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Evaluating social skills in long term cochlear implant recipients

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EVALUATING SOCIAL SKILLS IN LONG TERM COCHLEAR IMPLANT RECIPIENTS

by

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Abstract: A longitudinal study observing cochlear implant recipients' social skills using ratings from their parents and the students themselves over time.

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Throughout history, many children born with deafness or hearing impairment were isolated from their peers. Due to late diagnosis, lack of sufficient technology and lack of appropriate educational placements, many children with hearing loss struggled socially. The passing of Public Law (PL) 94-142 changed deaf education. Prior to this law most children with hearing impairment were educated in residential schools or self-contained classrooms. In addition to not having the technology to get good access to sound, they were not interacting to the extent they are today with their hearing peers.

In several studies in the past it was found that deaf children had a rate of emotional adjustment difficulties that were 3 to 6 times that of the normally hearing population (Meadow and Trybus 1979). One study conducted by, Farrugia and Austin (1980), examined social emotional adjustment patterns of hearing-impaired students in various educational settings using the Meadow Kendall Social Emotional Assessment Inventory for Deaf students (Meadow 1980). They chose students who had been in a particular program for at least 3 years and had hearing parents. A sample of 200, 10 to 15 year old deaf students was grouped into four categories: (a) deaf students in public schools, (b) deaf students in residential schools, (c) hard-of-hearing students in public schools and (d) hearing students in public schools. The results suggested that the deaf students in residential schools and hearing students in public schools were the most similar. Children who were deaf and hard-of-hearing in the mainstream setting exhibited the lowest levels of self-esteem. In 1990 Henggeler, Watson and Whelan examined peer relations of 35 hearing-impaired adolescents and 35 hearing adolescents based on reports from mothers, fathers and the adolescents themselves using the Missouri Peer Relations Inventory, the socialized aggression subscale from the Revised Behavior Problem

Checklist and the activities and social subscales of the Child Behavior Checklist. Measures included emotional bonding, aggression and social maturity. They found that parents rated their child's behavior with friends to be higher in aggression and lower in emotional bonding compared to parent ratings of hearing adolescents. In another study evaluating self perception of social relationships of 220 students with hearing impairment, Stinson, Whitmore and Kluwin found that students felt more secure with their hearing-impaired peers than their hearing peers (1996). There was no increase in emotional security in students who were mainstreamed for longer periods of the day. Although these studies from the past indicated that children with hearing-impairments were having social difficulty, much has changed in recent years. In the past twenty years, hearing aid technology has improved and cochlear implant technology has developed. These technological innovations, combined with earlier diagnosis and intervention, have resulted in earlier access to sound, faster spoken language development and younger mainstream placement.

Not all research published has concluded that hearing impaired students have poor social skills. Recent research has shown some more positive results for students. For example, a long term follow up study of 37 adult cochlear implant recipients suggested significant decreases in loneliness, social anxiety and distress within one year of receiving the implant (Knutson et al. 1998). Another recent study which used a questionnaire to see how parents felt about their child receiving a cochlear implant one year post implantation, found that 23 out of 27 parents felt that since their child had received the implant they were more self reliant, self confident and had better socialization with other children (Incesulu, et al. 2003). Filipo et al. 1999 evaluated the

psychological well being of 6 adolescents and 6 children pre-implant and post-implant using projective tests, assessment scales and structured interviews with parents and teachers. Their results indicated there were more modes of figurative expression, good relationships in their social environment, and positive integration at home and school post-implant. These studies suggest that social development of students who are deaf is improving.

Furthermore, many programs and schools are incorporating social skills into their curriculum which could add to improvement in social skill awareness. In 1998 Greenberg and Kusche` used the PATHS (promoting alternative thinking strategies) curriculum as an intervention to test improvement of self control, emotional understanding and problem solving in 57 school age deaf children. Results suggested that the intervention led to significant improvements in students' social problem solving skills, emotional recognition skills and both teacher and parent ratings in social competence. Cochlear implants are giving profoundly deaf children much better access to sound and thereby to spoken language. These increased verbal skills along with social skills curriculums and early intervention, help to raise the probability that children with hearing impairment can function as happy confident adults in the everyday world with their peers.

More children with hearing loss are being mainstreamed into public schools. This gives them more interaction with a diverse group of children. Davis (1981) states that appropriate educational planning for mainstreamed hearing impaired children must include assessment of "social maturity and peer acceptance". Measuring a child's social skills can assist a special education teacher in determining readiness for the mainstream. Such measures can also be used to assess how well a child is functioning socially once he

or she is placed. However, measuring social skills of any child can be quite challenging, especially when the children or adolescents being measured have delays in language that make it difficult to express themselves. Due to this factor, a nonverbal test is often used with young children. It is also possible to measure a child's social skills through observation of the child, although this can be overly subjective depending on who the observer is. An alternative way to measure a child's self perception and social abilities with their peers is to have the teacher or parent fill out a rating form. Because these two people interact with the child on a daily basis, their opinions can be useful. It is possible however that the teacher or parent could have a bias that the child is doing better or worse than they are simply because of their relationship to him or her. One such rating scale is, The Social Skills Rating Scale (Gresham and Elliot 1990), a nationally standardized series of questionnaires that obtains information from teachers, parents and children themselves regarding the student's social skill acquisition. There are different forms that are used for different age groups. Because more and more children with hearing impairment are being mainstreamed, it is important to look at how they are functioning socially in schools.

The purpose of the present study was to look at how adolescents using cochlear implants rate their own social skills compared to an age matched normative group of hearing students, and to compare these ratings with social skills ratings obtained from their parents. The second question is whether language levels or speech perception levels after long term use of a cochlear implant are predictive of social competencies in adolescence. Finally due to the longitudinal nature of this study, it was possible to

compare social ratings in adolescence to previous ratings of the same children obtained in elementary school.

Participants

This sample was drawn from a nationwide study conducted between 1997 and 2000 of 181 children who had received cochlear implants when they were in preschool (ages 2 to 5). They had received a comprehensive test battery when they were 8 or 9 years of age that included, assessment of their personal, social and family adjustment (Nicholas and Geers 2003). To date, 58 parents and 58 high school students (27 males and 31 females) now currently between the ages of 15 and 17 (mean age 16.7), have followed up for the current study. They came from 25 states in the USA. Ethnicity did not vary much with 51 participants being white, 4 Asian, 1 African American, and 2 placed themselves in the "Other" category. The onset of deafness was between 0 and 35 months (mean = 5.1 months). Duration of cochlear implant use ranged from 11.4 years to 15.6 years (mean = 13.1 years). Finally, the average performance intelligence quotient on the Wechsler Intelligence Scale (Wechsler 1991) was 103.

Each student's parent had rated what type of communication method was used in their preschool and elementary school setting. Ratings were made on a scale of 1-6 and averaged across the first four years following cochlear implantation. The number 1 represented total communication with a sign emphasis. 2 of the 58 participants had earlier communication ratings in this category. The number 2 represented total communication with equal emphasis on speech and signing. 19 participants fell into this category. 3 represented total communication with a speech emphasis. 10 participants fell into this

category. Number 4 represented communicating with cued speech. 3 participants were in this category. The number 5 represented an auditory visual method which represented 17 of the participants. Last, number 6 represented an auditory verbal method. 5 participants fell into this category.

All test data were obtained with consent from the student and the parent at both test sessions. Identifying information was removed and the parent and child were assigned matching code numbers for the analysis phase of this study. The test protocol and consent procedures were approved by an Institutional Review Board for the protection of human subjects.

Measures

Measures collected at age 8 and 9: In the prior study, (Nicholas and Geers 2003), the participants' social adjustment was evaluated using parent ratings on the Meadow Kendall Social-Emotional Assessment Inventory for Deaf and Hearing Impaired Students (Meadow-Orlans, 1983) and student ratings on items from the Harter and Pike (1984) Pictorial Scale of Perceived Competence and Social Acceptance for Young Children. These items were modified for the children's linguistic abilities and renamed the Picture Assessment of Self Image for Children with Cochlear Implants (PASI).

Measures collected at age 15-18: At follow up testing, the students and parents each filled out a separate form of the Social Skills Rating Scale (SSRS). Each parent completed a parent rating form in which they rated behaviors observed in their own child. Each behavior was rated as occurring never, sometimes or very often. In addition, they rated each behavior as not important, important or critical. The subscales included on the

parent form are: Cooperation, Assertion, Responsibility and Self-control. Points are totaled in each subscale to produce a raw score that is compared with normative data from an age appropriate group of hearing students. Once the raw scores are totaled, a standard score can be recorded to indicate whether the student exhibits fewer, average or more abilities in each subscale. The parent form also includes a separate section where the parents rate the child's externalizing and internalizing problem behaviors. A second standard store is obtained in this section. Standard scores on some subscales were not recorded for three parents due to failure to rate a sufficient number of items. However, their scores on other subscales in which they did rate a sufficient number of items were included in the study.

The students completed the Student Form of the SSRS where they responded to items rating their own behaviors. The categories on the Student Form include: Cooperation, Assertion, Empathy and Self-control. In addition, the students were given the Clinical Evaluation of Language Fundamentals (CELF-4) evaluation (Semel et al 2003) to evaluate their receptive and expressive language abilities. This is a common standardized language evaluation that provides standard scores on receptive and expressive language relative to their hearing peers. The students' speech perception was evaluated using the Lexical Neighborhood Test (LNT) (Kirk, Pisoni and Osberger 1995), which provides a percent correct score for open set recognition of monosyllabic words. . The data was analyzed with correlations calculated on Excel. In addition, each item on the SSRS was put into a table under the appropriate subscale to see what percentage of students rated each item as occurring never, sometimes, or very often and the percentage that rated each item as not important, important or critical (see appendix). Then the

categories including problem behaviors were examined to observe how many students had fewer social abilities and more problem behaviors in each category. The students' who fell into one of these categories were examined to see if language or speech perception scores were related to their difficulties. Finally scores on the SSRS were compared to previous social ratings of the same students and parents at age 8 and 9.

Results

Table 1a lists the percentage of parents who felt their child had fewer, average or more social ability in each sub scale. The second table shows the percentage of students who rated themselves as having fewer, average or more ability in each subscale of. Most students fell into the categories of average or more on each subscale, suggesting that their own perception is that they are doing well socially. 20% of parents rated their child to have less responsibility, which is somewhat high, however 79.9% percent rated their child to have average or more responsibility. 17.5 % of parents felt their child had fewer assertion skills than average however, 82.4% rated their child to have average or more assertion capabilities.

Table 1a: Number (percent) of students in each rating subscale from the parent form of the SSRS

Social Skills	Parents		
	Fewer	Average	More
Cooperation	9 (15.5%)	39 (67.2%)	10 (17.2%)
Assertion	10 (17.5%)	40 (70.2%)	7 (12.2%)
Responsibility	11 (20%)	36 (65.4%)	8 (14.5%)
Self-Control	6 (10.9%)	35 (63.6%)	15 (27.3%)
Total Raw Score	5 (9%)	36 (65.4%)	14 (25.4%)

Table 1b: Number (percent) of students in each subscale from the Student Form of the SSRS

Social Skills	Students		
	Fewer	Average	More
Cooperation	5 (8.6%)	38 (65.5%)	15 (25.9%)
Assertion	7 (12%)	43 (74.1%)	8 (13.8%)
Empathy	6 (10.3%)	44 (75.9%)	8 (13.8%)
Self-Control	5 (8.6%)	40 (69%)	13 (22.4%)
Total Raw Score	7 (12%)	37 (63.8%)	14 (24.1%)

Extensive data was available for these students regarding their language and

speech perception scores.

Table 2: Mean scores and standard deviations on receptive and expressive language test (CELF 4) and speech perception tests (LNT)

Test	Mean Score	Standard Deviation
CELF 4	86.7 (standard score)	19.0
LNT pc 50	40.5%	19.0
LNT pc 70	55.6%	24.13

*The CELF 4 is a standard score while the LNT represents the percent correct

The average standard score on the CELF 4 was 86.7. There was a mild correlation

($r = .25$, $p < .05$) between student scores on the SSRS and the CELF 4 which would

indicate that for some students perhaps the better their language, the better they perceive

their own social skills. However, again this correlation was relatively weak and did not

reach significance. Interestingly, most students whose parents rated them as having more

internalizing problem behaviors also had a CELF 4 score that was below average. While

the number of students who fell into this category was relatively small (N= 6), 5 of them

obtained CELF 4 scores below the average range. There were equal numbers of males

and females in this group of students.

The correlation between the students' scores on the SSRS and their speech perception scores did not reach significance. Likewise, for the correlation between students who were rated by their parents to have more internalizing and externalizing behaviors to their speech perception scores.

Table 3: Correlations of parent and student ratings to various factors that did not reach significance

Correlations	Value of r
Parent standard score to student standard score on the SSRS	.22
Student standard score on the CELF 4 to standard score on SSRS	.25
Parent Standard score to LNT Score	.06
Student standard score to Student LNT Score	.07
Problem Behaviors standard score to student score on the CELF	-.14

*P < .05

There was a significant correlation (r = .41, p< .05) found between previous parent ratings on the Meadow Kendall Social Emotional Assessment Inventory for Deaf and Hearing Impaired Students in the subscales of social adjustment (r =.41, p< .05) and self-image (r = .42, p < .05) when the students were 8 and 9 and current ratings on the Social Skills Rating Scale at age 16, which is shown below. This indicates that parental perception of social adjustment has stayed relatively stable over time.

Table 4: Correlation between parent ratings at age 8-9 and parent ratings on the SRSS in adolescents

Correlation of Parent Ratings of Their Child at 8-9 to Ratings in Adolescents	
Meadow Kendall Social adjustment rating at age 8-9 to SRSS rating	. 41
Meadow Kendal Self Image rating at age 8-9 to rating to the SRSS rating	.42

* P < .05

The correlation between students' previous social ratings at age 8-9 to their ratings of themselves on the SSRS did not reach significance. However, both groups fell into the average range for hearing peers on both questionnaires.

Table 5: Mean scores of student ratings at age 8-9 compared to ratings at age 15-17

Student Rating Scores			
Rating Scale	**Min/Max**	**Mean**	**Standard Deviation**
PASI social subscale at age 8 or 9	2.60/4.00	3.62	.38
SSRS at age 15-17	76/131	104.6	14.6

*The SSRS are standard scores while the PASI scores are a rating from 1-4. There are no norms for the PASI

Although the minimum score on the SSRS is relatively low, only one student scored in the 70-80 range out of 58. The data suggests that at both times students were rating their social capabilities as very good.

Discussion

Much of the literature from the past has shown the difficulties deaf and hard of hearing students have with personal and social adjustment. More recent studies are showing that this is improving. Perhaps it is earlier intervention, earlier access to sound due to enhancements in technology, earlier implantation, or perhaps the incorporation of pragmatics and social skills into lesson plans in schools for the deaf. No one would ever claim that cochlear implants fix deafness or that being deaf is not difficult. However, hopefully with continued early implantation and early intervention, we can give these students a better quality of life.

All of the children in the current study were implanted at a very early age and have had their cochlear implant for over 10 years. The results indicate that these students are adjusting very well and very similarly to their hearing peers. Although there was only a low correlation that did not reach significance between student and parent ratings, parents consistently felt confident in their child's abilities over time. There were 6 students who had more internalizing behaviors. These students also had low language scores which could indicate that students who have more delays in language internalize their feelings more. However, there were not a high number of students who fell into this category. There were even fewer students who had more externalizing behaviors (3). There was a low correlation of language scores to overall social ratings scores in students. This may suggest that for some students, their confidence levels may be affected by their language level. It could also suggest that items were not fully

understood by some who had low language levels. However, this was not a strong correlation and did not reach significance for this sample.

When looking at the individual items, the only statement where there was a significant difference in how parents answered and how students answered was in the self-control subscale. The statement on the parent form is: Avoids situations that will most likely result in trouble. 72% of parents said that their child does this very often. On the student form the statement says: I avoid doing things with others that might get me into trouble with adults. Only 34% of students stated that they do this very often. Although this was an interesting finding, it seems that this is pretty typical of teens to want to rebel while their parents perceive that they are not doing anything wrong. Overall, it would appear that these students have high self-perceptions.

There are limits to a study such as this. First, measuring true development of social skills is very difficult. Because this is only a questionnaire and the ratings of two very biased people (parents and students of themselves), it is hard to make definite conclusions. It would be helpful to get an outside perspective on how these students are developing. However, it is unethical to ask their peers, and although teachers could rate them, their teachers do not see what occurs outside the classroom. One could analyze these students through observation; however that could lead to a lot of subjectivity and with a large population could be very time consuming. Adolescence is a difficult time socially for any child, and even more challenging for a student with a disability. Research on how these same students are doing ten years from now could be very beneficial. Further studies could also look at how intelligence relates to social skills of students with cochlear implants or how mainstreaming effects these students socially.

Conclusion

Students utilizing cochlear implants appear to be developing social skills and positive self perceptions much more positively than in the past. Results of this study indicate good social development as perceived by both parents and students. Perhaps with earlier identification due to the recent pass of newborn hearing screening in 2003, better technology and the recognized importance of teaching social skills directly, we can help these students to have a better quality of life. Furthermore we can guide them towards good relationships with others and the self-confidence to fulfill all of their goals and dreams.

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Appendix A

Student Form Ratings on Individual Items

	Never	sometimes	Very Often	Not Important	Important	Critical
Communication						
I listen to adults when they are talking to me	0	28%	72%	2%	47%	52%
I ask before using other people's things	0	41	59	7	53	40
I avoid doing things with others that may get me into trouble with adults	6	59	34	22	38	40
I do my homework on time	0	38	62	5	29	66
I keep my desk clean and neat	16	55	29	41	38	21
I finish my classroom work on time	3	34	62	3	38	59
I use my free time in a good way	10	48	41	19	55	26
I follow the teacher's directions	2	24	74	5	34	60
I use a nice tone of voice in classroom discussions	2	36	62	5	57	40
I ask friends to do favors for me	9	59	33	22	59	19
Assertion						
I make friends easily	2	47	52	3	53	43
I ask adults for help when other children try to hit me or push me around	45	45	10	41	47	12
I am confident on dates	9	60	31	10	57	31
I am active in school activities such as sports or clubs	7	33	60	12	38	50
I ask someone I like for a date	34	53	12	34	50	16
I give compliments to members of the opposite sex	7	52	41	19	57	24
I start conversations with opposite-sex friends without feeling uneasy or nervous	5	55	40	10	71	19
I invite others to join in social activities	7	47	47	12	57	31
I get the attention of members of the opposite sex without feeling embarrassed	10	55	34	22	57	21
I start talks with classroom members	9	57	34	12	69	19
Empathy						
I say nice things to others when they have done something well	0	26	74	5	50	45
I try to understand how my friends feel when they are angry, upset, or sad	0	21	79	0	24	76
I ask friends for help with my problems	2	60	38	9	60	31
I feel sorry for others when bad things happen to them	0	34	66	5	55	40
I listen to my friends when they talk about problems they are having	0	22	78	2	36	62
I tell other people when they have done	3	43	53	5	67	28

something well						
I smile, wave or nod at others	0	19	81	7	43	50
I let friends know I like them by telling or showing them	3	48	48	5	55	40
I stand up for my friends when they have been unfairly criticized	5	40	55	9	43	48
I talk things over with classmates when there is a problem or an argument	7	64	29	17	67	16
Self-Control						
I ignore other children when they tease me or call me names	3	57	40	38	47	16
I disagree with adults without fighting or arguing	14	71	16	22	67	10
I avoid doing things with others that may get me into trouble with adults	6	59	34	22	38	40
I do nice things for my parents like helping with household chores without being asked	12	62	26	24	59	17
I compromise with parents or teachers when we have disagreements	9	64	28	15	62	22
I ignore classmates who are clowning around in class	10	69	21	41	51	9
I end fights with my parents calmly	10	69	21	16	59	26
I accept punishment from adults without getting mad	12	72	16	21	67	12
I control my temper when people are angry with me	12	57	31	22	52	26
I take criticism from my parents without getting angry	9	71	21	14	72	14

Appendix B

Parent Form Ratings on Individual Items

	Never	Sometimes	Very Often	Not Important	Important	Critical
Cooperation						
Helps you with household tasks without being told	7	69	24	3	75	19
Attempts household tasks before asking for your help	14	58	28	7	74	17
Uses free time in an acceptable way	2	50	48	0	69	29
Volunteers to help family members with tasks	7	55	37	0	67	31
Keeps room clean and neat without being reminded	29	50	21	5	75	19
Completes household tasks within a reasonable time	2	57	41	7	71	22
Attends to your instructions	2	47	52	0	45	55
Puts away belongings or other household property	5	71	24	3	83	14
Uses time appropriately while waiting for your help with homework or some other task	10	59	31	0	70	29
Asks sales clerks for information or assistance	7	34	59	4	54	42
Assertion						
Starts conversations rather than waiting for others to talk first	3	45	52	2	60	38
Participates in organized activities such as sports or clubs	7	34	59	2	50	47
Introduces himself or herself to new people without being told	10	47	43	2	54	43
Invites others to your home	5	36	59	2	64	33
Makes friends easily	7	47	46	2	36	62
Acknowledges compliments or praise from friends	0	32	68	4	64	32
Joins group activities without being told to	10	39	51	0	62	36
Is self-confident in social situations such as parties or group outings	10	43	47	0	58	42
Shows interest in a variety of things	2	43	55	0	56	44
Appears self-confident in social interactions with opposite-sex friends	7	43	50	1	57	42
Responsibility						

Says nice things about himself or herself when appropriate	3	62	34	3	63	33
Shows concern for friends and relatives of his or her own age	0	28	72	0	51	49
Appropriately expresses feelings when wronged	0	59	38	0	51	49
Follows rules when playing games with others	0	21	79	0	48	52
Waits turn in games or other activities	0	21	79	0	61	39
Informs you before going out with friends	0	22	74	0	37	63
Follows household rules	0	22	74	0	32	67
Reports accidents to appropriate persons	2	25	73	2	36	64
Is liked by others	0	14	86	0	49	51
Answers the phone appropriately	12	32	56	9	50	41
Self-Control						
Politely refuses unreasonable requests from others	0	59	41	0	42	58
Responds appropriately to teasing from friends or relatives of his or her own age	5	43	52	2	42	58
Responds appropriately when hit or pushed by other children	5	41	54	2	33	65
Avoids situations that are likely to result in trouble	0	28	72	2	26	74
Controls temper in conflict situations with you	7	51	42	0	32	68
Ends disagreements with you calmly	5	61	33	0	46	54
Speaks in an appropriate tone of voice at home	0	36	64	2	54	44
Controls temper with arguing with other children	0	51	49	0	44	56
Compromises in conflict situations by changing own ideas to reach agreement	7	71	21	2	64	34
Receives criticism well	9	63	29	2	48	50

* Due to parents not answering all items, items were averaged into numbers between 54 and 57 depending on number of items answered.