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The Psychological Effects of Cochlear Implants: a Comparison of One Adult with a Cochlear Implant and One Without.

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The Psychological Effects of Cochlear Implants: a Comparison of One Adult with a Cochlear
Implant and One Without.

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Senior Honors Research Project

Spring 2016

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ABSTRACT

This study involved the development, implementation and analyzation of two qualitative case studies, with one involving a profoundly deaf individual who possesses a cochlear implant, the other with an individual who possesses normal hearing ranges. Participants were given two quantitative measures of observation, the Acceptance and Action Questionnaire and the Thought Control Questionnaire, before participating in a semi-structured interview that was intended to gather information about the individuals, their life experiences, and the factors of psychological flexibility, adaptability and resiliency as applied to their lives. The semi-structured interview involved a set list of questions that were posed to the individuals; clarification or “follow-up” questions were added in as the need to understand the answers arose. The results of the quantitative measures showed that the individual with normal hearing scored slightly higher than the individual with the cochlear implant, which could show that normal hearing ranges enables an individual to be more psychologically flexible and better able to control unwanted thoughts. During the course of the semi-structured interview, the individual with the cochlear implant had a high rating of psychological flexibility, which may indicate a greater sense of self-awareness; more research is needed to validate this idea. However, considering that only two participants were involved in this particular study such a conclusion is difficult to come to.

CHAPTER 1

INTRODUCTION

Currently in the field of audiology, there is a vast amount of information about the human ear and hearing mechanism on biological levels, how sound waves are transduced in a series of energy conversions to eventually signal the brain as to what is happening around us, and what certain sounds are. According to the Scope of Practice document created by the American Academy of Audiology (2004), audiologists work to identify, assess, diagnose, and treat individuals with hearing impairments, using primarily the gross amount of biological information that is available. There is much information about the biological processes of hearing, and the biological processes of deafness; where information is lacking is concerning the psychological effects of being deaf or hearing impaired, and how those affect the overall development of the human in general. Diagnosing the physical or chemical problem and deriving the solution are the major points of the field of audiology, and it may be as equally important to know the psychological effects and processes that the individual being treated is undergoing, so as to provide a holistic therapy approach, treating the whole person and not just the biological issue. The entire person, of which the psyche is a huge component, is the major goal in all health care professions, and audiology is no different. If the psychological effects of being deaf or hearing impaired can be isolated, studied, and treated, then the already impressive therapies to work with these individuals can be further augmented and improved.

CHAPTER 2

LITERATURE REVIEW

Anatomy of the Ear

The ear is comprised of three sections; the outer ear, middle ear, and inner ear. The outer ear has the primary job of collecting sound and funneling it inwards through the ear canal. When the sound waves reach the eardrum, they enter the middle ear. The middle ear is responsible for transducing the sound waves, which are comprised of acoustic energy, into mechanical energy via bone conduction. As the bones of the middle ear vibrate, the vibrations are transferred to the round window of the cochlea. The number of vibrations per second informs the cochlea the frequency of the sound, for example:

The frequency of a sound is determined by the number of oscillations or vibrations per second. In this case, it is the number of oscillations of the [tympanic membrane]-ossicle-footplate combination: A 100 Hz signal results in the footplate moving inward and outward 100 times per second, and that periodic vibration is translated to the basilar membrane, where it initiates a wave action known as the traveling wave. (Seikel, Drumright & King, 2010, p. 537)

The “floor” of the cochlea is comprised of the basilar membrane, and is where the organ of hearing is found, and where the hair cells of the cochlea live. These hair cells allow the human body to perceive and understand sound. There are two types of hair cells: outer and inner. The three rows of outer hair cells are embedded in the basilar membrane and are responsible for sensing and coding the intensity of the sound wave that is being perceived by the cochlea. The single row of inner hair cells has the job of decoding the specific frequency bands that are

present in the sounds that have reached the cochlea, and dissect the waves further before sending the information via the auditory nerve to the brain.

The cochlear basilar membrane is organized tonotopically, where each part of the membrane correlates to specific frequencies of specific sound waves. The membrane is organized by tones, the frequencies of the many sound waves and stimuli that ears perceive. Near the base of the cochlea is where the high frequencies are perceived, while low frequencies are picked up near the apex. Depending on which hair cells are stimulated, a rudimentary idea of the frequency band and corresponding sounds can be sent via the auditory nerve to the brain for further processing. If the hair cells malfunction, are damaged or absent, then the stimuli will not reach the auditory cortex and therefore will not be processed, which is an example of sensorineural hearing loss where the sensory organ, the cochlea, is malfunctioning. For a client who has no hair cells, or the hair cells have been damaged in some way, a cochlear implant may be considered as a solution.

Cochlear Implants

According to the National Institute of Deafness, a cochlear implant (CI) is a “small, electronic device that can help to provide a sense of sound to a person who is profoundly deaf or severely hard-of-hearing,” (NIDCD, 2011). Comprised of a microphone, external processor, transmitter and an electrode array, the CI is a complex piece of technology that stimulates the neurons of the hearing mechanism and enables sounds to be perceived by the ear that is in this case lacking the hair cells needed to hear. By inserting the electrode array into the cochlea along the basilar membrane, the electrodes take the place of the absent or damaged hair cells and imitate the actions by electrically stimulating the basilar membrane when a sound wave is

perceived. Simply put, the CI is able to bypass other pathologies that may exist in the cochlea and send signals on to the auditory nerve and the brain.

History of Cochlear Implants

In 1972 the first cochlear implant (CI) was developed in Australia. This CI had a single channel and was implanted in over 1,000 people through the 1980s. In 1984, Cochlear Corporation developed the first multi-channel cochlear implant- the Nucleus 22 (N-22). The N-22 system had an implanted receiver/stimulator plus an intracochlear electrode array of 22 electrodes. The early versions of the N-22 used radio frequencies for stimulation and control, and later versions used magnets to keep the coils together. Because only 22 channels existed, accurately coding speech was exceedingly difficult for this device. Eventually, “a feature extraction scheme was developed that allowed transmission of the fundamental frequency as well as the second harmonic of speech (F0/F2). Later improvements in the speech-processing algorithm allowed transmission of the first formant frequency as well (F0/F1/F2),” (ASHA, 2004).

Cochlear implants have made significant progress in the past few decades, improving the electrode array that is available for implantation, as well as refinements in the surgical process itself.

Future of Cochlear Implants

Cochlear implants continue to adapt and change as technological advances are made. In the aspects of “design, programming techniques, coding strategies and determining candidacy,” cochlear implants are consistently tested and the field strives to improve upon them (Schow & Nerbonne, 2013, p.92). Improvements are continually made to the electrode array that is used

with the use of many channels; “Multichannel cochlear implants attempt to mimic the place representation of frequencies along the cochlea by tonotopic arrangement and stimulation of electrodes,” (AAA, 2016). Since the basilar membrane is not being stimulated by hair cells, the goal is to make the electrode array function as close to that of an aural hair cell as possible. In surgery, as more information is made known about the workings of the inner ear and the cochlea, surgeons are able to take more precautions during implantation in order to preserve whatever function resides in the cochlea, and that the device is truly augmenting existing structures, not destroying them.

“A promising development is the idea of electric-acoustic stimulation,” (Schow & Nerbonne, 2013, p. 92), coined by Cochlear Corporation as the Hybrid[®] cochlear implant (Hybrid[®] -CI). A Hybrid[®] -CI uses a partial cochlear implant as well as a standard hearing aid. According to the American Academy of Audiology’s Clinical Practice Guidelines from June of 2013, “Hybrid amplification devices are a combination of hearing aids and cochlear implants and provide acoustic amplification to the low frequencies and electrical stimulation to the higher frequencies,” (AAA, 2013 p. 15). For individuals with no hair cell usage, a cochlear implant is the best in order to attempt restoration of all frequencies. However, for individuals who have mild hearing losses in the low and mid-frequency ranges, a full-range cochlear implant is unnecessary. Those losses can be augmented with a simple hearing aid. If those same individuals have mild hearing losses in the low- and mid-frequencies, but severe to profound losses in the high frequencies, a partial implant can be used in order to stimulate the high frequency areas of the cochlea. Usage of both the hearing aid and the partial implant is ideal for an individual who still has some functioning aural hair cells, and does not need the entire electrode array implanted.

If customizable cochlear implants are the future, that would be good news indeed for individuals who have residual hearing but need a boost in certain frequency bands.

Stigmatization of Hearing Impairments

Ciesla, Lewandowska & Skarzynski (2015) looked at the quality of life of clients who were partially deaf. They stated:

A hearing impairment is not only a disability (a communication dysfunction) but can also be perceived by an individual as a handicap with its psychosocial effects. Patients often encounter confusion, stigmatization or even mockery... It has been argued that behavioral and affective variables have to be considered to provide successful management. (Ciesla, Lewandowska & Skarzynski, 2015, p. 1).

Along that same vein, a point that has been raised by the deaf community since the inception of cochlear implants is the thought that people with hearing losses and/or deafness are abnormal, broken and need to be fixed. As stated by the National Association of the Deaf (NAD) in their "NAD Position Statement on Cochlear Implants", many medical professionals continue to view deafness as a problem and believe that hard of hearing and deaf individuals must be "fixed" by such devices (NAD, 2000). Efforts have been made to combat hearing loss at the source, and to assist the clients experiencing the hearing impairments in adjusting to life without a full range of hearing, or figuring out alternative means of hearing through cochlear and brain stem implants. Efforts now need to be made to help the individuals with implants fully adjust to life outside of the hearing factors, with social and psychological effects at the top of the list.

Observing Psychometric Effects of Cochlear Implants

The Cochlear Implant Function Index (CIFI) was developed and used to see how individuals with cochlear implants perceive the world around them and how that affected their overall quality of life, as well as how the individuals were able to adjust to everyday tasks such as talking on the phone or being in a large crowd. This exploratory study showed that the CIFI is a promising tool in order to evaluate hearing in every day, real-world settings by users of cochlear implants, and therefore can be used to test how the individual is adjusting to the implant and what areas of therapy should receive more focus.

Psychological Flexibility

Flexibility is a quality that is applied to human beings in many differing contexts daily, but pinning down one exact definition for flexibility proves to be difficult. One thought many can agree on is the thought that there are different types of flexibility and therefore each type has a different definition. In these particular cases, psychological flexibility is the focused type of flexibility that is being explored. According to Kashdan & Rottenberg:

Psychological flexibility spans a wide range of human abilities to: recognize and adapt to various situational demands; shift mindsets or behavioral repertoires when these strategies compromise personal or social functioning; maintain balance among important life domains; and be aware, open, and committed to behaviors that are congruent with deeply held values. (Kashdan & Rottenberg, 2010, p. 1)

The human psyche is primed for analyzing outside environments and stimuli and is able to adapt to almost any situation with relative ease. If an exam testing psychological flexibility could be developed and included in the test battery for candidates looking to receive a cochlear

implant, medical professionals would have a much better idea of the individual's level of psychological flexibility and possible problem areas that may arise in the future. It would also provide the professionals valuable insight to the psyche of the individual, and therefore would assist in building treatments and sessions around the client's individual needs, and not just the needs of the hearing issue at hand. By treating the whole person, that individual has the best chance of receiving holistic and effective treatment.

Purpose

The purpose of this project was to find a relationship between being profoundly deaf with a cochlear implant and the traits of adaptability, resiliency and psychological flexibility existing when compared to those same traits in an individual with normal hearing ranges. These correlations were discovered and discussed via two qualitative case studies, involving one individual with a cochlear implant and a profound hearing loss and one individual with normal hearing ranges. The participants were matched in age, race and gender to the best of the researcher's abilities and were given two quantitative measures, the Acceptance and Action Questionnaire and the Thought Control Questionnaire. After the quantitative data was gathered, a semi-structured interview was conducted in order to gain information about the participants' personal traits of adaptability, resiliency and psychological flexibility, with the goal of comparing and contrasting the responses.

CHAPTER 3

METHODS

Demographics

Two males, ages 24 and 30 were interviewed via FaceTime. One male, Arthur, has a unilateral cochlear implant (CI) N-22 unit on the left side, and the other, Gawain, has normal hearing ranges. Both males have high school diplomas, college degrees and full-time jobs. The names of the individuals have been changed in order to protect their privacy.

Quantitative Measures Taken

Before the semi-structured interview, two quantitative measures were taken. The first was the Acceptance and Action Questionnaire (AAQ-2) which measures psychological flexibility. The AAQ-2 consists of a ten question survey on a 7 point scale, with 1 being “never true” and 7 being “always true”. The second measure used was the Thought Control Questionnaire (TCQ) which makes inquiries into techniques used to control unpleasant or unwanted thoughts, and involves a thirty question survey on a 4 point scale, with 1 being “never” and 4 being “almost always”.

Semi-Structured Interview

The semi-structured interview was conducted via FaceTime. Researchers created a questionnaire that consisted of entirely open-ended questions; the questions were designed with the allowance that follow-up, clarification and/or probing questions could be posed during the course of the interview in addition to the set questionnaire. The basic structured questions were the following:

1. *Of your five senses (hearing, touch, taste, smell, sight)*
 - a. Which is the strongest?
 - b. The weakest?
 - c. If you could change or trade which sense was your weakest how would you like to change it? Do you wish your weakest sense was different?
2. *Sensory disability or issue*
 - a. Do you have a sensory disability or issue?
 - i. If yes:
 1. How does that affect your daily life?
 2. How do you have to change your actions, thoughts, opinions because of your disability?
 3. Do people treat you differently because of it?
 4. How does that make you feel?
 - ii. If no:
 1. What if you had a hearing loss? How do you think that would affect your daily life?
 2. How do you think that would change your actions and thoughts?
3. *Moving to a different house, city, state or country*
 - a. Have you ever moved to a different house, city, state, or country?
 - i. What was/were your moving experience(s) like?
 - ii. On a scale of 1-10 (1 being extremely difficult and 10 being extremely easy) how do/did you handle moving? Please explain.
4. *Self-Evaluation: Adaptability*

- a. On a scale of 1-10, how adaptable would you say you are?
 - i. Can you please explain your above rating?
5. *Self-Evaluation: Resiliency*
 - a. On a scale of 1-10, how resilient would you say you are?
 - i. Can you please explain your above rating?
6. *Sensory Abilities and Life Outlook*
 - a. Do you feel as though your sensory abilities change your outlook on life?
 - i. Can you please give me some details about the above question?
7. *Anxiety*
 - a. When experiencing new things (moving, changing jobs, meeting new people) do you experience anxiety?
 - i. If yes, please explain the degree of anxiety you feel
 - ii. How do you manage your anxiety?
8. *Compensating for Sensory Abilities*
 - a. Do you feel as though you have to over/undercompensate for any sensory abilities you may or may not have?
9. *Psychological Flexibility*
 - a. Do you consider yourself a flexible individual, with flexibility defined as
 - i. “Psychological flexibility spans a wide range of human abilities to: recognize and adapt to various situational demands; shift mindsets or behavioral repertoires when these strategies compromise personal or social functioning; maintain balance among important life domains; and be

aware, open, and committed to behaviors that are congruent with deeply held values” (Kashdan & Rottenberg, 2010)?

10. *Questions specific to a Cochlear Implant Candidate*

- a. For the individual with a unilateral CI:
 - i. Do you feel as though you are at an advantage or a disadvantage as far as your implant goes? Please explain why you chose the answer you did for this question.
 - ii. Do you rely more on body language than what is said by the person?
 1. How does that affect you adjusting to new places and people?
 - iii. How do subliminal messages affect you?
 - iv. Do you consider yourself very adaptable because of your hearing loss/implant?
 - v. Do you regret lip reading instead of learning and use American Sign Language to communicate?

11. *Closing Questions*

- a. Is there anything I did not ask you about that you would like to add? Do you have any other thoughts or feelings you would like to share?
- b. Do you have any questions for me?

Follow-up questions were added in organically during the course of the interview and will be addressed in the results and discussion section.

The interviews were originally scheduled to match date and time, in order to be completed back to back with two hours of time available for the interview. Unfortunately, due to outside interference with work, Arthur was unable to participate on the originally scheduled day

and was interviewed the following day. Gawain was interviewed on a Monday at 2:30 p.m., and Arthur the next day at 9:00 p.m.

CHAPTER 4

RESULTS AND DISCUSSION

The semi-structured interview began with the two participants completing the two quantitative measures, the Acceptance and Action Questionnaire (AAQ-2) to measure psychological flexibility and the Thought Control Questionnaire (TCQ) to observe how the individuals managed unwanted thoughts.

Quantitative Measures

Acceptance and Action Questionnaire

The Acceptance and Action Questionnaire (AAQ) was developed as part of the Acceptance and Commitment Therapy (ACT). In 2011 the questionnaire was shortened from the original ten questions to seven questions; this new test was named the Acceptance and Action Questionnaire 2 (AAQ-2), “which assesses the construct referred to as, variously, acceptance, experiential avoidance and psychological inflexibility,” (Bond et al., 2011, p. 1). The AAQ-2 is scored on a scale of 1 to 7, where 1 = never true, 2 = very seldom true, 3 = seldom true, 4 = sometimes true, 5 = frequently true, 6 = almost always true, 7 = always true. A reverse scoring process is involved with questions 2, 3, 4, 5, 7, 8 and 9. (See Appendix A for the questions and scoring process.)

The AAQ-2 is a measure of psychological flexibility. The highest score possible is 70 points; the higher an individual scores, the more psychologically flexible they are. (See Appendix A for the test). On the AAQ-2 Gawain had very high scores for every question; according to those scores, Gawain has excellent psychological flexibility and is seemingly quite

secure in handling life and its obstacles. Arthur also had high scores, but not as high as Gawain who has normal hearing. Since this is just one individual, this is simply an observation but it does seem that according to the scores, Gawain is more psychologically flexible with normal hearing ranges, whereas Arthur is not quite as psychologically flexible. Arthur had a lower score on question 7 seven with a score of 4, “sometimes true” while Gawain had a score of 7 “always true” for question seven. See Appendix B for both Arthur and Gawain’s full AAQ-2 surveys.

Thought Control Questionnaire

The Thought Control Questionnaire (TCQ) is a 30 item questionnaire developed by Adrian Wells and Mark I. Davies (1994) to assess the effectiveness of strategies used for the control of unpleasant and unwanted thoughts. The TCQ was developed in order to observe and measure the various way individuals control and deal with unwanted and/or unpleasant thoughts, analyze those strategies used most often by the individual, and attempt to draw conclusions between the results and the psychological factors of the individual.

The TCQ is a thirty question survey that is scored on a scale of 1 to 4, with 1 being “never” and 4 being “almost always”. The questions fall into five categories of factors that correspond to different thought control strategies: Distraction, Social Control, Worry, Punishment and Re-Appraisal. See Appendix C for a list of all questions, the factors they follow, and the corresponding scoring strategy.

Gawain’s highest scores were in the categories of the Distraction and Social Control techniques, with both being tied for 18 points, whereas Arthur favored the Re-Appraisal category with 16 points, followed by Distraction with 14 and Worry by 10. Gawain’s use of comparing negative and unwanted thoughts against social controls could indeed be a result of having normal

hearing and being a social creature, and/or being more easily swayed by external sources.

Gawain's score for Social Control was 18, whereas Arthur had a score of 8 for the Social Control category. It would seem that due to these scores, Arthur depends more on himself, his internal sources of re-evaluating thoughts and events (Re-Appraisal) and distracting himself from such thoughts. Arthur's score for the Worry category (10) was higher than that of Gawain's (7), which raises the question of whether having a CI causes Arthur to worry more about outside events, and worry about burdening others with negative thoughts or feelings, hence keeping them to himself. See Appendix D for the results and scores for each participant's TCQ.

Arthur's overall scores on the AAQ-2 and TCQ were high, showing excellent control in managing unwanted or unpleasant thoughts, as well as possessing good amounts of psychological flexibility. However, when compared to Gawain, who possesses normal hearing ranges, Arthur scored slightly lower on the questions, leading to the question of whether those scores are caused by his hearing loss and life experiences. Since this observation is due to one individual, correlation does not equal causation, but should be researched further. According to the scores only, it appears that Gawain, with normal hearing ranges is more psychologically flexible, whereas Arthur is not quite as psychologically flexible. The question could then be raised that since Arthur was born with such a profound hearing loss, perhaps even with the cochlear implant he missed out on the full range of psychological flexibility that children with normal hearing ranges encounter during the developmental stages. Arthur was implanted at age 3, and therefore could have missed some crucial age-oriented developmental time when it comes to speech and language.

Semi-Structured Questions

The semi-structured interview began after the demographics questions. Both individuals were asked about their senses.

Of your five senses (hearing, touch, taste, smell, sight)

The first open-ended question was “Of your five senses (hearing, touch, taste, smell, sight) which is the strongest?” Arthur, the individual with a CI answered “Sight, for sure.” Gawain, with normal hearing and no CI responded “Between sight and sound. My students are always like ‘how did you hear that you’re on the other side of the classroom!’ so I think definitely the job I have now has lended that aspect of my hearing to improve on and really work on.”

Clarification questions were posed to Gawain because he had responded with two senses (sight and sound), not one. The first clarification question was “Before you were a teacher and were put in that environment, sound would not have been your first pick?” to which Gawain responded, “No, it would have been sight, yes.” The second clarification question was “Because of your change in environment you felt the shift?” Gawain responded “I can learn by listening to a professor talk but when I can actually see it written on a board I retain it better.”

It has been said that when a human loses one of the five senses, the others become stronger. By that logic, it is no surprise that Arthur considers eyesight his strongest sense, having a profound hearing loss. Gawain, as teacher, must constantly monitor the environment of the classroom and the students, assessing for changes and issues and evaluating whether the students are okay and whether they need help or not; both sight and hearing are essential tools for such a job, and Gawain uses them to his full advantage. Even though Arthur lacks the normal hearing

ranges and the related sense of hearing as we define it, by using the other senses to his advantage he functions perfectly well in society.

The second open-ended question was, “Of your five senses (hearing, touch, taste, smell, sight) which is the weakest?” Arthur responded “That’s a difficult question...nah it’s my hearing.” Gawain responded “I guess touch? I’m not really tactile, like you don’t have to touch everything you can just look at it.”

It appears as though Arthur is to the point where he can joke about his hearing loss, considering his response when asked the question about the weakest sense. It was interesting to hear that Gawain’s weakest sense, to his consideration, was the sense of touch. Some individuals are very tactile, others are not. Some individuals have excellent senses of smell and seek employment in perfume factories, or excellent taste and become food critics. Since Gawain is not very tactile, a job such as a teacher works well since there is little tactile demand involved.

The third open-ended question was “If you could change or trade which sense was your weakest, how would you like to change it? Do you wish your weakest sense was different?” Arthur with a CI responded “No-I like where I am right now because out of all the senses hearing is the only one that can be really fixed through technology.” Gawain responded with:

“I don’t know. I could definitely improve on my touch, though...be a little more tactile-oriented, like old book dealers [who] can tell what the paper is made out of by touching it. That’d be interesting. I would not do well working in a museum though because then I’d want to touch the painting. Also, that would help with the hands-on activities in the classroom; some of my high school students are reading at a 3rd or 4th grade level and learn better with tactile activities and I’m not the best at that but that’s what works.”

Arthur's response to this question was unexpected. He comes across as entirely at peace with his hearing loss and cochlear implant, and is content with where he is in life and the experiences he has had thus far. He may have a point in saying that thus far, the sense of hearing appears to be the only sense the medical community can truly augment and attempt to restore, hence his utter peace with it. That Gawain acknowledges his weakest sense and considers ways to strengthen or use it in ways he would not ordinarily shows self-awareness and willingness to improve and grow.

Sensory disability or issue

This section queried the participant about any sensory disability or issue they may or may not have, and based on their response was followed by more open-ended questions. If the participant responded "yes" to having a sensory disability or issue, certain questions came next in the questionnaire; the same for an answer of "no", with a different track of questions.

Gawain

The first open-ended question for this section was "Do you have a sensory disability or issue?" Gawain responded with "No. Not that I know of."

The next corresponding open-ended question for an answer of "no" was "What if you had a hearing loss? How do you think that would affect your daily life?" Gawain answered:

"I would definitely have to be more aware of my surroundings, utilize my sight much more to look to be just as simple as crossing the street, to paying attention to my students I would definitely need to pay attention and look at them all at once I can't have my back

turned to a group of students while I'm helping a different group of students working on a project, so it would definitely take a learning curve.”

At this point a clarification question was posed by the interviewer, “You think you'd adapt?” and Gawain said “Yes, eventually we'd get there. Now if I were a musician I think that would be much more challenging than just being a teacher where I am now.”

The third corresponding open-ended question posed to Gawain was “How do you think that would change your actions and thoughts?” He answered: “Something just as simple as instead of having my alarm clock I'd have to use the vibrate on the phone to wake me up. Walking down the steps and you don't hear someone else walking up and if you're not paying attention and looking for visual cues you might bump into somebody versus you don't know if there's an intruder in your house.”

Gawain does not possess any sensory disabilities or issues, but shows remarkable awareness of the types of sensory disabilities that exist and the accommodations that must be made for the individuals experiencing them. By keeping an open mind about the possibility of developing a sensory issue (such as age-induced hearing loss) and how to work with it, Gawain appears very flexible both psychologically and physically to adapt as things change in his life.

Arthur

The first open-ended question for this section was “Do you have a sensory disability or issue?” to which Arthur responded with “Um, well I'm deaf so yes. I'm profoundly hearing impaired.”

The corresponding list of open-ended questions as a result of an answer of “yes” began with “How does that affect your daily life?” Arthur responded:

“It affects my daily life in many ways, um, I mean since I have a CI it really reduces the challenges I face. Really the only difference is with the challenges I face my disability is I have to wake up in the morning, spend an extra 5 seconds to reach over to my bedside and put my CI in and turn it on, and I’m a swimmer myself and I can’t wear my CI when I’m swimming, so, when the coach is trying to talk to me I have to read his or her lips um and then when I’m at work even though I have an implant I still struggle to hear people every once in a while. Mostly on phone calls, talking to people from abroad who have thick accents, so it can be challenging sometimes. Everything that involves hearing is a bit more challenging than for a normal hearing person honestly.”

The next open-ended question was “How do you have to change your actions, thoughts, opinions because of your disability?” Arthur responded with:

“I have to adapt to the environment that I’m in; I try to position myself if I’m at a table at a restaurant I position myself so I can hear people as best as I can because I hear people well on my left side, so I’ll sit at the right end of the table so everyone’s to my left side, um, and like I said earlier I read lips so if I struggle with somebody I’ll read their lips.”

The third open-ended question for this section was “Do people treat you differently because of it?” Arthur said:

“The thing that I’ve discovered is that when I meet new people they’ll notice that I’m deaf, they only notice it when I actually tell them I’m deaf. In most cases people that I’ve come across when people realize that I’m deaf they actually try and accommodate and

“speak more clearly, speak louder for me, so. And slower so I can read their lips. They mostly try to accommodate me. My really close friends accommodate me really well; if they speak normally and I misunderstand them, they apologize and say it again for me.”

The following open-ended question was “How does that make you feel?” Arthur answered “Uh, I tell myself that it could be worse, um, one way, one of the advantages of that is I know who my good friends are and who aren’t really my friends. Exactly. I just know that my really good friends are the ones who accommodate me the most. Does that make sense?”

Arthur has a profound hearing loss and uses a cochlear implant to augment his sense of hearing in order to interact with the world around him. He has a job in an office, with many coworkers that need to be communicated with, phone calls that must be made, and meetings that must be attended. By using his cochlear implant he is better connected to the fast-paced world of the office he works in, and the people and tasks involved. It is not a perfect system, however, as he mentioned people speaking faster than his ability to read their lips. Sometimes this causes communication breakdowns, but by calmly asking the individual to repeat themselves Arthur is able to move past the breakdown and continue on. Arthur has a high level of awareness of himself and the environment he is in, and the adjustments that he must make in order to make the best of any situation. The example of going to a restaurant and sitting at the right end of the table so that the other people at the table are speaking to his left ear, which is stronger, shows a high level of self-awareness and a deep understanding of how to set himself up for success in the particular environment he finds himself in at that particular time. This deep level of self-understanding appears in his relationships with people, especially friends and family. He mentioned that upon first meeting, people do not realize that he is profoundly hearing impaired

and has a cochlear implant; when the realization manifests, most people will try their best to accommodate Arthur and his needs.

Moving to a different house, city, state or country

The first question for this section was “Have you ever moved to a different house, city, state or country?” Gawain responded with “Yes, I moved to South Carolina which was a big move for me, and then from Columbus to Cleveland.” Arthur said “Yes multiple times, I moved from Memphis, TN to Cleveland, OH during high school, moved again to Michigan for college, moved to Lexington, KY for my parents, I went to Denver, CO for two summer internships, I moved to Washington, D.C. for two months for a job before I ended up here in Texas.”

The second open-ended question for this section was “What was/were your moving experience(s) like?” Gawain responded that the move was “Much more sight and sound oriented; so much light and open space once you get to the beach you hear the crashing waves and the crunch of the sand; definitely eye-opening, definitely a different environment.”

At this time a follow-up clarification question was posed to Gawain, which was “Was it hard?” Gawain responded “getting used to the accents the first couple of weeks, you really had to look at the person for visual clues when you hear a new phrase to see if you might be taking it a different way than they intended.”

Arthur’s response to the open-ended question of “What was/were your moving experience(s) like?” was:

“My first move from Memphis to Cleveland, that was a tough one. At the same time it was a nice move to have, because back in Memphis I was in a private school so I was

around some really good kids, who were very nice then I got sent to Westlake, OH and a public school which was a drastically different environment with some good kids, some bad kids, some mediocre kids, uh, but what made me less challenging was that I joined a swim team during the summer and most of the kids on that swim team went to the same school that I was going to, so by the time school started I already knew some people at the school, so it made it less challenging. Once that move happened, I knew what to expect when I moved to a new location.”

The next question pertaining to moving places that was posed to the participants was “On a scale of 1-10 (1 being extremely difficult and 10 being extremely easy) how do/did you handle moving? Please explain.” Gawain and Arthur both rated themselves at a 9 on the scale. Gawain cited his reasoning as “I think if I’d moved abroad instead it would have been much more sensory overload, almost like when someone goes on vacation to another country the first couple of days because you’re maybe a little sleep deprived and seeing all of these new sights and smelling all of these new smells that you might not have otherwise encountered.” Arthur said the only thing about moving that he has a problem with is “Patience with the cable companies and the energy companies setting up my account and telling them my address. And the actual moving itself, the actual process. I’m okay with moves.”

Moving to a new place is a daunting prospect to many individuals; leaving home, friends, family and familiarity and trading that security for the unknown tends to cause anxiety in most humans. However, both Gawain and Arthur have experienced moving, to different jobs, states, and cities, and have found that they adjust quite well to the experience. Both individuals admit that the first move was the most difficult, but that picking up and moving around became easier with time and practice. Arthur mentioned that the most difficult thing about moving is

convincing the cable company to change the billing address, which sounds funny but when one considers all of the factors involved in moving, that is a small part of the puzzle. Gawain appears to enjoy the thrill of going somewhere new, meeting new people, and adjusting into new places. He mentioned that going with the flow serves him well, because change will happen whether or not one is prepared for it; all one can do is adjust.

Self-Evaluation: Adaptability

Gawain

The following questions were posed concerning self-evaluation of adaptability: “On a scale of 1-10, how adaptable would you say you are? In terms of moving to a different place, switching jobs, meeting new people, doing things, and trying new things. Can you explain your above rating?” Gawain’s response:

“Probably an 8? I mean where I teach now when I meet people from the country or the suburbs they always say ‘Oh my God how can you teach in the inner city schools,’ and I get all of these offhand comments like ‘Are you the only white person?’ or ‘Do you feel safe?’ and I think for a lot of people they couldn’t adapt to a situation where they are a minority so that’s why I think I’d be a little closer to an 8, and just being able to put yourself out there and not be afraid of acting the fool. So last year during the talent show I did a dance with some of the other teachers and I suck at dancing, I am horrible! And there’s videos of it, but whatever I can have fun. Some folks are very reserved whether because of how they were raised or the company they’re in they might act very different around different people. So I think overall I’m pretty adaptable. As a teacher I have to be adaptable for my students so they can understand material.”

Arthur

When posed the question “On a scale of 1-10, how adaptable would you say you are? In terms of moving to a different place, switching jobs, meeting new people, doing things, and trying new things. Can you explain your above rating?” Arthur responded with:

“I would say 8 or 9. I mean, again, I’ve moved around a lot, I’ve been able to adjust every move, I don’t get homesick. When I move to a new location I’m there for a reason and I focus on that reason instead of dwelling on the past, um, I mean I do change my daily routines, I can change in an instant but there are many things I can adapt to. I mean, I was working in an academic environment for 4 years and all of a sudden I got a job in a corporate environment and I had to adjust immediately. And the job I have now, when I first joined they told me that it would take up to 6 to 6 months to over a year to fully acclimate myself to the job and I did it in 4 months, so.”

Both Gawain and Arthur considered themselves very adaptable individuals, landing around an 8 or a 9 on the scale discussed. Gawain, as a teacher, said that he has to be adaptable in order to do his job well, and he takes that seriously. Adapting to fit the needs of his students bodes well not only for the job but for his personal life; getting transferred to a new school or moving to a new city allows the same adaptability to be applied to other aspects of his life. Earlier when discussing how Arthur lives with his hearing loss and cochlear implant, he mentioned how he will adjust to whatever the situation and environment calls for; adaptability is a facet of this same sense of self-awareness, and Arthur takes things in stride to keep going and reach his overall goal.

Self-Evaluation: Resiliency

Gawain

When posed the question “On a scale of 1-10, how resilient would you say you are? Can you please explain your above rating?” Gawain answered:

“8. I’d say I’m fairly resilient, our generation we kind of got the short hand of the stick with jobs and college being expensive and what not, but a lot of people lament about that and complain, boo hoo hoo, well that’s just the way life is right now and it sucks but you just got to work with it. Definitely have to roll with the punches, we’re on our 3rd and 4th new head principal in the 3 years I’ve taught at this school so I’m not a fan of them but I’m not trying to work against their agenda they’re trying to push so you just got to roll with the punches sometimes versus digging your heels in the ground hoping change will never happen, when change will always happen.”

Arthur

When posed the question “On a scale of 1-10, how resilient would you say you are? Can you please explain your above rating?” Arthur responded with

“I would say 7 or 8 for that. I would say 8 actually. Why? The reason I say a 7 is ‘cause I’m a fairly methodical person and I rarely change, I only change my methods when I know that change will work. People will think I’m stubborn, but I’m just set in my own ways and if people can convince me that this new way will work then I’ll change. I just have a dogged determination.”

Both Gawain and Arthur gave themselves high scores for resiliency, with Gawain citing his ability to endure in the midst of supervisory turmoil and Arthur his methodical thinking

methods. Gawain has the ability to assess the situation and figure out what he has to do in order to succeed and endure in that particular situation, for example, consistently having new principals come into play. Arthur is methodical to the point where he will not change his methods or way of thinking unless someone can prove that their way is better. His dogged determination makes him resilient to endure regardless of any outside events that may interfere with his work or goals. By keeping their goals in sight and the end result in mind, these individuals are resilient in the midst of change.

Sensory Abilities and Life Outlook

The first open-ended question for this section was “Do you feel as though your sensory abilities change your outlook on life?” Gawain said:

“Yes. I really like hiking. Especially living up here there’s a lot of good hiking around between Cuyahoga and Summit County. So when I go hiking I really like seeing the different animals, hearing the different sounds I mean I saw a bald eagle last weekend, so things like that I get really excited about but other people might be going up to buckeyes on the ground and picking up leaves going on touch and I’m all about the sight and sounds. When you’re a little kid you learn a lot from touch and taste versus when you’re an adult where you’re more sight and sound I think.”

When posed the same question, Arthur responded with

“Yes. It all came down to my development early in my childhood because of course I had trouble hearing so I didn’t have any really strong social skills so I wouldn’t say they were nonexistent, they just weren’t very strong so I didn’t have a good group of friends, I wasn’t one of those kids who played soccer every day and hanged out with a bunch of

kids I was more of a, half of the time I was hanging out with other kids, and half of the time I was by myself and I would spend that time daydreaming, thinking about stuff, so since I had that time to myself I've developed a very analytical mindset and that's what's developed my attitude for today, so, so that's one of the best traits I have today is that I have an analytical mindset so that when people see chaos and conflicts in situations I see patterns and reasons like simple reasons behind the events that are happening. So that's how my hearing disabilities have impacted my personality.”

At this point, a clarification question was posed to Arthur, which was “So because, explain that to me because of your hearing abilities or disabilities you had to alter how you interacted with the world? Or you had to adjust?” Arthur replied

“So I still have trouble communicating with other people because of my disability, I have a very strong social life. Yes I hung out with kids, but not as often as you would expect from a regular child so throughout my childhood I spent a lot of time by myself. So I mean, back when I was a child most of the time I was by myself because I mean I had trouble communicating so other kids didn't want to hang out with me so as I was growing up I got used to being by myself so nowadays I'm comfortable being by myself once in a while.”

Gawain cited his love of nature, the sights and sounds of trails and forests as impactful on his life outlook. Arthur cited the experiences he had growing up with the cochlear implant as effective and molding to the person he is today. By spending time alone as a child that was not always by choice, it seems as though, through his comments, Arthur came to be very independent and developed a deep sense of self-understanding that he could always rely on.

Arthur was able to socialize and interact with people, but is fine being alone from time to time. Being able to work alone as well as on a team is an important skill, and Arthur seems to have mastered it.

Anxiety

Gawain

The first open-ended question for this group was “When experiencing new things (moving, changing jobs, meeting new people) do you experience anxiety? If yes, please explain the degree of anxiety you feel.” Gawain said with a laugh that he becomes anxious “If there’s not vegetarian food options! I think that would be a big one. I’m not at all ‘I’m freaking about the world what’s going on what’s the point of living’ but everyone gets a little anxious sometimes it’s all in how you handle it I think.”

The next open-ended question in this series was “How do you manage your anxiety?” Gawain talked about being in nature, saying “Hiking. I get anxious when I can’t get outside, I do know that. if I can’t get outside even for a little bit just to walk down the street or something I get a little anxious if I’m cooped up inside all day so when I have to stay at school all day I’ll definitely take a walk to the corner store to buy a pop or something. And reading. I have a stack of books over here that I have to finish up.”

Arthur

The first open-ended question for this group was “When experiencing new things (moving, changing jobs, meeting new people) do you experience anxiety? If yes, please explain the degree of anxiety you feel.” Arthur’s response was “When I’m moving/changing jobs, no not

really. When I get introduced to new people I get nervous a little bit but that's mostly me just being an introvert, I'll get over it."

When asked the next question, "How do you manage your anxiety?" Arthur said "When I have to meet new people I talk to myself, I tell myself nothing bad is going to happen just go and introduce yourself."

It appears as though both individuals experience normal levels of anxiety that any and all humans have from time to time. The most important thing is that both individuals understand what makes them anxious, and better yet how to combat the anxiety or deal with it so that the anxiety does not cripple their day or goal.

Compensating for Sensory Abilities

This section is headed by the open-ended question "Do you feel as though you have to over/undercompensate for any sensory abilities you may or may not have?" Gawain's response was "No, I don't think so. If I definitely start feeling self-conscious that I'm losing my hair then I'll be all like Mr. Bulky 'The Rock' style so I think that would be the only thing- That's what I notice about guys my age when they start losing their hair they either A start dressing really differently, B, get really cocky or C they bulk up. So I'd probably bulk up." Arthur's response was that being profoundly deaf with a CI "It actually balances out. I definitely have to put more effort into listening to people because I have a disability but on the other hand there are less distractions like if I take my implant off I can't hear people obviously so that takes away many distractions for example I sleep well at night and then when I'm swimming at meets I don't have my implant on so I don't have any distractions I can focus on my own swimming. There are advantages and disadvantages so it really balances out."

Psychological Flexibility

The question for this section was posed as follows: “Do you consider yourself a flexible individual? On a scale of 1-10, how would you rate your flexibility? In this case, flexibility is defined as ‘to recognize and adapt to various situational demands; shift mindsets or behavioral repertoires when these strategies compromise personal or social functioning; maintain balance among important life domains; and be aware, open, and committed to behaviors that are congruent with deeply held values,’ (Kashdan & Rottenberg, 2010).” Gawain responded:

“5. Fairly flexible, but one of the parts of that question was ‘a balancing act of life’s opportunities’ kind of thing and you have to be flexible to balance out because you might have days that you’re stuck doing something you don’t really want to per se, but it makes it easier in the long run. So I stay after school on Thursday to get my lesson plans done and I don’t have to worry about lesson plans all weekend ‘cause they’re done already.”

When posed the above question, Arthur responded:

“I’ll give myself an 8. So when you mentioned flexibility being able to accommodate emotional changes, um, I mean everyone goes through emotional changes, everyone’s mad, happy, sad, frustrated, I mean I deal with that every day but I’m able to control my emotions, be flexible to my emotions, have them drive the energy behind doing something and making it constructive instead of destructive or hindering.”

Gawain gave himself a 5 on the scale of 1 to 10 when questioned about being psychologically flexible; he referenced the part of “balancing life’s activities” in the definition given, and admitted that he could do better in balancing the items in his life. He is aware of the balancing that must be done, hence his example of staying late on Thursday so that he can relax

during the weekend. Arthur gave himself an 8, which was 3 points higher than Gawain's self-rating. Arthur considers his emotional awareness and control integral to this rating, understanding where emotions come from and how to manage them in order to fuel the pursuit of a goal instead of allowing the emotions to negatively affect his life. It appears as though this high rating of psychological flexibility is another manifestation of Arthur's heightened self-awareness and how he must adapt to succeed.

Questions specific to a Cochlear Implant candidate

These questions were posed only to Arthur, as he has a unilateral CI. The questions were moot for Gawain because he possesses normal hearing.

The first open-ended question posed to Arthur in this section was "Do you feel as though you are at an advantage or a disadvantage as far as your implant goes? Please explain why you chose the answer you did for this question." Arthur's responses were:

"I am advantaged. So, when people realize that I'm a deaf person they're like 'oh he's probably not a very smart person' and they start developing low expectations for me so that gives me the ability, the greater ability to exceed expectations and uh make a good impression on them. Basically my hearing ability lowers people's expectations for me which makes it easier for me to exceed their expectations."

From this comment, one may infer that in general, when people meet a deaf person, the automatic thought is that they are limited or challenged in some way. Arthur mentioned that people assume that because he has a CI and is deaf, he must not be as smart as the average person, and therefore lower their expectations. Humans sometimes assume that "different" means "bad" or "less than", and it is evident in the situations where people underestimate Arthur

based on his CI. Arthur worked hard through college, majoring in economics and double minoring in mathematics and political science, all while captaining the swim team. Arthur considers himself highly capable of achieving whatever goal or completing whatever task is set in front of him. Whether or not that determination is a result of growing up with a CI and learning to be independent quickly, Arthur is no stranger to hard work and success.

The next question posed to Arthur concerning his CI and communication abilities was “Do you rely more on body language than what is said by the person? How does that affect you adjusting to new places and people?”

“It gives me the ability to trust people well, so when I’m at a new place or a new job I can use that skill to know who’s a good person to talk to if you need help with something, because for example you can go to this person for help because he gave me a good body language feel, or avoid that person because she didn’t give off very good body language and didn’t want to be helpful, so. That’s one advantage. In most cases when people say one thing but mean another it’s easier for me to figure out what they’re really trying to say, yes.”

Sometimes people may leave a conversation wondering if they missed something through the course of the interaction. People may say things they don’t mean, and mean things they don’t say. It’s a frustrating game to play, wondering if someone is being truthful or not, and if they are, whether they are being entirely truthful. When a relationship is still new it is difficult to pinpoint whether or not a person is being truthful. By relying on nonverbal cues and body language, Arthur might have an advantage over hearing-oriented people in understanding people’s true motives the first time around.

The third open-ended question posed to Arthur was “How do subliminal messages affect you? How do you do sarcasm? How well does it go when someone else is using sarcasm? Like let’s say someone you don’t know very well is being sarcastic how does that go as far as you understanding the sarcasm and not taking it seriously?”

“Um, I mean the people that I know well, I do a fairly good job of knowing whether or not they’re being sarcastic or not but new people, ones I don’t know I struggle with that. Because I don’t have a good profile of them, because the people I know I have a good profile of them and I know when they’re serious and when they’re not but new people I don’t have a lot of information on them so I don’t know what kind of person they are, therefore limiting my ability to understand whether they’re being sarcastic or not. I take everything they say with a grain of salt.”

The next question posed was “Do you regret lip reading instead of learning and use American Sign Language to communicate?” Arthur said:

“No. Because if I was taught sign language before learning to read lips I would have become very reliant on sign language and it would have limited my ability to interact with normal hearing people. Because the thing I’ve noticed because I’ve interacted with a lot of impaired people and I notice the ones who were taught sign language before they were taught oral communications are more reliant on sign language and it’s different the other way around, people who talk using oral communication first do better with communicating with people with normal hearing.”

Closing Questions

The first open-ended question posed for this section was “Is there anything I did not ask you about that you would like to add? Do you have any other thoughts or feelings you would like to share?” Gawain responded with “No. This is my first real interview for this sort of thing, though!”

Arthur’s answer was of more length;

“Basically my entire life I have been challenged; so every challenge I come across that’s a norm for me because I mean my parents would answer this question better but I mean when I was at the Memphis Oral School for the Deaf I was challenged every day it was one of those things where school was tough every single day I would go to school uh, do lessons, do speech therapy all day then I would come back home and I collapsed on the couch for the rest of the afternoon, that’s how exhausting it was. I wasn’t used to that grinding series of constant challenges so it was the norm for me and it became a habit for me, I knew that any and every challenge could be overcome so every time I see a challenge these days I say ‘okay let’s see how I can beat this challenge’ instead of ‘oh my God I don’t know if I can do this’ I mean I overcame challenges every day so all of the new challenges I come across its nothing new. So it really all comes down to the training I went through at school, it was very challenging because when I got my cochlear implant it was almost unheard of for a kid like me to be able to communicate effectively through oral communications, um, so I basically um beat the impossible, I was able to start communicating effectively.”

“My mother would hate me if I did not say this but uh I got my cochlear implant when I was 3 years old back in 1995 and at the time the cochlear implant had just passed FDA trials to be implanted in little kids. I have, the internal device is the N-22. By the time I was 3 years old my parents knew I was deaf and the doctors were telling them ‘oh your son’s got to learn sign language he’s got to live with the hearing impaired community’ and my parents were like ‘no I’m not willing to accept that,’ so they took the risk and a bunch of parents in our neighborhood thought my parents were crazy that they were having their child implanted with this device that had just passed the FDA trials, it was something brand new so they thought my parents were crazy for having me do it but in the end look where I am now. It was all worth it in the end. Throughout my life I’ve been beating the impossible, so.”

The interview was ended with “Do you have any questions for me the interviewer?” Both Gawain and Arthur said they did not have questions.

Arthur, the individual with a cochlear implant, stated that as a child, he was shunned by other children because of his hearing loss, subsequent cochlear implant and the resulting communication difficulties. However, he did not let that stop him; he spent a lot of time alone, but used that solitude to develop an analytical mind that was honed to solving problems and being assertive, instead of passively avoiding conflicts and other people. He does not see his deafness and cochlear implant as a weakness to be exploited; he will tell anyone who asks him that he is “advantaged” instead of disadvantaged, and he does not regret the decisions he and his family made concerning his hearing loss up to this point. Arthur can pick up and move from place to place with little to no warning; having moved to Washington, D.C. after graduating from college, two months later picked up everything and moved to Houston, TX. Gawain has also

moved a lot in his life, as well as changed jobs frequently. He has to adapt to many situations in a short time frame, and stay flexible in midst of fast-paced changes.

Besides the test scores, these two individuals, despite their differences in hearing abilities, seem to have developed well and both have high amounts of psychological flexibility, adaptability, resiliency, and good strategies for managing negative thoughts. Whether or not these traits are due to their overall development and not their hearing abilities was not fully understood in the course of this study.

Limitations

One limitation to this study is that by only observing two cases, the data cannot truly be generalized to the population at large due to the limited sample size. However, through qualitative case study explorations, improved quantitative surveys can be created and thus a larger scale research project can emerge. The interview process was only semi-structured not fully structured, and there was personal bias of the researcher present. However, as a therapist, having deep personal knowledge of the client(s) helps the client even more because there is a personal connection and it helps therapists treat the whole person and not just the pathology present.

Future Research

In the future, this study would benefit from being run with an increased number of participants, perhaps with 5-10 participants who have cochlear implant(s) and the same number of participants with normal hearing abilities. This study could also be done with individuals comprising a wide age range, observing the young as well as middle-aged and elderly individuals and observe how opinions and thoughts change with the aging process. A factor that would be

interesting to research further would be to observe the people comprising the support systems of the individuals in question, and how those experiences influence the thoughts and feelings of the participants.

Conclusion

This study would be best labeled as a pilot study that was attempting to find a links, differences, and similarities between being profoundly deaf with a cochlear implant and the traits of adaptability, resiliency and psychological flexibility existed when compared to those same traits in an individual with normal hearing ranges. This study is considered level three research, where the research only included two individuals and did not use a comparison group. The overall goal of the study was to identify variables that would be worthy of further study in the future, with a better research design in place.

According to the test scores, both individuals scored well, but the individual with normal hearing ranges had slightly higher scores than the individual with the cochlear implant. As for the semi-structured interview, both participants seemed equally matched in the categories of adaptability, resiliency and psychological flexibility, as well as similar life experiences.

Through the course of the semi-structured interview, it appears that the individual with the profound hearing loss and cochlear implant had a deep sense of self-understanding and adaptability due to his introspective knowledge of his strengths and weaknesses. By understanding his limitations and how to work them into strengths, Arthur proves to be self-aware to the point of facilitating his own successes. Gawain is self-aware as well, but it appears that through the course of the interview he could have a higher level of psychological flexibility, for his score was lower than Arthur's in that category. As for the self-evaluations of resiliency,

and adaptability both individuals scored very closely together, and had normal ranges of anxiety consistent with the average anxiety-inducing situations that humans experience.

The goal of this study was to begin research into the psychological effects of deafness and being hard of hearing. Much research has been done into the biological causes and treatments of hearing issues, but not much research exists concerning the psychological development and well-being of those same clients. By beginning this research with questions posed to a profoundly deaf individual that uses a cochlear implant, we have a good idea of that individual's thoughts and feelings as well as how his life has been affected by the cochlear implant. We know that cochlear implants and augmentative hearing devices change people's lives; the question is, how exactly are they changing them and how can we continue to improve them?

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Appendix A

A copy of the Acceptance and Action Questionnaire (AAQ-2) as presented to the participants:

AAQ-2

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1. Its OK if I remember something unpleasant.	1	2	3	4	5	6	7
2. My painful experiences and memories make it difficult for me to live a life that I would value.	1	2	3	4	5	6	7
3. I'm afraid of my feelings.	1	2	3	4	5	6	7
4. I worry about not being able to control my worries and feelings.	1	2	3	4	5	6	7
5. My painful memories prevent me from having a fulfilling life.	1	2	3	4	5	6	7
6. I am in control of my life.	1	2	3	4	5	6	7
7. Emotions cause problems in my life.	1	2	3	4	5	6	7
8. It seems like most people are handling their lives better than I am.	1	2	3	4	5	6	7
9. Worries get in the way of my success.	1	2	3	4	5	6	7
10. My thoughts and feelings do not get in the way of how I want to live my life.	1	2	3	4	5	6	7

How the AAQ-2 is scored: reverse scoring is taken into account for the marked questions.

AAQ-II SCORING

**HIGHER SCORES INDICATE GREATER PSYCHOLOGICAL FLEXIBILITY.
ITEMS WITH AN 'R' NEXT TO THEM ARE REVERSED FOR SCORING PURPOSES.**

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1. Its OK if I remember something unpleasant.	1	2	3	4	5	6	7
2. My painful experiences and memories make it difficult for me to live a life that I would value. R	1	2	3	4	5	6	7
3. I'm afraid of my feelings. R	1	2	3	4	5	6	7
4. I worry about not being able to control my worries and feelings. R	1	2	3	4	5	6	7
5. My painful memories prevent me from having a fulfilling life. R	1	2	3	4	5	6	7
6. I am in control of my life.	1	2	3	4	5	6	7
7. Emotions cause problems in my life. R	1	2	3	4	5	6	7
8. It seems like most people are handling their lives better than I am. R	1	2	3	4	5	6	7
9. Worries get in the way of my success. R	1	2	3	4	5	6	7
10. My thoughts and feelings do not get in the way of how I want to live my life.	1	2	3	4	5	6	7

Appendix B

Arthur, with a unilateral left side CI, scored the following on the AAQ-2:

AAQ-2

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1. Its OK if I remember something unpleasant.	1	2	3	4	5	6	7
2. My painful experiences and memories make it difficult for me to live a life that I would value.	1	2	3	4	5	6	7
3. I'm afraid of my feelings.	1	2	3	4	5	6	7
4. I worry about not being able to control my worries and feelings.	1	2	3	4	5	6	7
5. My painful memories prevent me from having a fulfilling life.	1	2	3	4	5	6	7
6. I am in control of my life.	1	2	3	4	5	6	7
7. Emotions cause problems in my life.	1	2	3	4	5	6	7
8. It seems like most people are handling their lives better than I am.	1	2	3	4	5	6	7
9. Worries get in the way of my success.	1	2	3	4	5	6	7
10. My thoughts and feelings do not get in the way of how I want to live my life.	1	2	3	4	5	6	7

Gawain, with normal hearing ranges, scored the following on the AAQ-2:

AAQ-2

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1. Its OK if I remember something unpleasant.	1	2	3	4	5	6	7
2. My painful experiences and memories make it difficult for me to live a life that I would value.	1	2	3	4	5	6	7
3. I'm afraid of my feelings.	1	2	3	4	5	6	7
4. I worry about not being able to control my worries and feelings.	1	2	3	4	5	6	7
5. My painful memories prevent me from having a fulfilling life.	1	2	3	4	5	6	7
6. I am in control of my life.	1	2	3	4	5	6	7
7. Emotions cause problems in my life.	1	2	3	4	5	6	7
8. It seems like most people are handling their lives better than I am.	1	2	3	4	5	6	7
9. Worries get in the way of my success.	1	2	3	4	5	6	7
10. My thoughts and feelings do not get in the way of how I want to live my life.	1	2	3	4	5	6	7

Appendix C

A copy of the Thought Control Questionnaire (TCQ) as presented to the participants:

Thought Control Questionnaire (TCQ)

Most people experience unpleasant and/or unwanted thoughts (in verbal and/or picture form) which can be difficult to control. We are interested in the techniques that you *generally* use to control such thoughts. Below are a number of things that people do to control these thoughts. Please read each statement carefully, and indicate how often you use each technique by *circling* the appropriate number. There are no right or wrong answers. Do not spend too much time thinking about each one.

When I experience an unpleasant/unwanted thought:

		Never	Sometimes	Often	Almost always
1	I call to mind positive images instead	1	2	3	4
2	I tell myself to not be so stupid	1	2	3	4
3	I focus on the thought	1	2	3	4
4	I replace the thought with a more trivial bad thought	1	2	3	4
5	I don't talk about the thought to anyone	1	2	3	4
6	I punish myself for thinking the thought	1	2	3	4
7	I dwell on other worries	1	2	3	4
8	I keep the thought to myself	1	2	3	4
9	I occupy myself with work instead	1	2	3	4
10	I challenge the thought's validity	1	2	3	4
11	I get angry at myself for having the thought	1	2	3	4
12	I avoid discussing the thought	1	2	3	4
13	I shout at myself for having the thought	1	2	3	4
14	I analyse the thought rationally	1	2	3	4
15	I slap or pinch myself to stop the thought	1	2	3	4
16	I think pleasant thoughts instead	1	2	3	4
17	I find out how my friends deal with these thoughts	1	2	3	4
18	I worry about more minor things instead	1	2	3	4
19	I do something that I enjoy	1	2	3	4
20	I try to reinterpret the thought	1	2	3	4
21	I think about something else	1	2	3	4
22	I think about the more minor problems I have	1	2	3	4
23	I try a different way of thinking about it	1	2	3	4
24	I think about past worries instead	1	2	3	4

25	I ask my friends if they have similar thoughts	1	2	3	4
26	I focus on different negative thoughts	1	2	3	4
27	I question the reasons for having the thought	1	2	3	4
28	I tell myself that something bad will happen if I think the thought	1	2	3	4
29	I talk to a friend about the thought	1	2	3	4
30	I keep myself busy	1	2	3	4

Scoring the TCQ results is as follows:

The scores for the five strategy categories (distraction, social control, worry, punishment and re-appraisal) are totaled per category. There are three questions that employ reverse scoring, which are questions 5, 8 and 12. A total TCQ score is found by adding the individual category scores together.

The five strategy categories and their corresponding question numbers are as follows:

1. Distraction (questions 1, 9, 16, 19, 21, 30)
2. Social Control (questions **5, 8, 12**, 17, 25, 29)
3. Worry (questions 4, 7, 18, 22, 24, 26)
4. Punishment (questions 2, 6, 11, 13, 15, 28)
5. Re-appraisal (questions 3, 10, 14, 20, 23, 27)

Appendix D

Arthur, with a unilateral left side CI, scored the following on the TCQ:

		Never	Sometimes	Often	Almost always
1	I call to mind positive images instead	1	2	3	4
2	I tell myself to not be so stupid	1	2	3	4
3	I focus on the thought	1	2	3	4
4	I replace the thought with a more trivial bad thought	1	2	3	4
5	I don't talk about the thought to anyone	1	2	3	4
6	I punish myself for thinking the thought	1	2	3	4
7	I dwell on other worries	1	2	3	4
8	I keep the thought to myself	1	2	3	4
9	I occupy myself with work instead	1	2	3	4
10	I challenge the thought's validity	1	2	3	4
11	I get angry at myself for having the thought	1	2	3	4
12	I avoid discussing the thought	1	2	3	4
13	I shout at myself for having the thought	1	2	3	4
14	I analyse the thought rationally	1	2	3	4
15	I slap or pinch myself to stop the thought	1	2	3	4
16	I think pleasant thoughts instead	1	2	3	4
17	I find out how my friends deal with these thoughts	1	2	3	4
18	I worry about more minor things instead	1	2	3	4
19	I do something that I enjoy	1	2	3	4
20	I try to reinterpret the thought	1	2	3	4
21	I think about something else	1	2	3	4
22	I think about the more minor problems I have	1	2	3	4
23	I try a different way of thinking about it	1	2	3	4
24	I think about past worries instead	1	2	3	4
25	I ask my friends if they have similar thoughts	1	2	3	4
26	I focus on different negative thoughts	1	2	3	4
27	I question the reasons for having the thought	1	2	3	4
28	I tell myself that something bad will happen if I think the thought	1	2	3	4
29	I talk to a friend about the thought	1	2	3	4
30	I keep myself busy	1	2	3	4

Arthur's categorical scores are as follows:

1. Distraction (questions 1, 9, 16, 19, 21, 30)

a. 14

2. Social Control (questions **5, 8, 12**, 17, 25, 29)
 - a. 8
3. Worry (questions 4, 7, 18, 22, 24, 26)
 - a. 10
4. Punishment (questions 2, 6, 11, 13, 15, 28)
 - a. 8
5. Re-appraisal (questions 3, 10, 14, 20, 23, 27)
 - a. 16

Arthur's total score for the TCQ was 56.

Gawain, with normal hearing ranges, scored the following on the TCQ:

		Never	Sometimes	Often	Almost always
1	I call to mind positive images instead	1	2	3	4
2	I tell myself to not be so stupid	1	2	3	4
3	I focus on the thought	1	2	3	4
4	I replace the thought with a more trivial bad thought	1	2	3	4
5	I don't talk about the thought to anyone	1	2	3	4
6	I punish myself for thinking the thought	1	2	3	4
7	I dwell on other worries	1	2	3	4
8	I keep the thought to myself	1	2	3	4
9	I occupy myself with work instead	1	2	3	4
10	I challenge the thought's validity	1	2	3	4
11	I get angry at myself for having the thought	1	2	3	4
12	I avoid discussing the thought	1	2	3	4
13	I shout at myself for having the thought	1	2	3	4
14	I analyse the thought rationally	1	2	3	4
15	I slap or pinch myself to stop the thought	1	2	3	4
16	I think pleasant thoughts instead	1	2	3	4
17	I find out how my friends deal with these thoughts	1	2	3	4
18	I worry about more minor things instead	1	2	3	4
19	I do something that I enjoy	1	2	3	4
20	I try to reinterpret the thought	1	2	3	4
21	I think about something else	1	2	3	4
22	I think about the more minor problems I have	1	2	3	4
23	I try a different way of thinking about it	1	2	3	4
24	I think about past worries instead	1	2	3	4
25	I ask my friends if they have similar thoughts	1	2	3	4
26	I focus on different negative thoughts	1	2	3	4
27	I question the reasons for having the thought	1	2	3	4
28	I tell myself that something bad will happen if I think the thought	1	2	3	4
29	I talk to a friend about the thought	1	2	3	4
30	I keep myself busy	1	2	3	4

Gawain's categorical scores are as follows:

1. Distraction (questions 1, 9, 16, 19, 21, 30)
 - a. 18
2. Social Control (questions 5, 8, 12, 17, 25, 29)

- a. 18
- 3. Worry (questions 4, 7, 18, 22, 24, 26)
 - a. 7
- 4. Punishment (questions 2, 6, 11, 13, 15, 28)
 - a. 6
- 5. Re-appraisal (questions 3, 10, 14, 20, 23, 27)
 - a. 11

Gawain's total score for the TCQ was 60.