

Michael Noyes

Dr. Tomblin

CPSP227

Cochlear Implants: Uniting Two Cultures or Pushing Them Apart?

Introduction

Imagine if your entire life was put on mute. You can see lips moving, things happening; knowing there's a sound, but you cannot hear it. Everything would be different. You wouldn't be able to understand others, it would be hard to communicate, you would miss out on conversation, you would miss out on listening to music, you would miss out on anything that makes a sound, and in the world we live in, most everything revolves around sound and being able to hear and interpret those sounds.

Such is the life of a deaf person, and as a result, there is a large rift between the deaf and the hearing since the two cultures are so different. However, just because the Deaf are not able to hear does not mean that they see it as a disability. There are two major classifications of deaf people: the deaf, spelled with a lowercase "d", and the Deaf, spelled with an uppercase "D". The difference between these two groups is monumental and deals with how they identify themselves in accordance with their deafness.

People who are deaf (little d) see themselves as physically unable to hear, or hard of hearing. The deaf consider this a disability and wish to be part of the hearing world. In the same logic, it follows that the deaf communicate orally and sparsely use sign language. Also, they are not invested in the Deaf community, consequently not associating at all with it.

In contrast, the Deaf (Big D) do not see themselves as disabled because of their deafness. They see being deaf as an opportunity to live life in a unique way. They embrace their deafness and are very involved within the Deaf community. The Deaf almost exclusively use sign language to communicate with each other, and mainly only associate themselves with other members of the Deaf community. Also, one does not need to be deaf to be Deaf. A hearing person that is close with the Deaf community, who communicates via sign language, can be considered Deaf as well. The Deaf are a proud, purist group and do not appreciate it when the hearing world makes attempts to try to “fix” their deafness or to assimilate them. There is no major difference in the interpretation of the CI between men and women in the Deaf community; they both share the views of the Deaf as a whole (Aronson, 2001).

The current issue that has been the source of controversy between the Deaf and the Hearing is in regards to the implementation of the Cochlear Implant (CI). The Cochlear Implant has been labeled as “the bionic ear” and has the appearance of a hearing aid, except there is a magnet attached to the external device as well. The magnet acts as mechanism to align the removable exterior component of the CI with the permanent interior component. The CI receives sound via the microphone (exterior), and then the receiver (interior) converts the sound to electrical impulses that are sent across the cochlea, through the auditory nerve, to the brain for interpretation. Implant surgery removes the Hair Cells in the cochlea, which facilitate our normal hearing, in favor of 24 electrodes that wrap around the cochlea, meaning that all natural hearing is lost in the ear that the implant is in. The Cochlear Implant is unlike any hearing aid technology in its

field because of its tremendous success and because of its physiological permanence. However, those very things that distinguish the CI are what have led to the Deaf Community associating a stigma with it. Until the stigma that is linked with the cochlear implant is removed or dealt with by the Deaf community, they won't be able to progress as a culture. The ideals that the Deaf hold strong such as their distrusting nature of non-Deaf, and opposition to hearing technology may cause them to be left behind in a world that is moving towards the future every day.

Methodology

The path that the Cochlear Implant has taken in regards to its polarizing nature can be outlined using the STS framework "Social Construction of Science and Technology". The social construction framework emphasizes the fact that the meaning of a technology is not defined by its capacity, but by the views that groups have towards that technology and how they interpret it (Pinch & Bijker, 2007). In this example, although the Cochlear Implant is a technology that has the capability to restore hearing to a certain degree, which was its intention when developed, different groups have interpreted the CI to signify different values and purposes. Social construction theory holds weight in the situation of the CI because if social factors were excluded from consideration, the Cochlear Implant would be maximizing its potential to help its target audience: the deaf. However, that is not the case here because of the social stigma the Deaf associate with the CI, thus reducing the amount of people that could be helped. As of 2007, there are approximately 120,000 individuals implanted with a CI, with the majority of those implants in children (ASL CI Users, 2008). This number could be higher if the CI were accepted across the Deaf Community.

One of the main aspects of Social Construction of Technology is the idea of Interpretive Flexibility, meaning that different social groups adopt different interpretations of a technology to fit their ideologies and their needs. The relevant social groups who are affected by the CI are the Deaf (in general), the deaf, Deaf children, Deaf teenagers, older Deaf (35+), the scientific community, and the Hearing World. Although all of these groups play an important role in the social construction of the Cochlear Implant, the primary focus is on the interaction between the Deaf and the Hearing.

Generally speaking, the Deaf have a negative view towards the Cochlear Implant, thus causing it to not be successful among this group. Since they hold the belief that it is harmful to their lifestyle and culture, they have no reason to want to adopt the Cochlear Implant and use an oralist technology. They much prefer to stick to their manual roots.

The deaf on the other hand are enthusiastic about the Cochlear Implant. To them, the Cochlear Implant is a step towards being a part of the Hearing World, subsequently taking advantage of what the Hearing World has to offer. The CI serves as a quasi cure for their disability and it follows that the deaf are heavily in favor of the technology.

Deaf children, mainly under the age of six years old, may not really have the ability to form a legitimate viewpoint towards the Cochlear Implant due to the fact that they are children, but they, as a group, have had a large impact on the CI since children stand to benefit the most from a Cochlear Implant. Implantation is most effective in children because, at the time of the operation, a child is still going through, or has not yet gone through their period of sensory development in which the brain is in a very plastic state, which allows for better integration of speech development with the CI technology.

When the brain is in a plastic state, neural pathway or synapses are formed whenever something is learned via the synapse. These neural pathways serve as a shortcut for the brain to be able to access what was learned during the forming of the synapse if that information needs to be accessed later on (Fagan & Pisoni, 2009). During the developmental stage of life, in infancy and early childhood, these synapses are formed at an incredibly high rate because children are constantly coming in contact with new experiences, new stimuli, plus new knowledge that they receive and learn to interpret via their senses. The child without the CI would go through this crucial developmental stage, without taking in the sensory information from their sense of hearing, thus missing out on processing a lot of information, including that of word formation, pronunciation, intonation, and other nuances of speech. With the CI, the child has the same developmental opportunities as a normal hearing child. Therefore, it would seem that it is a safe assumption that all deaf children should get an implant, but then the issue of who has the right to decide if the child will be deaf, or essentially hearing with a CI. Deaf children are also too young to make the choice on being deaf or Deaf, so it depends on the child's parents to bring them into Deaf culture or not.

Deaf teenagers are at this point in their lives immersed in the Deaf community, and hold the same ideologies as the Deaf, however, their age and the generation in which they have grown up in has influenced them in a way that older Deaf were not. The teenage Deaf have grown up in a technological age where everything they do is integrated with technology, and as a result they are less averse to trying new technologies such as the Cochlear Implant (Myers, 2011). In contrast to the technology-rich generation that teenage Deaf are a part of, Older Deaf were a part of the generation that

was trying to invent much of the technologies that are being improved upon today. As such, many of these inventions were not successful, just disappointing. Specifically focusing on hearing aid technologies, there was promise of success, yet when the public tested the products there was no success. Unfortunately, this proved to be a repetitive cycle in the 20th century when most hearing aid technologies were being developed and refined. Constant letdowns and false hope eventually led to a strong resistance towards most new hearing technologies (Myers, 2011). Also, the Older Deaf tend to have similar views as the Deaf community as a whole, so they associate the stigma with the CI.

The Scientific community and the Hearing World share similar views on the Cochlear Implant in that they see the technology as a great opportunity for deaf people to regain the function of a sense and be a part of the Hearing World. It is difficult on both sides to communicate with a deaf person, not just for the deaf person, but for the hearing person as well. A CI would make it easier to be able to educate the deaf, and integrate them into society more than they are currently. The Hearing World is not by any means trying to force this technology on the Deaf.

In order to demonstrate my argument that the Deaf are negatively impacting their own culture by opposing the CI, I will first describe who the CI is designed to benefit, and how the CI benefits them. Then I will focus on the period after implantation to show the linguistic results of the surgery, as well as psychological effects. Next I will contrast these results with the views of the Deaf to show how the CI is not a technology that was meant to hurt the Deaf, but to help.

History of the CI

The Cochlear Implant has its roots dating back to 1790, when Alessandro Volta discovered that by inserting metal rods into his ears, he could provide electrical stimulation to the auditory system could produce a sporadic hearing sensation, which, during his experiments, lacked tonal quality. Over the course of the next century, research and experiments were done in Paris and Amsterdam focusing on bioelectrical methods of curing deafness, none of which had any success. This lack of progress led to a bleak outlook for the future of a technology that could reproduce hearing, but in the 1900s, research shifted its focus away from bioelectrical methods due to its invasive nature, and shifted towards artificially reproducing hearing. It was through the work of Wever and Bray in 1930, and Gersuni and Volokhov in 1936 that it was discovered that the cochlea was the area in the auditory system that was being stimulated by these electrical impulses and producing sound. In 1961, Dr. William House began to make correlations between electrode placement in the cochlea and stimulation in the auditory nerves, a discovery that in combination with other research resulted in the development of House 3M Single Electrode implant, which was used for voluntary testing in the 1960s. This major breakthrough laid the groundwork for multichannel implants that were developed in the late 1960s and throughout the 1970s, and became the norm in the 1980s. Adam Kissiah Jr. officially patented the Cochlear Implant in 1973 and the first FDA approved Cochlear Implant came in 1981 (Brown). It was through these implantations of test patients and through more research and development that candidacy requirements were refined, the technology was refined to include speech processors, and by the late 1980s most safety concerns were resolved. Now in the present day, risks are continuing

to be minimized with better understanding of the procedure and better equipment, rate of successful implantations is being increased and acceptance is starting to spread.

Beneficiaries of the CI

Despite being marketed as the bionic ear and being known for restoring hearing, the Cochlear Implant does not work for all people who are deaf or hard of hearing. Candidacy requirements have been put in place to ensure that only people who have a high chance of success will be implanted, thus preventing unnecessary invasive surgery and loss of hearing. A person who is considered for the implant must not experience much benefit from the use of a hearing aid, and must have bilateral profound hearing loss, meaning that the person is deaf in both ears. Also the candidate must have a strong support system to encourage post-implant recovery and therapy to aid in the learning and auditory development, and also a support system that is in favor of the implant (Nussbaum, 1995). Those who would not meet the candidacy requirements would be someone who is missing the “eighth nerve”, which is the auditory nerve that is responsible for transmitting sound and equilibrium information from the inner ear to the brain and also those who do benefit from hearing aids. Also, if one does not meet the minimum age requirements, implantation is not an option. When the CI debuted in the 1980s, the minimum age of implantation was 18 years old, but as surgical risks have decreased, as technological improvements have been made, and success rates have risen the age has decreased (Brown). By 1990, the minimum age was 24 months old and as of 2007, the minimum age of implantation had dropped to 12 months old (Saunders). By

decreasing the minimum age to include children, the scope of the Cochlear Implant increased exponentially. As noted earlier, children benefit the most from Cochlear Implants due to the ongoing development of their brains. For the two of the three major Cochlear Implant companies: Advanced Bionics and Cochlear Corporation, children make up almost 50% of their implanted patients. For Advanced Bionics: out of 24,000 current implanted individuals, about 45% of them are children. For Cochlear Corporation: out of 91,000 current implanted individuals, about 47% of them are children. Over 50% of the children being implanted receive bilateral implants, i.e. implants in both ears (ASL CI Users, 2008).

In order to show whom exactly benefits from the Cochlear Implant and how they benefit, it is important to first note if that patient is pre-lingually deafened or post-lingually deafened. The difference between these two is that someone who is pre-lingually deafened became deaf before learning any language skills or linguistics, while someone who is post-lingually deafened lost their hearing after having learned linguistics and language. Those who are pre-lingually deafened generally have a more difficult time adjusting after receiving an implant because they are literally starting from scratch in that once they are receiving auditory input, they do not recognize it and it is hard for them to associate a sound with what it represents. A post-lingually deafened person will more quickly adapt to the Cochlear Implant because of their previous experience with auditory input and their familiarity with sounds. In both cases it is a difficult task to relearn how to hear. This does not apply as much for children however, because the most important thing that matters for children is their age of implantation. Research was done on children who were implanted before five years old vs. children who were implanted after

five years old and, although there were no differences in performance on closed-set tests of speech perception ability, on open-set word recognition tests the under five years old group significantly outperformed the above five years old group. It should be noted that both groups did much better on the tests than they did before implantation (Fryauf-Bertschy, H, Tyler, R.S., Kelsay, D.M.R., & Gantz, B.J., 1997). These findings show that different age ranges have different effects on the level of language development that occurs after implantation, but chiefly show how much children benefit from the implant. Before implantation, below 5% of profoundly deaf children can understand conversation, common phrases or properly use the telephone. Conversely, as Figure 1 shows, with each year that passes after receiving the implant, speech recognition greatly increases to above 60%.

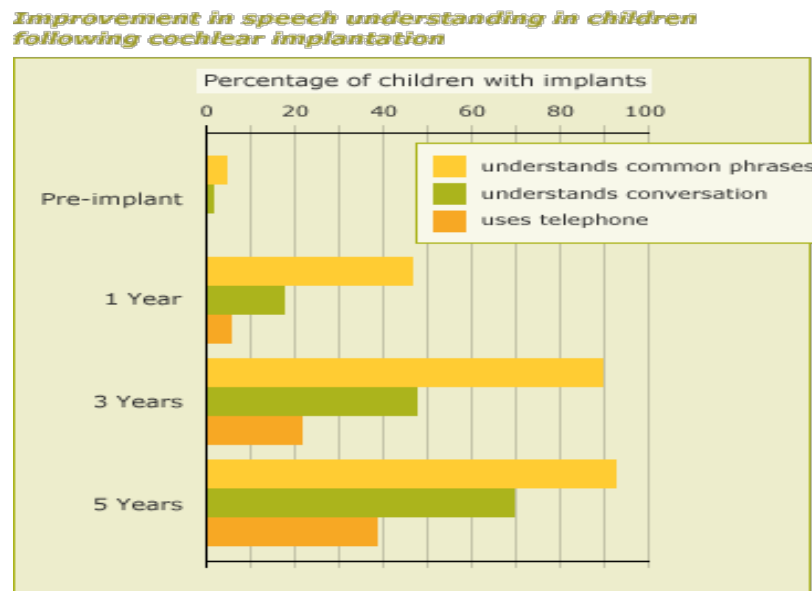


Figure 1, Source: ("Improvement in speech understanding in children following cochlear implantation")

Looking at the larger implications of deaf children receiving Cochlear Implants reveals an issue of children's rights. In America children have certain rights, such as they

cannot be forced to work and they must be educated, just to name a few. In these cases it is the Federal Government that has given these rights to children. From that arises the question of who gets to choose if a child gets a Cochlear Implant. As of now there is no Federal mandate that declares a profoundly deaf child should receive a CI. It is noted that almost without a doubt that if a child gets a CI, they will be able to have functional hearing, thus letting them be a full member of the hearing world in every way. By not getting the implant, it would be ensuring that they become a part of the Deaf world, given a Deaf upbringing. When asked about whether infants ought to be implanted or not, Dr. Bruce Gantz, Head of the University of Iowa's Otolaryngology (Medical focus on the ear, nose, and throat), responded saying that one of the major problems with growing up deaf is that Sign Language is the only language that is learned. The problem with this is that in only speaking a manual language, there exists no correlation between American Sign Language and reading. Unless sign English is used, which is the literal signing of English sentences using the same grammar and syntax, most deaf cannot reach a fourth grade reading level. A study at the University of Iowa on fifty-eight children, who have been implanted for five or more years and are above the age of nine, reveals that every implanted child has reached the fourth-grade reading level and most are reaching grade level equivalents in language (Gantz, 2000). So not only is it a matter of the children's right to decide to be Hearing or Deaf, this problem branches out to giving the child the capacity to be able to learn and be successful in the academic world as well.

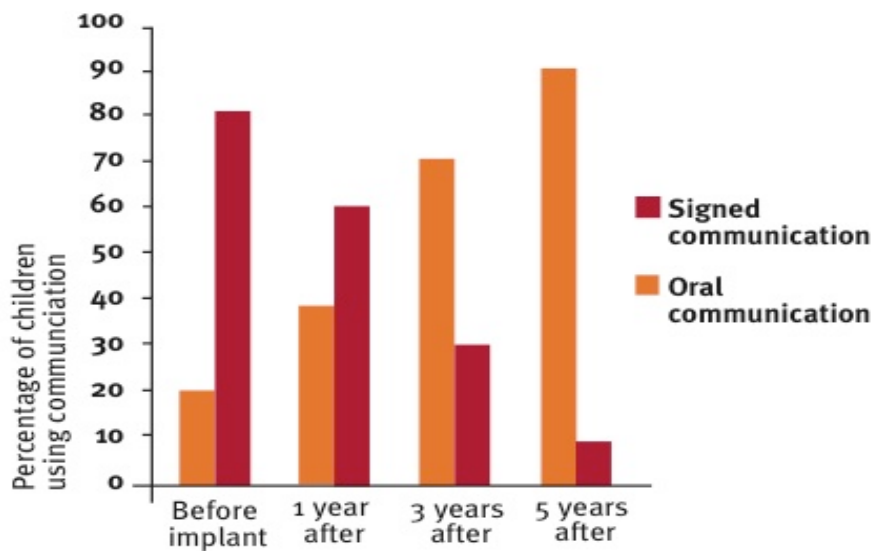
One last thing to look at when considering those who are implanted is how the patients fare socially and psychologically after implantation. Looking at children, if a child is implanted and put into a Hearing environment and schooling, they tend to do well

and fit in (Aronson, 2001). The same goes if other implanted children surround an implanted child in schooling, they all do well because of their similarity. However, if the implanted child is still being educated in the Deaf community surrounded by Deaf children, they tend to abandon using their CI and use Sign Language. This behavior is especially true at the college age. Shirley Myers, a professor at Gallaudet University; the university for the deaf, noted that students who have CIs often take them off while they are attending Gallaudet because wearing them does not fit in with the culture. Though once they leave Gallaudet and enter the real world, they put the CI back on since the societal pressure is no longer there. For adults, it can be a tough decision to get a Cochlear Implant, especially if you are a part of the Deaf community because of the stigma that is associated. Getting an implant can alienate you from the group if the group consists of mainly Deaf, which is why it is so important to have a strong support system going into the surgery, or else it is easy to fall into depression due to a feeling of exclusion with the Deaf community. However, when adult patients were consulted involving their satisfaction with the results of the Cochlear Implant and their communication skills and hearing development, the consensus was of approval and contentment (Zwolan, T.A., Kileny, P.R., & Telian, S.A., 1996).

Cochlear Implant: Culture Killer?

To the Deaf, the stigma that surrounds the Cochlear Implant is not singularly concerning the CI and did not begin with the CI. The issue is one that has been a part of the Deaf vs. Hearing standoff for many years: the debate between oralism and manualism. The Deaf are a manual culture; they learn and communicate via their hands. The Hearing are an oral culture; they learn and communicate via speech and voice. The Deaf are also

a very proud culture, and embrace their manual traditions, specifically the use of Sign Language. Sign Language is the central component of Deaf Culture, which is why threats to the future of Sign Language are met with such resistance. The Deaf see Hearing technologies such as the Cochlear Implant and the Hearing Aid, as attempts to force the Deaf to change from Manual to Oral. As a result, the Deaf are very stringent in their exclusivity in terms of how they communicate. It is frowned upon to sign and speak, or to use Oral technologies. The Deaf have not ever reacted to a technology as strong as they have the Cochlear Implant, simply because no other technology has been as successful at restoring hearing as the Cochlear Implant has.



Source: ("Communication Modes at different ages")

As the graph shows, the trend in manual communication vs. oral communication is a negative one. After implantation, children tend to become more oral, with the percentage of oral communication increasing from 20% before implantation to up to 90%

in 5 years after. This trend represents a shift that opposes Deaf values and could indicate the fall of Sign Language as a result.

Although the Cochlear Implant is seen as a huge threat to Deaf culture, there is another aspect of the issue that the Deaf do not address; that their exclusiveness of Oral methods and the Hearing World might actually be more of a detriment than anything else. In general, the Deaf only associate with other Deaf, and are very immersed in the Deaf World, not so much the Hearing World. They do not like it when their values are compromised and meet such acts with great hostility as shown in the Gallaudet Protests of the 2000s concerning former President-Designate Jane Fernandes.

Fernandes was born deaf, but was orally schooled: not learning sign language until her early twenties. Her husband and children are all hearing, and thus the Deaf community did not see her as a fellow Deaf, despite being deaf and knowing sign language. When she was elected as President of Gallaudet, there was such an uproar over Fernandes not being Deaf enough that massive student protests occurred which led to Fernandes leaving the University and becoming the Provost at another university. One faculty at Gallaudet said that he would rather see Gallaudet fall, than have Fernandes as President of the university (Myers, 2011).

That mindset is similar to the Deaf mindset in terms of the Cochlear Implant and other perceived threats to Deaf culture. Yet, in reality the world is dominated by the Hearing. All new technologies are geared towards the Hearing and the progression of the world's culture is geared towards the Hearing within the world. As such, the Deaf will be left behind if they do not back down from their exclusive stance. No one culture ever

advanced without the help of another, and if the Deaf do not at least start to accept some Hearing practices and integrating the benefits found in the Hearing world with what the Deaf currently feature in their community, Deaf culture and Sign Language with it are in great danger.

Conclusion

Just looking at the Cochlear Implant by itself, it appears to be a marvelous invention with the ability to restore one of a human's five senses. There are not many more medical technologies that can do such a feat, and taking into consideration that a normal life fully utilizes all five senses daily, it would seem that it would be illogical to pass up an opportunity to get an implant if one was deaf. Yet that is not the case, and by analyzing the Cochlear Implant using the social construction of technology framework, it is clear that technologies of this magnitude are never only about their technological capabilities, but have much larger social implications that affect how successful it will be on the market. The stigma regarding the CI involving the Deaf has not prevented the CI from being successful, but it has limited potential customers since a large portion of possible patients fall within the Deaf. However, this stigma needs to be dealt with by the Deaf community because it is not hurting the CI as much as it is hurting the Deaf community. The Deaf have an opportunity to open the doors of their culture to the Hearing world, by integrating themselves with the Hearing world via the Cochlear Implant and could possibly get some of the benefits of being Hearing while still maintaining their rich Deaf culture. This should not be seen as an all or nothing situation for the Deaf. If the Deaf did what they have done in the past with some technologies such as instant messaging, they could strengthen their culture for years to come, and

spread understanding of the Deaf along the way. Lastly, as clichéd as it is, the children are the future, and without a strong young Deaf population, there will be no future Deaf. Since there is a possible issue with children's rights given how successful the implant has been in children, soon the U.S. may follow Switzerland's lead in requiring implants to be done in newborn deaf children, thus cutting down the deaf populace. The CI is not going anywhere, it is here to stay, and will continue to help deaf and Deaf children and adults; the only question is if those deaf children and adults are still going to be Deaf afterwards.