The Social-Emotional Impact of Cochlear Implants on Children

By

Janna R. Stein, M.S.Ed.

A Doctoral Project Submitted in Partial Fulfillment of
the Requirements for the Degree of Doctor of Psychology
in the Department of Psychology at Pace University

New York

2007

UMI Number: 3282700

ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

TABLE OF CONTENTS

CHAPTER		PAGE
	APPROVAL PAGE	v
	ACKNOWLEDGEMENTS	vi
	LIST OF TABLES	vii
	ABSTRACT	viii
I.	INTRODUCTION	1
II.	LITERATURE REVIEW	
	What is a Cochlear Implant?	2
	The Use of Cochlear Implants in Children	4
	Language Development in Children with Cochlear Implants	6
	Social Development in Children with Cochlear Implants	8
	Self-Esteem	10
	Social Anxiety	12
	Link between Social Anxiety and Self-Esteem	13
	State of Purpose	14
	Hypotheses	15
III.	METHODS	
	Participants	17
	Materials	20
	Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (PSPCSA)	20

	The Meadow-Kendall Social-Emotional Assessment Inventory for Deaf and Hearing Impaired Students (M/K SEAI Preschool Form)	21
	Vineland Adaptive Behavior Scales (VABS)	21
	Child Behavior Scale (CBS Teacher)	22
	Demographic Questionnaire	22
	Coding of Children's Behavior	23
	Procedure	25
IV.	RESULTS	
	Analysis of Data	28
	Hypothesis 1	31
	Hypothesis 2	31
	Hypothesis 3	31
	Hypothesis 4	32
	Hypothesis 5	32
	Hypothesis 6	33
	Exploratory Analyses	33
V.	DISCUSSION	
	Summary	36
	Implications for School-Clinical Child Psychology	42
	REFERENCES	44
	APPENDICES	
	Appendix A – Consent form for Children with Cochlear Implants	51
	Appendix B – Consent form for Normal Hearing Children	59

Appendix C – Letter sent to Parents of Children with Cochlear Implants 66

Appendix D – Consent for Videotaping of Children with Cochlear Implants 69

Appendix E - Consent for Videotaping of Normal Hearing Children 71

Appendix F – Letter to Teachers 73

Appendix G –Demographic Questionnaire 75

Appendix H – Coding Form 79

PSY.D PROJECT FINAL APPROVAL FORM

NAME: Janna R. Stein

TITLE OF PROJECT: The Social-Emotional Impact of Cochlear Implants on Children

DOCTORAL PROJECT COMMITTEE:

PROJECT ADVISOR: Dr. Beth Hart
Name

Professor — Pace University
Title — Affiliation

PROJECT CONSULTANT: Dr. Herb Krauss
Name

Professor — Pace University
Title — Affiliation

FINAL APPROVAL OF COMPLETED PROJECT:

I have read the final version of the doctoral project and certify that it meets the relevant requirements for the Psy.D. degree in School-Clinical Child Psychology.

Beth Hart
Project Advisor's Signature

10.29.07
Date

Herbert H. Krauss
Project Consultant's Signature

10.29.07
Date

ACKNOWLEDGEMENTS

There are a number of thanks that I must extend towards the individuals who have helped me with completing this doctoral project and making my doctorate a reality. Without all of the guidance, dedication and support of these special people I would not have been able to accomplish my dream of becoming a psychologist. My gratitude is extended to Dr. Beth Hart, who provided guidance in my professional development and whose wonderful words of praise and encouragement aided in my success. Additionally, I would like to thank Dr. Yael Bat-Chava and the entire staff of the New York University Cochlear Implant Center for allowing me to be a part of their research team and conduct research in an area that is very important to me. My thanks are extended to Dr. Herb Krauss who so patiently helped with my statistical data analyses.

Beyond those who have helped me academically, I must take this opportunity to thank my family, especially my parents. Without their unconditional love and support, I would not have become the woman I am today. They have been supportive in all of my endeavors and have been patient throughout my education. From the age of 15 when I decided that I wanted to become a psychologist, my parents have encouraged me to pursue my goals and to never let anything get in the way of my dreams. They have been there every step of the way and have taken pride in all of my accomplishments. I am forever grateful for your endless love and guidance.

LIST OF TABLES

Table

1 *Demographic Variables of Study Participants* 18

2 *Correlation Matrix for PSPCSA Subscales and Streams of Behavior for Deaf Children* 29

3 *Correlation Matrix for PSPCSA Subscales and Mode of Communication* 30

4 *Correlation Matrix for PSPCSA Subscales and Initiation and Response to Interactions* 30

5 *Means and Standard Deviations (SDS) of the PSPCSA* 33

6 *Correlation Matrix for Child Behavior Scale and Peer Acceptance and PSPCSA total* 33

7 *Correlation Matrix for Gender and PSPCSA subscales and Total* 35

ABSTRACT

Research shows that children who are deaf have difficulty socializing when they are with a group of hearing peers. Deaf children also have lower self-esteem than their hearing peers. The number of deaf children receiving cochlear implants is growing daily. The present study was conducted to examine whether deaf children with cochlear implants differ in perceived acceptance and competence as compared with their hearing peers. To date, there has been very little research into the psychological effects of cochlear implants in children.

All participants were subjects in a larger study designed to examine the factors that influence the development in deaf children with cochlear implants of positive relationships with hearing peers. Participants were 8 deaf children, ages 5 to 6, who received a cochlear implant at the New York University Cochlear Implant Center (CIC) at least 1 year prior to participation. Each child with an implant was matched by age and gender to a hearing control child. Both children were asked to play with each other for 20 minutes in a room with age-appropriate toys. These sessions were videotaped and later coded. Modes of communication, initiation and response to interactions, and other aspects of the streams of behavior were assessed. Following the play session, parents of the child with the cochlear implant completed a series of questionnaires, including the Child Behavior Scale (CBS; Ladd & Profilet, 1996), Vineland ABS (Sparrow, Balla & Cicchetti, 1984) and a demographic questionnaire. Following the each play session, the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (PSPCSA; Harter & Pike, 1984) was completed by both the deaf and hearing child.

In spite of small sample sizes, findings suggest that children with cochlear implants do not differ from hearing children on any self-perception scales. Children with cochlear implants who perceive themselves in a generally positive manner were found to interact more, have more verbal exchanges, and initiate more new topics when engaged in a social relationship with a hearing peer. Regression analyses determined gender to be a significant predictor of self-perception and peer acceptance among deaf children with cochlear implants. Females tended to feel more accepted by peers and perceived themselves more positively than did males. Gender and hearing status were found to have interacted significantly to predict a child's overall self-perception.

CHAPTER I

INTRODUCTION

For the past decade the use of cochlear implants for deaf children has been growing, especially for those children of hearing parents. About two to three of every 1,000 children in the United States are born deaf or hard-of-hearing (NIDCD, 2006). Of these over 90% of hearing-impaired children are born to parents both of whom hear, and 97% have at least one hearing parent (Balkany, Hodges, Miyamoto, Gibbin & Odabassi, 2001). When a child is born deaf or hard-of-hearing, parents often seek assistance in deciding how to provide their child with the best possible life. Many parents are becoming increasingly interested in the possibility of a cochlear implant.

The research on cochlear implants in children continues to grow. It has been well documented that cochlear implants have a positive effect on deaf children in the areas of auditory and language development (Geers & Moog, 1994; Svirsky, Robbins, Kirk, Pisoni & Miyamoto, 2000; Tye-Murray, Spencer & Woodworth, 1995). Only a handful of studies have addressed the social development of children with cochlear implants and they have yielded mixed results (Antia, Kreimeyer & Eldredge, 1993; Bat-Chava & Deignan, 2001; Boyd, Knutson & Dahlstrom, 2000; Knutson, Boyd, Reid, Mayne & Fetrow, 1997; Leigh, 1999). No studies have assessed the emotional impact of cochlear implant on children. The purpose of the present study was to examine the social and emotional effects of cochlear implants in children, more specifically their interactional skills, social acceptance and self-esteem.

CHAPTER II

LITERATURE REVIEW

What is a cochlear implant?

When a child is born with or develops a profound, bilateral, sensorineural hearing loss, often times, hearing aids will not be effective. A cochlear implant differs from a hearing aid in that instead of digitizing and amplifying certain sounds, the implant converts the digital information into a program. This program determines how much electrical stimulation should occur and in what order the stimulation should be presented to the auditory nerve. This type of programming is known as mapping. Mapping begins at 4-6 weeks after implantation surgery and can be changed to best fit the child throughout his/her life. Each implanted child has a unique map that is appropriate for his/her own perception levels (Hedley-Williams, Sladen, & Tharpe, 2003).

For people with normal hearing, sound waves enter the outer ear, and then proceed into the ear canal. From there the waves are sent to the eardrum causing it to vibrate. The eardrum is attached to ossicles in the middle ear that also begin to vibrate. The ossicles send the vibrations through to the oval window and then pass the waves to a fluid-filled part of the inner ear called the cochlea. Movement in the fluid causes hair cells in the cochlea to bend. The movement of these hair cells stimulates neural activity sending an electrical current to the auditory nerve (8^{th} cranial nerve). Then, the nerve sends the current to the brain, where the electrical stimulation is recognized as sound.

When a person has a hearing impairment due to a defect or damage to the tiny hair cells in the inner ear, sounds cannot reach the nerve effectively. The cochlear implant is designed to bypass the damaged hair cells, stimulate the auditory nerve, and provide the information necessary for hearing to the brain. Different portions of the cochlea respond to different sound frequencies. It is necessary for the cochlear implant to be able to stimulate this process if one is to hear adequately, hence the need for programming (Kolb & Whishaw, 2003).

There are several different types and brands of cochlear implants; however the two major components remain the same: an internal and an external component. The internal component, which is surgically implanted while under general anesthesia, is comprised of an internal electrode array and a receiver. The internal electrode array is inserted directly into the cochlea. The receiver is connected to a magnet, which is placed over the mastoid bone, underneath the skin. The internal receiver sends information to the electrode array, which stimulates neurons in the cochlea. The external component is comprised of a microphone, a speech processor, and a transmitter. These components provide power to the internal component. The processor is responsible for transmitting the encoded speech signal to the internal device (Hedley-Williams et al., 2003).

The current selection criteria for children to receive a cochlear implant require that they are at least 12 months old and have a severe-to-profound bilateral sensorineural hearing loss. The child must also have little to no speech recognition when tested and it must be found that s/he would gain more from a cochlear implant than from their current use of hearing aids (CHDR, 2005). Furthermore, the child must have a supportive family

with appropriate expectations for the implant and they must possess the resources to provide language, speech and auditory rehabilitation services for their child (Balkany et al., 2002). To get maximum benefit from a cochlear implant, the recipient will need individual training, such as speech and language therapy, lip reading therapy, and auditory training (FDA, 2004).

The Use of Cochlear Implants in Children

Although the cochlear implant has been available for use in the United States since 1984, the Food and Drug Administration (FDA) first approved its use in children in 1990 (Schery & Peters, 2003). In 2000, the age of eligibility for implantation was lowered to children as young as 12 months of age. Today, in the United States, approximately 15,000 children, including infants, have been implanted. There are approximately 100,000 worldwide (NIDCD, 2007). It is estimated that the number of children who receive cochlear implants is increasing at a rate of 25% per year (Niparko, 2001).

The use of the cochlear implant is a controversial issue within the Deaf community although it is becoming increasingly prevalent for young children born deaf. Deaf people give two arguments against their use. The first is that if cochlear implantation restores perfect hearing in congentially deaf children, the Deaf culture will eventually die out. Deaf people take pride in their language and culture and do not consider their inability to hear to be a handicapping condition. There is a debate about who has the right to determine what is in the best interest of the child: the child's parents or the Deaf community. Since the majority of deaf children are born to hearing parents

and the number of cochlear implantation surgeries is increasing rapidly, there is a chance that deafness, the Deaf culture and sign language will eventually become obsolete (Copeland & Pillsbury, 2004). The second argument is that the Deaf community does not believe that the implant produces normal speech production and perception. Predictably, researchers have mainly focused their studies on demonstrating the effectiveness of this device in children and how it positively impacts an individual's auditory and language development (Rubenstein, 2002). However, the social aspects of cochlear implants have been minimally researched and their psychological effects in children have not been studied at all.

Cochlear implants are viewed slightly different in the United States as compared to other countries around the world. Fjord (2001) states that in the United States, hearing parents, as well as professionals, believe the cochlear implant is a "miracle" that gives their child the ability to hear. The belief that a child can miraculously hear is incorrect because a cochlear implant is battery operated and when the processor is turned off the child is again deaf. While in other countries, the cochlear implant is instead thought of as a "high-powered hearing aid."

The FDA has developed a website that explains the benefits and risks of a cochlear implant. The benefits of cochlear implants are many: individuals can perceive sounds of varying volumes and tones, many understand speech without needing to lip-read, they can make phone calls, watch television and listen to music, and hearing can range from near normal hearing ability to the understanding of speech (FDA, 2006).

In addition to the known surgical risks associated with receiving a cochlear implant, such as going under general anesthesia, the FDA warns that individuals could lose residual hearing, may suffer from unknown and uncertain effects, and might not be able to hear or understand language as well as others. Certain medical procedures, such as Magnetic Resonance Imaging (MRI) may be impossible to perform or could require extensive preparation. Moreover, the cochlear implant is expensive because in addition to the surgery, the device is expensive and the batteries need to be recharged or changed regularly (FDA, 2006).

Language Development in Children with Cochlear Implants

In the past, cochlear implant research has focused on speech production and perception showing that there were significant improvements in a child's ability to express him or herself verbally and discriminate between different words (Geers & Moog, 1994; Svirsky et al., 2000; Tye-Murray et al., 1995). These findings created positive beliefs about the effectiveness of the cochlear implant. Despite many studies having found that there are positive effects of cochlear implants on speech and oral language, numerous factors effect such language development in children with cochlear implants. These factors include age at implantation, duration of implant use, and mode of communication.

Age of implantation plays a key role in the development of communication skills. Ouellet and Cohen (1999) have argued that because the cochlea is developed at birth and all surrounding structures are fully developed by age two, it may be especially beneficial to implant children before the age of two. They suggest doing so will reduce the delay in

language development and likely result in better speech and language skills. In addition, prelingually deaf children, at age 12, who have used sign language as their primary method of communication, have shown minimal gains in speech perception post-implantation (Ouellet & Cohen, 1999). These findings have led to a large increase in the number of children receiving cochlear implants prior to reaching school age.

Svirsky et al. (2000) studied the improvement of English language skills based on auditory input in prelingually deaf children who had received cochlear implants. In addition, they compared the language development of children with cochlear implants with that of normal hearing children. The study found that language development in children with cochlear implants exceeded that of deaf children without cochlear implants, and was relatively similar to that of normal hearing children. The children who can better discriminate words were more likely to resemble normal language development (Svisrky et al., 2000). It has been found that an increase in language skills leads to an increase in communication skills in deaf children (Bat-Chava, Martin & Kosciw, 2005)

Language development is a significant predictor of social and academic success. Children who have language impairments have had problems in school and social situations. In society, high values are placed on academic performance and social status, therefore if a child perceives him/herself as having difficulties in these areas it may result in a negative self-image (Jerome, Fujiki, Brinton, & James, 2002). Therefore, if deaf children are unable to socialize with their peers and have difficulty with academic progress, it could lead to the development of poor self-esteem.

Social Development in Children with Cochlear Implants

It is known that deaf children experience difficulties in social development. Children with hearing loss tend to play with other children who have a similar level of hearing loss (Antia et al., 1993). Many children with hearing losses are placed in mainstream classrooms; however these children report a sense of loneliness and lack close social bonds (Stinson & Whitmire, 1992). Frequently, the child is the only one in the classroom with a hearing loss therefore s/he lacks the opportunity for interpersonal relationships with other deaf children. This could create insecurities within the child (Evan, 1989) and cause negative self-perceptions (Leigh, 1999). Similarly, children with cochlear implants often want to maintain friendships with other hearing-impaired peers despite their mainstream life (Bat-Chava & Deignan, 2001).

Quality of life is an area that has rarely been explored in individuals with cochlear implants. Despite the ability to hear, other factors play a role in an individual's overall life satisfaction. Karinen, Sorri, Valimaa, Huttunen, Lopponen (2001) studied the quality of life of adults, aged 18 to 44 with cochlear implants. The study looked at six different areas of life: health (pain), energy, sleep, mobility, emotional reaction and social isolation. The study found that individuals with cochlear implants had significantly more problems with energy, sleep and social isolation than the average age-matched population. In addition, a feeling of social isolation was more common for the youngest age group whose ages ranged from 18 – 44 years old studied (Karinen et al., 2001). To date, in the peer reviewed literature, there has been no investigation of the quality of life of children who have received a cochlear implant.