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Honorable Mention Contest Entry: Consonant Acquisition in Infants with Cochlear Implants and Their Normal-Hearing Peers

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How I Used the Library Resources

I was first introduced to the library resources by Dr. Doug Dechow through his presentation in our First Foundation Course (FFC). Using the research topic CRISPR, Dr.Dechow taught the class how to navigate through the library resources, how to access the 318 databases in the Chapman library, and how to use those databases to narrow down and specify our wanted results. As a sleep-deprived college student, I continuously zoned out and fell asleep during the presentation. However, little did I know, that this lesson was essential to my next few years at Chapman University.

At the end of the fall semester, for my final project in Dr.Fagan's research lab, I was given the task of writing a literature review on the consonant acquisition in infants with cochlear implants and their normal-hearing peers. I first began by searching the keywords "cochlear implants" in the search bar on the library site and was blessed with thousands of resources. Searching the keywords on the library site gave me a general feel for the types of articles that were available, more knowledge about the topic, and an outline for my paper. However, this search bar is only the beginning. After skimming through a few articles and structuring a brief outline, I used the advanced search function to look for more detailed and specific articles for the subtopics in my paper.

The more specific search system allowed me to refine the thousands of articles and narrow them down to the most suitable articles using *TRAAP*. The *T* in TRAAP refers to timeliness. Since I was writing about cochlear implants, recent articles were preferred because the technology and method of cochlear implants have changed or developed over time; hence,

during my research, I entered the years “2000 to 2018” into the publication date filter. Rather than only searching the keywords “cochlear implants”, using Academic Science Premier, I also entered “infants”, “consonant acquisition”, and “normal hearing peers” to ensure the relevance of my results. Authority refers to the author’s credentials and credibility. I satisfied this criterion by selecting the “scholarly (peer reviewed) journals” box; the peer reviewing process helps to ensure that the article is credible and of quality. Accuracy is checked by verifying the information in other source and determining where the information comes from. To satisfy this criterion, I read other articles related to the topic and also referred to the resources cited in the works cited page. Reading through the works cited page not only is a way of checking accuracy but also provides more primary literature for me to use in my paper. Lastly, the *P* in TRAAP represents purpose meaning why this information exists. When opening up an article, the first step I take is reading the last sentence of the introduction; this sentence is typically the purpose statement which summarizes the goals and purpose of the article.

Using these criteria, I was able to narrow down 8,766 results down to about 50. One of my favorite and most useful article for my project was “Consonant Acquisition in Young Cochlear Implant Recipients and Their Typically Developing Peers”. This article satisfied all five criteria and was a great help to my project. This article was written in 2017 which thus contained recent data and observations. The purpose of this article was to compare and contrast the consonant acquisition in infants with cochlear implants and their normal-hearing peers. Its purpose shows its relevance to my topic of consonant Acquisition in normal-hearing infants and infants with cochlear implants. The authors, Suneeti Nathani Iyer, Jongmin Jung, and David J. Ertmer, are credible individuals who are associated with well-known universities, University of Georgia, The Ohio State University, and Purdue University respectively. Lastly, I checked the

accuracy of this article by identifying that it has been reviewed and checking the resources listed in the works cited page.

From this research project, in addition to gaining an intensive amount of knowledge on cochlear implants in infants and normal hearing infants, I also learned how to efficiently use the library resources to write a thorough and accurate literature review. This research informs other scholars about the similarities and differences in consonant development between cochlear implant infants and their normal-hearing peers. This information is useful for creating speech and language developmental milestones and methods to help cochlear implant recipients overcome the consonants they struggle to acquire. As an inspiring pediatrician, this influx of knowledge aids me in understanding the speech development in cochlear implant patients and the reasoning behind it. In the future, I will be able to explain to the parents of these patients why it is difficult for their children to reach certain milestones and whether or not certain speech observations are normal.

Summary

Due to the lack of exposure to auditory cues compared to their normal hearing (NH) peers, cochlear implant (CI) recipients tend to differ in the initial speech production and development when compared to their NH peers.

Some studies indicate that CI children have a larger and more variable consonant inventory due to the sudden burst of growth that typically occurs immediately after implantation. Opposing to those studies, others argue that even when receiving an implant early on in life children still require at least 5 years of cochlear implant use to be able to produce the number of consonants within the typical range of their age. CI infants tend to lag behind their NH peers but this lag is recuperated after extended cochlear implant use.

Although, in general, there is no single universal order for the acquisition of overall speech sounds, some developmental trends have appeared in the development of phonemes. In terms of manner, stops, glides and nasals are typically produced first in NH infants followed by fricatives and liquids. Similar to the NH peers, stops are the dominant and most accurately produced consonant in CI infants. However, glides and nasals tend to be more difficult to acquire due to their lack of visibility. Despite a large number of studies that support this information, there are also other studies that disagree with the pattern.

The lack of consensus in the difference in consonant inventory and patterns of acquisition indicate the need for further studies and more observations of the consonant development in cochlear implant recipients and their normal-hearing peers.

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