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Annotated Bibliography #2

Examining the Communication Skills of a Young Cochlear Implant Pioneer

Carol McDonald Connor, Examining the Communication Skills of a Young Cochlear Implant Pioneer, *The Journal of Deaf Studies and Deaf Education*, Volume 11, Issue 4, Fall 2006, Pages 449–460, https://doi-org.ezproxy.tcu.edu/10.1093/deafed/enl001

Hypothesis: This study closely examined the effects of a cochlear implant on one deaf child's speech, language, and communication skills from kindergarten through the end of high school. Qualitative research reveals the long-lasting benefits of cochlear implants in regard to speech perception, oral language, and literacy development. Research also reveals the effects of cochlear implants to be superior to those of hearing aids. For example, children with hearing aids develop language at half the rate of hearing children while children with cochlear implants' development parallels that of hearing children. Although research reveals how impactful cochlear implants can be for a deaf individual, there is great variety amongst those who use cochlear implants. There is a lack of research in regard to the effect of these differences on the impact of cochlear implants. Therefore, the goal of this case study was to achieve a better understanding of the communicative competence in different social and cultural spheres. In order to achieve this better understanding in different social and cultural spheres, multiple frameworks were used so that the child's speech was measured by both formal and informal assessments.

Subjects:

# of DHH: 1	**# of Hearing:** N/A
Age: 5	**Age:** N/A
Grades: Kindergarten through high school	**Grades:** N/A

Degree of hearing loss: At the age of 3, Christopher was diagnosed with congenital profound sensorineural hearing loss.

Educational Setting: Christopher was mainstreamed in an oral communication public school that focused on the development of speaking and listening skills. He learned a sign system when attending a speech and hearing summer camp, and in high school he received special education services such as access to a sign language interpreter.

Communication Approach: Christopher attended public school his entire life which utilized oral communication. He did know a system of sign language, but the specific sign system was unknown.

Methodology:

1. First the participant had to be chosen. Although the individual chosen appears to be a typical implant user, Christopher is quite unique. He holds status as a pioneer user being one of only four to receive implants at the university cochlear implant center in 1988 before it had even been approved by the FDA.
2. Approximately each year, Christopher's speech and language skills were formally assessed. Different aspects were tested in different ways:
    a. First his intelligibility was tested, which is a measure of how well a child's speech is understood by a listener. In this case, the listener had extensive experience working with deaf children. Intelligibility was scored through two separate tests. The first was the McGarr test of intelligibility, which was part of the FDA protocol until 1991. The second piece of information for intelligibility came from the computation of percentage of consonant correct (PCC) on a test of

articulation. These tests are quite similar, and both test the intelligibility of deaf children's speech.

b. Next, receptive spoken vocabulary was tested which is the vocabulary that the deaf child can understand. It was tested using the Peabody Picture Vocabulary Test (PPVT). This test uses a four-choice picture format where the child would point to or select a picture based on the vocabulary word spoken by the facilitator. FDA protocol states that this test is administered purely using speech and absolutely no sign language. Once this test is administered, scores are reported as language quotients meaning that the age equivalent score is divided by the chronological age of the child and then multiplied by 100. Therefore, a score of 100 implies the child has age appropriate language skills when compared with their fellow peers.

c. After, expressive vocabulary was tested using the Woodcock-Johnson Tests of Achievement. In this assessment, children provide the vocabulary for pictures of increasingly unfamiliar objects. In this test, both signed and spoken responses were acceptable. Similar to the receptive spoken vocabulary test, the language quotient was calculated afterwards.

d. Next, reading comprehension was tested using two highly similar tests: the Woodcock Reading Mastery Test-Revised passage comprehension subtest or the Woodcock-Johnson Tests of Achievement passage comprehension subtest. Both of these tests utilize a closed procedure to assess reading comprehension. Children are presented with increasingly challenging passages and asked to provide the

missing word. Both signed and spoken answers are acceptable and like the last two tests, the language quotient was calculated to provide comparison.

3. Christopher's speech and language skills were also informally assessed each year through the videotaping and transcription of his language samples. During each session, a camera would be set up on a tripod. For the younger kids, toys or pictures were used to initiate conversation, while the older children were asked about a variety of topics such as family or sports. Christopher's favorite topic to discuss during these assessments was his time at summer camp. The children were left in charge of leading the conversation and the goal of the facilitator was to talk as little as possible. Once the 15-20-minute conversation ended, the video was transcribed using the chat protocol of the Child Language Data Exchange System (CHILDES). Each utterance was divided into communication units (C-units) representing complete thoughts. These results allowed for much more data to be collected:
    a. Mean length of C-unit (MLCU) was calculated to determine the child's average speech length and how it increased over time.
    b. Number of different words (NDW) was calculated to measure the diversity of the child's vocabulary.
    c. Complex syntax (SYN) was determined through morphemic and syntactic analysis. Using this score, children were assigned to Brown's stages I through V. As the child's chronological age increases, so should their stage accordingly.
    d. Not only was Christopher's language analyzed quantitatively, but professionals also measured the quality of his language samples. This was accomplished through several viewings looking for emerging themes and paying close attention

to his interactions with others. His attitude towards his deafness and use of a cochlear implant was also taken into consideration.

Results:

Formal assessment revealed great improvement in Christopher's speech after 13 years of implant use and intensive special education services. At the end of the study at the age of 19, Christopher had achieved speech and language skills within normal limits when compared to other children his age with normal hearing sensitivity. Within these normal limits, Christopher only fell slightly below the average child. The results revealed constant progress, but it was not linear. After receiving the cochlear implant, Christopher's speech and language skills grew very slowly for the first three to four years while the five to seven years following implantation, revealed rapid growth. After, Christopher seemed to progress at a similar rate to his fellow peers with normal hearing. Therefore, Christopher's data revealed a curvilinear graph across the years.

Informal results revealed great growth in the quality of Christopher's speech. Analysis of the language samples revealed that his speaking and listening skills improved, that he started using sign language for some time and then stopped, that his communication skills improved, and that his conversation topics became more abstract. As Christopher's ability to comprehend speech improved, so did his ability to produce speech. In the beginning of this study, he had difficulty producing any sounds at all and was instead using non-English phonemes, but at the one-year evaluation these were no longer present. At the age of 8, Christopher started using ASL fluently without babbling, however, at the age of 10 he stopped using signs frequently and instead sporadically. Researchers believe that Christopher was bilingual at this time and chose to speak in English since that was the well-known goal of the speech clinic. Christopher not only

improved his communication abilities, but he even began discussing his cultural identity expressing that he was proud to be a member of the “Deaf and hearing loss” group. Christopher made immense improvement over the years, but he was actually quite old when he first received his cochlear implant. Therefore, we can expect that children who receive one earlier on would have even better communication skills. They might even fall higher on the spectrum than Christopher did in regard to their speech and language skills.

Comments/Critiques:

By the time Christopher entered high school, his speech and language skills were within the normal limits and his progress was increasing at a rate similar to his fellow peers with normal hearing. Although great controversy exists in regard to cochlear implants, I think it is very important to realize the amazing impact that they can make on a deaf individual’s life. Being one of the first children to ever receive a cochlear implant, Christopher was fairly old. However regardless of those lost years, Christopher’s success is remarkable. The fact that he was able to reach normal limits after being diagnosed with a profound hearing loss is unique and not something that can be overlooked. While it is important to respect the child and their family’s decision, it is also important to inform them of the child’s potential with an implant. After analyzing this article, I have a much better understanding of cochlear implants and can now confidently provide others with information regarding the positives of receiving a cochlear implant.