hearing loss. Multiple studies also report rates of child maltreatment, abuse, and neglect to be higher among this population (Schenkel, Rothman-Marshall, Schlehofer, Towne, Burnash, &, Priddy, et al., 2014). Additionally, Schenkel specifically notes the prevalence of the various types of child maltreatment and the significance of deaf and hard of hearing individuals being at higher risk for a higher dose of exposure than individuals without a disability (Schenkel, Rothman-Marshall, Schlehofer, Towne, Burnash, &, Priddy, et al., 2014; Kazak

&Marvin, 1984; Sullivan & Knutson, 2000; Turner,Vanderminden, Finkelhor, Hamby, & Shattuck, 2011).

While there is an abundant amount of research connecting the links between hearing loss, deafness, and trauma, continued research is needed in this area to determine multiple factors. Specifically, exploring Adverse Childhood Experience Scores (ACE's) would significantly contribute to this area of research as ACEs is an area that is situated in a social context. For instance, when we understand the number of ACE's a child has experienced, it creates clarity in understanding the severity of potential impacts of the traumatic or adverse events. Additionally, measures of resilience, and health outcomes should also be considered in such research. Research on ACE's specifically, will allow for a more in-depth view that expands on society's general understanding of trauma. Often when we think of trauma, we think of serious, life-threatening events. While those events can most definitely be considered traumatic in many cases, ACE's allow us to consider events that may not be seen as trauma, but can potentially have significant adverse impacts on an individual. With ACE's, we see that trauma stems from a variety of factors. What is considered "minor" to one, may be quite traumatic for another. Additionally, both trauma and disability are often depicted in a negative light. However, another question is: could growing up with hearing loss or deafness actually lead to more positive outcomes? We are interested to see particularly if disability could actually serve as a protective factor against the impacts of trauma and potentially improve resilience. This systematic review of the research literature is necessary to explore these ideas and determine these next steps in this line of research.

Literature Review Objectives

The objectives of this literature review are listed below:

- To describe the current state of the research literature on deafness/hearing loss, and trauma/ACE's.
- To discuss issues, strengths, and weaknesses in previous research in this area.
- To explore potential protective factors (buffers) against the negative impacts of trauma.
- To explore if there are relationships between hearing loss/deafness, trauma/ACE's, and disability, and outcomes such as resilience and health outcomes.
- To draw conclusions based on the information obtained as they pertain to the research questions for this proposed study.
- To address the need for further research specifically as it pertains to impacts of trauma, ACE scores, and other measures mentioned above.

Keyword Search

Google Scholar, PubMed, ClinMed, ProQuest, Ericson, Ebsco Host, and Penn State Library online resources have been used to locate empirical studies on the links between deafness, hearing loss, and trauma. A variety of search terms will be used both alone and in combination including hearing loss, trauma, ACE, Adverse Childhood Experiences, adversity, mental health, adverse events, deafness, hard of hearing.

Summary of Findings

Based on the literature reviewed thus far, we are able to draw multiple conclusions about the links among hearing loss, trauma, and adversity. All of the studies reviewed demonstrate some accounts of adversity and trauma that are closely associated with deaf and hard of hearing individuals. Additionally, there are multiple protective factors that may potentially serve as a buffer to trauma and as a result, increase resiliency in this population.

Common themes across studies include the idea that the implications and impacts of trauma are dose-dependent, meaning the severity of the impact(s) depends on the number of and significance of the adverse events experienced (Schild, & Dalenberg, 2012). Additionally, many studies highlight the idea of Information Deprivation Trauma; a type of trauma that manifests in a negative or adverse experience resulting from deprivation of information or misinformation (Archer & Zöller, 2018). This type of trauma is more commonly associated with deaf and hard of hearing individuals due to the fact that deaf individuals can often miss information, keywords, points, etc. due to their hearing loss. Zöller & Archer, specifically highlight key points that allow researchers to connect the dots between deafness and hearing loss and trauma, as well as potential risk and protective factors.

Risks and Protective Factors

Generally speaking, there are a variety of risk factors that increase the likelihood of an individual or population being more susceptible to trauma exposure. However, when focusing specifically on the deaf and hard of hearing community, Zöller & Archer as well as others, discuss certain risk factors such as language deprivation and/or communication

difficulties, health issues, etc. that make deaf and hard of hearing individuals more likely to be exposed (Zöller & Archer, 2018). Zöller & Archer discuss how having a hearing loss or deafness in and of itself can bring about its own unique stressors, fatigue/tiredness, and vulnerability (Zöller & Archer, 2018).

In addition to addressing risk factors, Ahlert and Greff (2012) in their study, "Resilience factors associated with adaptation in families with deaf and hard of hearing children", discussed and identified potential buffers that lessen the negative impacts of trauma. For individuals of the deaf and hard of hearing community, some factors may assist in the improvement of family resilience outcomes. Factors such as the amount of time spent with family, routines, social support, communication confidence, meaning and acceptance etc. all were said to play a part in the development of family resilience when a child is diagnosed with hearing loss (Ahlert, & Greff, 2012). With these protective factors secured throughout childhood, it is likely that resilience would carry on into adulthood.

Blum, McNeely, and Nonnemaker (2001) also discuss both risk factors that make this population more vulnerable as well as protective factors that can lead to increased resilience later in life. Specifically, factors including family support and dynamics are known to play a crucial role in the development in children in general. However, for deaf and hard of hearing children specifically, these can be key determinants of outcomes following exposure to trauma or adversity in these individuals. Blum, McNeely, and Nonnemaker address that these elements can either make the individual more vulnerable thus increasing the potential for negative outcomes or serve as a protective factor thus reducing the likelihood of negative outcomes (Blum, McNeely, & Nonnemaker, 2001).

Schenkel & colleagues address the already widely known fact that individuals with disabilities, in general, are said to have an increased susceptibility to mistreatment, deprivation, bullying, abuse, neglect, etc. For deaf and hard of hearing individuals, specifically, factors such as being an outsider, not always being able to communicate, being "different" and so on, all have the potential to increase the above adverse experiences among this population (Schenkel, Rothman-Marshall, Schlehofer, Towne, Burnash, &, Priddy, 2018).

Resilience

Despite all of the risk factors discussed above, there are also a small number of studies that indicate that simply being deaf or hard of hearing in and of itself, can also promote resilience. When one is faced with a disability, there's no doubt that they will be faced with their own unique challenges. However, what this means is that due to those unique challenges, and in overcoming those challenges that come with the disability, they in turn, become more resilient (Schenkel, Rothman-Marshall, Schlehofer, Towne, Burnash, &, Priddy, 2018).

Post-Traumatic Growth

The theory of Post-Traumatic Growth or PTG describes how one comes out of a traumatic or even simply adverse experience having grown as a person and thus develops resilience. Although more research is needed on this concept specifically among deaf and hard of hearing individuals, the Post-Traumatic Growth Research Group of the Department of Psychology at the University of North Carolina at Charlotte, seeks to conduct such research with deaf people. Given what we now know about resilience in

deaf and hard of hearing individuals, incorporating such concepts into future research may also serve as highly beneficial for the reasons discussed above.

In summary, based on the literature reviewed above, we can clearly see links among deafness, hearing loss, and trauma. However, further research is needed to test if there is a connection specifically between Adverse Childhood Experience (ACE) scores and hearing loss/deafness as well as protective factors such as resilience, as well as health outcomes. To bridge this research gap, the current study was designed to test the following research questions:

- What is the prevalence of ACE's in the deaf and hard of hearing population?
- Are the impacts of trauma for this population different from the impacts on the general population?
- Are there protective factors or buffers that increase resilience among deaf and hard of hearing individuals who have been exposed to trauma?

Chapter 2

Methods

Participants

To this date, the survey was administered to 94 deaf and hard of hearing individuals, 83% of whom identified as women, 15% as men, and the rest as "other". The average age of the participants was 40 years, ranging from 18 to 71 years of age. Severity of hearing loss varied among participants. A vast majority of participants (32%), identified with having a severe haring loss, 30% with a profound hearing loss, 25% with a moderate loss, and 6% mild loss (See Table 1).

Table 1

The Table of Hearing Loss Status Among Participants

Hearing Loss Severity	Percent	Frequency
Mild (21-40 dB)	6	6.4
Moderate (41 to 60 dB)	25	26.6
Severe (61-85 dB)	32	34.0
Profound (86+ dB)	30	31.9
Total	93	98.9
Missing	1	1.1

Materials

The following scales were used to assess ACE's experienced by deaf and hard of hearing individuals (frequency and type), protective factors or mediators (i.e. social support, educational environment, parental support), physical and mental health status, and resilience scores:

- Adverse Childhood Experiences (ACE's) (Felitti et al., 1998)
- Scale of Protective Factors (SPF) (Ponce-Garcia, Madewell, & Kennison, (2014)
- Medical Outcomes (SF-36) (Ware & Sherbourne, 1992)
- Post Traumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996)

Recruitment Materials. Digital flyers along with a recruitment message were created and distributed to local hearing loss agencies/professionals via email, as well as posted on various social media platforms, specifically; Facebook, LinkedIn, Instagram, and online hearing loss support groups/forums (See Appendix B for recruitment materials).

Informed Consent. Written informed consent was provided in the first page of the survey. The informed consent consisted of the study purpose, procedures, etc. and ensured to mention that individuals may leave any unapplicable questions or questions that they may wish not to answer blank, as well as stop the survey at any time, if they choose with no impact to themselves. (See Appendix C for copy of informed consent).

Data Collection. An online survey consisting a variety of multiple-choice, and open ended questions was used for data collection. The survey was divided into subsections that included questions pertaining to hearing loss, physical and mental

wellness, resilience and post-traumatic growth, and questions relating to adversity. To elaborate, the beginning of the survey consisted of basic demographic information to obtain information about the various types of hearing loss among participants. Next, we incorporated questions from the Averse Childhood Experience Study (Felitti, et. Al, 1998) to assess ACE scores and types of adverse experiences participants of this population were exposed to. Further, we utilized the Scale of Protective Factors (SPF) (Ponce-Garcia, Madewell, & Kennison, 2014) to determine whether or not participants had access to potential protective factors such as supportive relationships, resources, etc. that could potentially mitigate negative effects of adverse experiences and trauma. Finally, we used the Medical Outcomes (SF-36) Scale to measure the physical and mental health of participants to examine whether or not participants with higher adversity experienced more negative health implications (See Appendix A for full survey).

Software/Hardware. Qualtrics was used for creation and distribution of the survey used for data collection. Data analysis was conducted with the use of IMB SPSS and Microsoft Excel.

Procedures

All study proposals, literature reviews, and required information was submitted to Penn State's Institutional Review Board (IRB) for approval. Upon approval, recruitment materials along with the electronic survey were distributed to a variety of sources via email, social media, online forums, etc. Interested participants clicked a link to enter the survey where they were presented with a welcome message and informed consent. Following the welcome message and informed consent, participants were asked a few short screening questions for eligibility. Participants then completed the questions on the

survey (See Appendix A for full survey). Data was then collected and analyzed to yield the following findings.

Chapter 3

Results

The preliminary analyses yielded the following findings:

Of the 94 participants, 22 (23.4%) reported their ACE score higher than 4. This frequency is almost twice as high as that found in a non-disabled population of 17,000 American adults (Felitti et al.,1998). Analyses by type of adverse childhood experience showed that the primary forms of abuse experienced by deaf and hard of hearing respondents were psychological (26% compared to 11.1% in hearing populations). The major sources of domestic dysfunction reported by participants was found to be ”mental illness” whose prevalence was 29.9% compared to 18.1% in a normally hearing population (see Table 4).

Further, there was a negative relationship between the number of adverse childhood experiences, ranging from 1-10, and self-assessments of general health (see Figure 2). These findings suggest that higher ACE’s scores were linked to diminished health outcomes, as hypothesized.

Responses to the question “My health is excellent” were significantly negatively correlated with ACE scores, $r(94) = -.24$, $p < .05$. ACE scores were also reported to greater impact one’s hearing loss. The higher the ACE scores, the more likely participants were to report that hearing loss restricts the things they do, makes them avoid social situations, makes them feel cutoff from things, and makes them feel tense and tired

(see Table 2). These relationships persisted even when controlling for actual hearing ability.

To explore what protective factors may mitigate these relationships, we explored the effects of social support ("Do you feel supported by friends and family regarding your hearing loss?), post-traumatic growth, and health, and hearing loss impact outcomes. First, an independent samples t-test analysis was conducted to determine the effects of feeling supported. We found that social support was significantly negatively related to expected health deterioration ("I expect my health to get worse (reverse coded), $t(90) = 1.97$, $p = .05$; and marginally positively related to good health ("My health is excellent"), $t(91) = 1.84$, but had no effect on hearing loss impact outcomes. Conversely, higher scores on post-traumatic growth were negatively correlated with hearing loss impact scores: participants with higher PTG scores were less likely to report that hearing loss makes them feel self-conscious, $r(92) = -20$, $p < .05$, and that hearing loss makes them inclined to avoid social situations, $r(92) = -0.27$, $p = .01$. There were no relationships between reported health outcomes and post-traumatic growth. Together, these findings show support for the hypothesized mitigating effects of two resilience-boosting factors, post-traumatic growth, and social support.

Figure 1

ACE Score in Relation to Hearing Loss Challenges

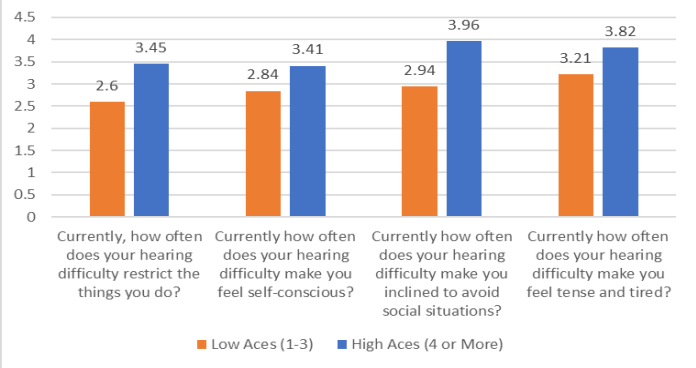


Table 2.

Mean ACE Score in Relation to Hearing Loss Challenges

	ACES_hi/low*	N	Mean	Std. Deviation	Std. Error Mean
Currently, how often does your hearing difficulty: - restrict the things you do?	1.00	70	2.60	1.109	.133
	2.00	22	3.45	1.335	.285
Currently, how often does your hearing difficulty: - make you feel self-conscious?	1.00	70	2.84	1.258	.150
	2.00	22	3.41	1.436	.306
Currently, how often does your hearing difficulty: - make you inclined to avoid social situations	1.00	70	2.94	1.153	.138
	2.00	22	3.86	1.167	.249
Currently, how often does your hearing difficulty: - make you feel tense and tired?	1.00	70	3.21	1.178	.141
	2.00	22	3.82	1.220	.260

*Note: 1 = Low ACEs, 2 = High ACEs

Figure 2
Health Outcomes in Relation to ACE Scores

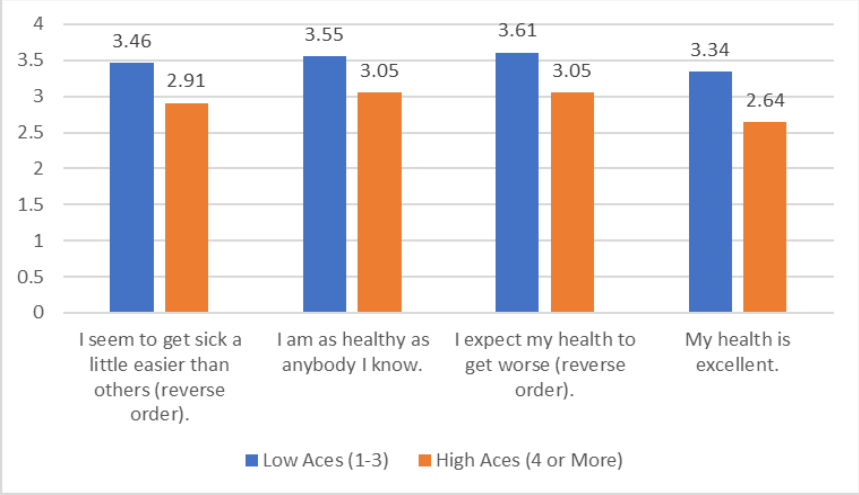


Table 3

Health Outcomes Means in Relation to ACE Scores

	ACES hi/low*	N	Mean	Std. Deviation	Std. Error Mean
- I seem to get sick a little easier than other people	1.00	71	3.46	1.318	.156
	2.00	22	2.91	1.601	.341
- I am as healthy as anybody I know	1.00	71	3.55	1.106	.131
	2.00	22	3.05	1.214	.259
- I expect my health to get worse	1.00	70	3.61	1.107	.132
	2.00	22	3.05	1.253	.267
- My health is excellent	1.00	71	3.34	1.095	.130
	2.00	22	2.64	1.255	.268

*Note: 1 = Low ACEs, 2 = High ACEs

Table 4

The Table of Abuse Prevalence Among Deaf and Non-Deaf Individuals

	Prevalence (%) – Felitti et al. (1998)	Prevalence (Present Study)
Abuse by category		
Psychological	11.1%	26.6%
Physical	10.0%	13.8%
Sexual	22.0%	17%
Household dysfunction by category		
Substance Abuse	25.6%	23.7%
Mental Illness	18.8%	29.9%
Mother treated violently	12.5%	8.5%
Criminal behavior in household	3.4%	4.3%

Chapter 4

General Discussion and Conclusions

General Discussion

The study reveals that the members of the Deaf and hard of hearing population do in fact, report higher rates of trauma, measured by the number of ACES, compared to non-disabled populations. Findings also confirm that there is a dose-dependent relationship demonstrating that individuals with higher ACE scores report worsening health and perceiving greater impact of their hearing loss in daily life. Finally, the data suggests that individuals who had access to supportive buffers report lower adverse health and psychological outcomes from ACEs. Specifically, post traumatic growth lessens the perceived impact of hearing loss, especially in the social area, and friends and family's support lessens the reported ill health.

There are a variety of variables and factors to consider when considering the prevalence of Adverse Childhood Experiences within diverse populations, such as the deaf and hard of hearing population. This study sought to examine these variables and factors by measuring attitudes towards quality of life with hearing loss, protective factors such as social supports, and health and resilience outcomes. The results of this study found that the implications of Adverse Childhood Experiences are dose-dependent, meaning that the greater the ACE score, the more significant the implications such as worsening health outcomes. Further, the study also found that the Deaf and hard of hearing population's ACE scores had a negative impact on the unique challenges these

persons face as they pertain to hearing loss specifically such that individuals with higher ACE scores reported greater restrictions and ill-feelings when attending social events. In addition, the deaf and hard of hearing population reported higher rates of psychological abuse compared to hearing populations, as well as higher rates of household dysfunction in the areas of mental illness in the household). The study also found that participants who had access to protective factors not only had more positive health outcomes, and that post-traumatic growth decreased reported impact of hearing loss.

Conclusion

While there are multiple studies that address the links between trauma associated with the deaf and hard of hearing population, there are few studies that specifically address the prevalence and significance of ACE scores and how those scores affect this population. Additionally, many studies do not include measures such as resilience scores, health outcomes, and buffers such as parental or social support that may lessen the burden of the impacts of exposure to ACEs. Although the findings from this study are still in preliminary stages, they have already shown robust support of the hypotheses and suggested interesting new areas of study.

I hope that these findings help increase awareness of the unique types of trauma and challenges faced by the deaf and hard of hearing population to professionals and the general population, and lay ground to new interventions and supports that help deaf individuals thrive

Appendix A

Survey Instrument

The following is an online survey instrument used to collect data for this study. It was presented in the Qualtrix format display similar to what is presented on this page.

Childhood experiences in the deaf community

Q102 Are you proficient in written English?

- ○ Yes (27)
- ○ No (28)

Q101 Do you reside in the United States?

- ○ Yes (5)
- ○ No (6)

Q100 Do you have a hearing loss?

- ○ Yes (1)
- ○ No (2)

Q99 Are you 18 years or older?

- ○ Yes (1)
- ○ No (2)

Q68 Age……

Q4 At what age were you diagnosed with hearing loss/deafness?

_____

Q5 Did a specific event or illness cause your hearing loss? If so, can you specify?

_____

Q81 Do you use any of the following types of hearing assistive technology? Check all that apply.

- [ ] I do not use any hearing assistive technology (1)
- [ ] Cochlear Implant (2)
- [ ] Telecoil or T-Coil (3)
- [ ] Hearing Aid (4)
- [ ] FM System (5)
- [ ] Personal Sound Amplifier (6)

Q82 How involved are you in the Deaf Community?

- [ ] I'm a leader in the Deaf community (1)
- [ ] I am involved with a Deaf school (2)
- [ ] I regularly attend a Deaf organization (3)
- [ ] I do not attend a Deaf organization (4)
- [ ] Other Explain (5) _____

Q83 What kind of school did you attend?

- ○ A Deaf school that you lived at (1)
- ○ A Deaf school that you commuted to (2)
- ○ Mainstreamed with an interpreter (3)
- ○ Combination of above (Please List) (4) _____
- ○ Other (Please Explain) (5) _____

Q84 What language were you taught the most at school?

- ○ Fluent ASL (1)
- ○ Some ASL (2)
- ○ Signed English (3)
- ○ Spoken English (4)
- ○ Writing back and forth (5)
- ○ Other (Explain) (6) _____

Q86 Your mother or female figure who raised you was...

- ○ Deaf (1)
- ○ Hard of Hearing (2)
- ○ Hearing (3)
- ○ Not sure (4)

Q87 You father or male figure who raised you was...

- ○ Deaf (1)
- ○ Hard of Hearing (2)
- ○ Hearing (3)
- ○ Not sure (4)

Q88 What is your preferred everyday communication method?

- ○ Sign language only (1)
- ○ Sign language more than speak (2)
- ○ Speak/lip read more than sign language (3)
- ○ Speak/lip read only (4)
- ○ Other (specify) (5) _____

Q89 What was your primary means of communicating with your family?

- ○ Oral / speech and speechreading (1)
- ○ Cued Speech (2)
- ○ Signed English or Signing Exact English (3)
- ○ Sign Supported Speech (4)
- ○ Total Communication / Signing with Voice (5)
- ○ American Sign Language (6)
- ○ Other (7) _____

Q6 Please complete the following questions regarding challenges related to your hearing loss.

Q90 Please answer the following questions about how your hearing loss impacts your daily life

	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Almost Always (5)
How often do you feel worried or anxious because of your hearing difficulty? (1)	○	○	○	○	○
How often are you inconvenienced by your hearing difficulty (2)	○	○	○	○	○
How often do you feel inclined to avoid social situations due to your hearing difficulty? (3)	○	○	○	○	○
How often do you feel cut off from things because of your hearing difficulty? (4)	○	○	○	○	○
How often do you feel tense and tired because of your hearing difficulty? (5)	○	○	○	○	○

Q7 What, in your experience is the greatest emotional or personal challenge with being Deaf/HOH?

Communication Barriers (1)

- Educational/Career Barriers (2)
- Accessibility (to technology, accommodations, services etc.) (3)
- Often feeling misunderstood by peers and hearing individuals (4)
- Other Explain: (5) _____

Q8 Have you ever been bullied by peers?

- Yes (1)
- No (2)

Q9 Have you ever been mistreated by a parent or member of your family before the age of 18?

- Yes (1)
- No (2)

Q10 Have you ever been deprived of critical health information due to your hearing loss?

- Yes (1)
- No (2)

Q12 Did a parent or other adult in the household often or very often… Swear at you, insult you, put you down, or humiliate you? or Act in a way that made you afraid that you might be physically hurt?

- ○ Yes (1)
- ○ No (2)

Q13 Did a parent or other adult in the household often or very often… Push, grab, slap, or throw something at you? or Ever hit you so hard that you had marks or were injured?

- ○ Yes (1)
- ○ No (2)

Q14 Did an adult or person at least five years older than you ever… Touch or fondle you or have you touch their body in a sexual way? or Attempt or actually have oral, anal, or vaginal intercourse with you?

- ○ Yes (1)
- ○ No (2)

Q15 Did you often or very often feel that… No one in your family loved you or thought you were important or special? or Your family didn't look out for each other, feel close to each other, or support each other?

- ○ Yes (1)
- ○ No (2)

Q16 Did you often or very often feel that … You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you? or Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?

- ○ Yes (1)
- ○ No (2)

Q17 Were your parents ever separated or divorced?

- ○ Yes (1)
- ○ No (2)

Q18 Was your mother or stepmother: Often or very often pushed, grabbed, slapped, or had something thrown at her? or Sometimes, often, or very often kicked, bitten, hit with a fist, or hit with something hard? Or was she ever repeatedly hit at least a few minutes or threatened with a gun or knife?

- ○ Yes (1)
- ○ No (2)

Q19 Did you live with anyone who was a problem drinker, alcoholic, or who used street drugs?

- ○ Yes (1)
- ○ No (2)

Q21 Did a household member go to prison?

- ○ Yes (1)
- ○ No (2)

Q20 Was a household member depressed or mentally ill, or did a household member attempt suicide?

- ○ Yes (1)
- ○ No (2)

Q23 **Please answer the following questions about sources of support:**

Q24 Do you feel supported by your friends and family regarding your hearing loss?

- ○ Yes (1)
- ○ No (2)

Q25 Do you feel your experiences with hearing loss have benefited you positively and if so, in what ways?

_____

Q26 Do you feel your experiences with hearing loss have impacted you negatively and if so, in what ways?

_____

Q27 **Please answer the following questions with the choice that most closely reflects you:**

Q28 My friends/family…

- ○ Keep me up to speed on important events. (1)
- ○ See things the same way. (2)
- ○ Are seen as united. (3)
- ○ Are supportive of one another. (4)
- ○ Are optimistic (5)
- ○ Spend free time together. (6)

Q30 I am good at...

- ○ Socializing with new people. (1)
- ○ Interacting with others. (2)
- ○ Making new friendships. (3)
- ○ Being with other people. (4)
- ○ Working with others as part of a team. (5)
- ○ Starting new conversations (6)

Q29 When working on something, I....

- ○ Can see the order in which to do things (1)
- ○ Plan things out (2)
- ○ Organize my time well (3)
- ○ Set priorities before I start (4)
- ○ Do better if I set a goal (5)
- ○ Make a list of things to do in order of importance (6)

Q31 I am confident in my ability to…

- ○ Achieve goals (1)
- ○ Think out and plan (2)
- ○ Make good decisions/choices (3)
- ○ Think on my feet (4)
- ○ Succeed (5)
- ○ Solve problems (6)

Q33 Please answer the following:

	I did not experience this change. (1)	I experienced this change to a very small degree. (2)	I experienced this change to a small degree. (3)	I experienced this change to a moderate degree. (4)	I experienced this change to a very great degree. (5)
I changed my priorities about what is important in life. (1)	○	○	○	○	○
I have a greater appreciation for the value of my own life. (2)	○	○	○	○	○
I have developed new interests. (3)	○	○	○	○	○
I have a greater feeling of self-reliance. (4)	○	○	○	○	○
I have a better understanding of spiritual matters. (5)	○	○	○	○	○
I more clearly see that I can count on people in times of trouble. (6)	○	○	○	○	○
I established a new path for my life. (7)	○	○	○	○	○
I have a greater sense of closeness with others. (8)	○	○	○	○	○
I know that I can handle difficulties. (10)	○	○	○	○	○
I can do better things with my life. (11)	○	○	○	○	○
I am better able to accept the way things work out. (12)	○	○	○	○	○
I can better appreciate each day. (13)	○	○	○	○	○
New opportunities are available which wouldn't have been otherwise. (14)	○	○	○	○	○

I have more compassion for others. (15)	○	○	○	○	○
I put more effort into my relationships. (16)	○	○	○	○	○
I am more likely to try to change things that need changing. (17)	○	○	○	○	○
I have stronger religious faith. (18)	○	○	○	○	○
I discovered that I'm stronger than I thought I was. (19)	○	○	○	○	○
I learned a great deal about how wonderful people are. (20)	○	○	○	○	○
I better accept needing others. (21)	○	○	○	○	○

Q35 **Please answer the following questions about your overall physical and mental health.**

Q36 In general, you would say your health is:

- ○ 1- Excellent (1)
- ○ 2- Very Good (2)
- ○ 3- Good (3)
- ○ 4- Fair (4)
- ○ 5- Poor (5)

Q37 Compared to one year ago, how would you rate your health in general now?

- 1- Much better than a year ago. (1)
- 2 - Somewhat better now than one year ago (2)
- 3 - About the same (3)
- 4 - Somewhat worse now than one year ago (4)
- 5 - Much worse now than one year ago (5)

Q39 Please rate the following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	Yes, limited a lot (1)	Yes, limited a little (2)	No, not limited at all (3)
Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports (1)	○	○	○
Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf (2)	○	○	○
Lifting or carrying groceries (3)	○	○	○
Climbing several flights of stairs (4)	○	○	○
Climbing one flight of stairs (5)	○	○	○
Bending, kneeling, or stooping (6)	○	○	○
Walking more than a mile (7)	○	○	○
Walking several blocks (8)	○	○	○
Walking one block (9)	○	○	○
Bathing or dressing yourself (10)	○	○	○

Q49 During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

○ Yes (1)

○ No (2)

Q51 Cut down the amount of time you spent on work or other activities

- Yes (1)
- No (2)

Q52 Accomplished less than you would like

- Yes (1)
- No (2)

Q53 Were limited in the kind of work or other activities that you could do

- Yes (1)
- No (2)

Q54 Had difficulty performing the work or other activities (for example, it took extra effort)

- Yes (1)
- No (2)

Q55 During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

- Yes (1)
- No (2)

Q56 Cut down the amount of time you spent on work or other activities

- Yes (1)
- No (2)

Q58 Didn't do work or other activities as carefully as usual

- Yes (1)
- No (2)

Q59 During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

- 1 - Not at all (1)
- 2- Slightly (2)
- 3 - Moderately (3)
- 4 - Quite a bit (4)
- 5 - Extremely (5)

Q60 How much bodily pain have you had during the past 4 weeks?

- 1 - None (1)
- 2- Very Mild (2)
- 3- Mild (3)
- 4- Moderate (4)
- 5-Severe (5)
- 6- Very Severe (6)

Q61 During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

- 1 - Not at all (1)
- 2 - A little bit (2)
- 3 - Moderately (3)
- 4 - Quite a bit (4)
- 5 - Extremely (5)

Q62 **The following questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.**

Q63 How much of the time during the past 4 weeks...

	All of the time (1)	Most of the time (2)	A good bit of the time (3)	Some of the time (4)	A little of the time (5)	None of the time (6)
Did you feel full of pep? (1)	○	○	○	○	○	○
Have you been a very nervous person? (2)	○	○	○	○	○	○
Have you felt so down in the dumps that nothing could cheer you up? (3)	○	○	○	○	○	○
Have you felt calm and peaceful? (4)	○	○	○	○	○	○
Did you have a lot of energy? (5)	○	○	○	○	○	○
Have you felt downhearted and blue? (6)	○	○	○	○	○	○
Did you feel worn out? (7)	○	○	○	○	○	○
Have you been a happy person? (8)	○	○	○	○	○	○
Did you feel tired? (9)	○	○	○	○	○	○

Q64 During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

- 1 - All of the time (1)
- 2 - Most of the time (2)
- 3 - Some of the time (3)
- 4 - A little of the time (4)
- 5 - None of the time (5)

Q66 How TRUE or FALSE is each of the following statements for you.

	Definitely true (1)	Probably true (2)	Neither true nor false (3)	Probably false (4)	Definitely false (5)
I seem to get sick a little easier than other people (1)	○	○	○	○	○
I am as healthy as anybody I know (2)	○	○	○	○	○
I expect my health to get worse (3)	○	○	○	○	○
My health is excellent (4)	○	○	○	○	○

End of Block: Please answer the following questions below regarding your hearing loss.

Start of Block: Block 1

Q3 **Please answer the following demographic questions and questions about your hearing loss in general.**

Q73 What is your age (in years)?

_____

Q77 Which description(s) best match your gender?

- ☐ Woman (1)
- ☐ Man (2)
- ☐ Nonbinary (3)
- ☐ Agender/I don't have one (4)
- ☐ Genderfluid (5)
- ☐ I prefer to identify myself another way: (6) _____
- ☐ I prefer not to say (7)

Q79 What is your family/household's approximate total yearly income?

- ○ Under $50,000 (1)
- ○ $50,000-$75,000 (2)
- ○ $75,000-$100,000 (3)
- ○ $100,000-$125,000 (4)
- ○ $125,000-$150,000 (5)
- ○ $150,000-$200,000 (6)
- ○ Over $200,000 (7)
- ○ I prefer not to say (8)

Q81 What is/are your first/native language(s)?

_____

Q83 Were you born in the United States?

- ○ Yes (1)
- ○ No; I have lived in the US for this many years: (2) _____
- ○ I prefer not to say (3)

Q85 Please describe your racial and/or ethnic identity:

_____

Q79 **Without assistive technology, how would you describe your hearing loss?**

- ○ Mild (21-40 dB) (2)
- ○ Moderate (41 to 60 dB) (3)
- ○ Severe (61-85 dB) (4)
- ○ Profound (86+ dB) (5)

Q103 Is your hearing loss in one or both ears? Please describe:

_____

Q80 **With assistive technology, how would you describe your hearing loss?**

- ○ Slight (16-25 dB) (1)
- ○ Mild (26-40 dB) (2)
- ○ Moderate (41-55 dB) (3)
- ○ Moderately Severe (4)

Q94 When you were a child (5-10 years of age), how often did your hearing difficulty:

	never (1)	rarely (2)	sometimes (3)	often (4)	almost always (5)
restrict the things you did? (1)	○	○	○	○	○
make you feel self-conscious? (2)	○	○	○	○	○
make you inclined to avoid social situations? (3)	○	○	○	○	○
make you feel tense and tired? (4)	○	○	○	○	○

Q95 When you were a young adult (10 - 20 years of age), how often did your hearing difficulty:

	never (1)	rarely (2)	sometimes (3)	often (4)	almost always (5)
restrict the things you did? (1)	○	○	○	○	○
make you feel self-conscious? (2)	○	○	○	○	○
make you inclined to avoid social situations (3)	○	○	○	○	○
make you feel tense and tired? (4)	○	○	○	○	○

Q96 Currently, how often does your hearing difficulty:

	never (1)	rarely (2)	sometimes (3)	often (4)	almost always (5)
restrict the things you do? (1)	○	○	○	○	○
make you feel self-conscious? (2)	○	○	○	○	○
make you inclined to avoid social situations (3)	○	○	○	○	○
make you feel tense and tired? (4)	○	○	○	○	○

End of Block: Block 1

Start of Block: Block 2

Q98 Thank you for your participation!

End of Block: Block 2

Appendix B

Recruitment Materials

Recruitment Message for Social Media/Online Forums:

Seeking Deaf and Hard of Hearing Participants 18 years of age and older!

Research regarding the concept of Adverse Childhood Experiences (ACE's) is only just beginning to emerge as a tool to examine stress and well-being. While everyone is susceptible to Adverse Childhood Experiences, populations with disabilities, specifically deafness or hearing loss, could potentially be at greater risk as having a disability in general is known to come with unique challenges. We are seeking individuals who are deaf of hard of hearing to complete an anonymous, confidential, 30-40 minute survey regarding hearing status, life experiences, mental and physical health and wellbeing, social supports etc.

Your participation in this research is voluntary and you may withdraw your participation at any time. You may decline to answer any individual questions. You must be at least 18 years of age to participate. If you agree to take part in this study and have reviewed the above information, please click on the link below.

Completion of the survey is considered consent to participate in the research. Please print a copy of this email for your records or future reference.

Click the link below to participate in the survey!

https://pennstate.qualtrics.com/jfe/form/SV_eeODW2tRLWSj9cx

Should you have any questions, please feel free to contact Dr. Daniela Martin, PhD. dzm11@psu.edu or Danielle Guth at deg34@psu.edu

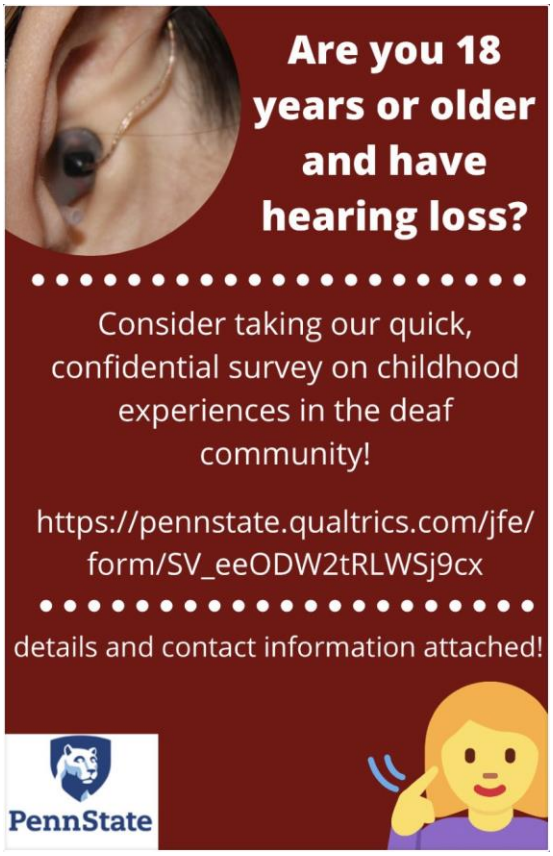
Thank you so much in advance for your participation!

Sincerely,

Dr. Daniela Martin and Danielle Guth

The Pennsylvania State University, Brandywine

Digital Flyer



Appendix C

Informed Consent

Title of Project: The Prevalence of Adverse Childhood Experiences in the Deaf and Hard of Hearing Population

Principal Investigator: Dr. Daniela Martin; dzm11@psu.edu, phone: (610) 892-1431

Student Researcher: Danielle Guth, deg34@psu.edu

Hello!

You are being invited to participate in a research study. This summary explains information about this research.

- ***Study Purpose:*** The purpose of this research is to extend our understanding of the prevalence of Adverse Childhood Experiences and other factors that may contribute to health and resilience among deaf and hard of hearing individuals. Additionally, we aim to examine potential buffers and protective factors that may lead to increased resilience and well-being despite such experiences
- ***Participation:*** You will be asked to complete a short online questionnaire about your hearing status, life experiences, mental and physical health, wellbeing, and social support. Participation duration is approximately 30-45 minutes.
- ***Confidentiality:*** The study is confidential. In the survey, there are no right or wrong answers, just your own opinions. These opinions will be collected confidentially, analyzed as data and then written up as research reports which will be valuable for advancing research in this area. No one at PSU will ever be able to see your responses. No potentially identifiable information, such as names or email addresses, will be stored

or recorded. We will ensure confidentiality to the degree permitted by the technology used. As with most Internet activities, no guarantees can be made regarding the illegal interception of data sent via the Internet by third parties.

If there are any questions that are not applicable for you or that you do not wish to answer, please feel free to leave the question blank.

If you have questions or concerns, you should contact Dr. Daniela Martin, dzm11@psu.edu, phone: (484)326-6286. If you have questions regarding your rights as a research subject or concerns regarding your privacy, you may contact the Office for Research Protections at 814-865-1775.

Your participation is voluntary and you may decide to stop at any time. You do not have to answer any questions that you do not want to answer.

Your participation implies your voluntary consent to participate in the research.

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ACADEMIC VITA

Danielle E. Guth

Deg34@psu.edu

B.A. Psychology, Expected May 2021, The Pennsylvania State University, Media, PA

Honors and Awards

- Human Subjects Research, CITI Training Program:
  - Research With Children
  - Social and Behavioral Human Subjects Research IRB Course
- President's Freshman Award (For maintaining 4.0 GPA freshman year)
- University Dean's List (Fall 2017, Spring 2018, Fall 2018, Spring 2019, Fall 2019, Spring 2020 semesters)
- Certificate of Recognition - Penn State Brandywine's Fall 2018 Digital Showcase
- Outstanding Academic Achievement Award (Spring 2019)
- Jane E. Cooper Honors Program (Spring 2018-present)
- Markley Trustee Scholarship (Recurring since Fall 2018)
  - Scholarship recipient for outstanding academic achievement
- Diane D. Shorter Outstanding Community Service Award (Spring 2019)
- Student Club of the Year Award (Spring 2020)
  - Award recipient as president of the "Student Club of the Year": DMAX Club
- Mandated Reporter Certification (September 2020)
- Charles W. Borgerding Memorial Scholarship (September 2020)

Professional Experience

Research Experience:

- **Trauma & ACE Scores in Deaf & Hard of Hearing Individuals (Honors Thesis)**: January 2020-present, Adviser: Daniela Martin, PhD., Penn State Brandywine
- **Creating Trauma Informed Schools with A Social Justice Lens (Research Project Coordinator**: January 2020- present
  Instructor: Marinda Kathryn Harrell-Levy, PhD., Penn State Brandywine

- **Creating Trauma-Informed Peer Mentors on College Campuses:**
  January 2020 – May 2020 Instructor: Dr. Christine Brown, PhD., Penn State Brandywine

Professional Research Work Experience:

- **Clinical Research Quality Control & Marketing Specialist** May 2019- Present
  Suburban Research Associates

Research Interests

I have a broad interest in the intersections between trauma, ,health, and biological psychology with a strong interest in adverse childhood experiences, the implications and impacts of chronic health conditions on overall health and wellbeing as well as physiological processes. I also have strong interests in exploring specific diverse population such as the deaf and hard of hearing population and other populations susceptible to adversity.

Professional Presentations

- Eastern Psychological Association Conference Presentation
  Title of Presentation: The Prevalence of Adverse Childhood Experiences in the Deaf and Hard of Hearing Population (Honors Thesis)
  Date: March 5, 2021