

Cultural constructs that impede discussions about variability in Speech-Based Educational models for deaf children with cochlear implants

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Abstract:

This paper identifies and discusses substantial variability in the product of cochlear implantation and in the outcomes of its requisite speech-based method of education. Current practices appear to be producing a population with great variation in hearing ability and in functional spoken language use – one that is not unlike the historical non-implanted population. It is proposed that many of the conclusions that support the application of speech-based treatments for implanted children rest on philosophical principles that are supported by fallacious argumentation – that they resemble systems of belief and practice that encourage the denial of observable facts. To the extent that such variability in the community is demonstrated, it is inappropriate to offer only one educational and linguistic option, especially when it cannot be shown that that option has been successful for a substantial proportion of the children. The paper ends with a call for the opponents in the classical debate on speech based vs. sign language-based methodologies to defuse their polar philosophical positions and begin a discussion of ways to provide the greatest levels of literacy and social competency for the largest number of deaf children.

Key words: Speech-Research and education. Deaf children-Education. Cochlear implants.

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The Speech Based vs. Sign Language Controversy

It is well known that a tension between speech based educational models and sign language based educational models for deaf children has existed for some time (JOHNSON; LIDDELL; ERTING, 1989; MAHSHIE, 1995; NOVER, 1995)¹. It centers on a discussion of how best to give deaf children access to language in general, literacy in particular, and to the things that children normally learn in school and daily life. One pole of the discussion could be labeled as the speech based approach, including at least oralism, mainstreaming or inclusion without sign language, cued speech, bimodal total communication, and similar approaches. It also includes those that use speech as the primary mode of communication in instructional situations, but may permit signing for social purposes only. Each of these approaches shares the characteristic that, no matter what the practitioners may think they are doing with other modalities, speech remains the most basic and influential factor in the linguistic picture. The other pole of the discussion has been labeled variously as manualism, bilingual education, bilingual-bicultural education, and so on. These approaches share the idea that a natural sign language such as ASL is a first and primary language, acquired through interaction with competent users, and a spoken language such as English is a second language, acquired primarily through visual access to print. Of course, the specific languages involved vary by which country or region of a country the child is in and most of the discussion that follows could apply well to places other than the United States. However, I will be limiting my remarks primarily to the situation in the United States, so will focus on American Sign Language (ASL) and English as the languages central to the discussion. For want of a more universal term, I have labeled this pole of the discussion as the ASL/ESL position, where ESL marks the phrase *English as a Second Language*. There are actually many combinations and permutations of these methodologies, but these two descriptions represent something like polar opposites for the discussion at hand.

In the past ten to fifteen years, with the increase in the number of children who receive cochlear implants early in life, and continuing pressure from the surgical community to move the age of implantation ever earlier, there has been an increased tension between the two approaches. It results from the fact that implantation in the United States is almost inextricably

linked to speech based educational methodologies. The outcome of this attachment has been a strong initial emphasis on speech based approaches for children with implants but also an increasing number of implanted children who, for one reason or another, have not done well in the sanctioned programs and who have migrated to more-traditional deaf educational settings.

Literature for parents considering implantation for their children tends to either state or imply that the implant will only succeed if the child is in the appropriate educational and rehabilitation environment – this environment usually interpreted as a speech based environment. This recommendation varies from subtle: “These results have implications for the socialization and education of children with cochlear implants, particularly with respect to on-time placement in mainstream educational environments with age peers” (NIPARKO; BLANKENHORN, 2003), to explicit: “Madell [...] stresses proper management. That has three components: •Fine-tuning [...] •Good therapy. Emphasizing listening to spoken language rather than lip reading or sign language. •Involved parents.” (DENOON, 2005). It is clear that most children are channeled directly to speech based programs upon receiving an implant. In certain cases it is said to be a requirement of receiving the surgery.

Parallel to the efforts of the surgical community to ensure speech based educational practices, there is increasing discussion in signing deaf school settings of the influx of implanted children and the changes this will bring to the entire approach to education in their schools. Cochlear implantation is widely seen as having potentially apocalyptic effects on traditional deaf educational institutions by removing many children from the educational pool on the one hand and by creating the need to educate implanted children with speech based techniques when they do arrive in the schools.

So the debate, somewhat quiet for some years, is re-emerging. It is not a new argument. It now bridges three centuries, having gained prominence and momentum around the turn of the 20th Century and again at the turn of the 21st. In the late 1800’s there were numerous conventions of deaf educators, in which the doctrine of speech based education gained almost universal favor and stood in opposition to several decades of notably successful sign language based education in France and the United States. These conventions were held at Milan in 1880, in Paris in

1889, in Chicago in 1893, in Geneva in 1896, and again in Paris in 1900. At each of these conventions, there were also deaf individuals, mostly French, who argued forcefully for the preservation of the more traditional approaches to deaf education – those involving the primary use of natural sign languages for instruction and the development of literacy skills in English (QUARTARARO, 1999).

There was also a resurgence of the discussion during the last two decades of the 20th Century and continuing to the present, with many of the same issues being discussed, and an increase in the acceptance of the ideas associated with an ASL/ESL approach (STRONG 1988; JOHNSON; LIDDELL; ERTING, 1989; JOHNSON, 1994; LIDDELL; JOHNSON, 1992; KUNTZE, 1992; RAMSEY, 1993; MAHSHIE, 1995; NOVER, 1995; LANE; HOFFMEISTER; BAHAN, 1996). Numerous ASL/ESL experiments were undertaken in the United States and Canada and in other countries in Europe and Latin America as well. By the end of the 20th Century bilingual approaches such as ASL/ESL had gained much wider favor throughout the world. But with the pressure from the medical community for speech based educational methods, the debate has warmed again.

After the presentation of a paper on the history of the debates during the 19th Century (QUARTARARO, 1999), a student remarked that it was interesting how, with calls for the use of sign language in the classroom, history was repeating itself. It is clear on closer examination, however, that history did not repeat itself. The debate never really stopped – especially among deaf people. At the time of this student's observation, the ASL/ESL approach had found renewed momentum in the wake of the Gallaudet Deaf President Now movement and the resulting sense of emancipation felt by the deaf community and educators who favored the traditional model. Thus, it was simply being addressed openly again after some years of public and institutional silence on the topic.

It is remarkable that the medical community interested in cochlear implants has not been very involved in the debate. Medical practitioners became allied early with the remnants of the moribund speech based educational establishment, and ignoring (or unaware of) the rather dismal results of such practices during the preceding century, proceeded with little consideration of a broader approach to the establishment of literacy and the education of children. In some sense they have been able to remain aloof from the discussion of educational practice, leaving that work to the

speech based educators with whom they are allied and who have largely resigned from the discussion of alternatives in deaf educational methodology. As a result, one might say that the debate in its present form is somewhat one-sided, taking place primarily among deaf people and deaf educators from outside the speech based establishment. Many of their claims are worth examining, but are not receiving attention from the medical decision-makers. In addition, many of the claims of the medical and speech-based educational communities have stood unexamined and unquestioned.

It is the purpose of this paper to attempt to bring the debate to the speech-based educational community, and to illuminate the issues that are critical to the discussion and the cultural and logical constructions that support them. The ultimate goal is to convince the decision-makers to consider an approach that permits the acquisition of a language and literacy by a large proportion of the children involved. In the discussion, I will be paying attention to the ways in which the supporters of speech based approaches employ their data and how they present their findings to the public. In addition, I will examine a set of cultural constructions that mediate the discussion, often causing a situation in which a real discussion cannot happen.

Some Observations About the Outcomes of Cochlear Implantation in Children

It may be surprising to know that interested persons not in the medical field cannot easily find the data upon which decisions about cochlear implantation have been based. Most results of research are reported in summary form, making the data opaque at best. Many appear in medical journals, which are available in medical libraries, but may be difficult to access for ordinary people. The outcome is that much of the work is represented as interpretations of research, leaving little information upon which an educated parent or advisor could make important and life-determining decisions for children. Even so, what is available is instructive about the outcomes and successes of cochlear implantation (CI) and the therapies and educational strategies employed with those children who receive CIs. First, it is worth noting that not all deaf children have received a CI, nor will they. The CI procedure remains limited to those with particular

types of severe hearing deficits, and among those there are other restrictions on candidacy for the surgery. It is emphasized in most literature on implantation that many children will not qualify for CI.

Numbers of Children with Cochlear Implants

Table 1 documents the steady growth of implantation in the years between 1992 and 2003. During that time, the percentage of children with CI grew from 1.4% to 7.9% of the overall sample of the Gallaudet University Annual Survey of Deaf and Hard of Hearing Children, which collects vital information on a large proportion of hearing impaired children receiving educational services in the United States. Note that the roughly 8% of children amounts to a raw number of 3189 (out of 40,282). Thus, the largest share of children with hearing deficits is still receiving more traditional audiological, therapeutic, and educational applications.

Table 1 – Cochlear implantees among school aged children with hearing impairments. Source: Mitchell (2004)

Annual Survey Year	Total in Survey	Total # Implantees	Percentage of Children Implanted
1992-93	48,300	663	1.4%
1995-96	48,274	1345	2.8%
2000-01	43,416	2565	5.9%
2001-02	42,361	2940	6.9%
2002-03	40,282	3189	7.9%

Table 2 separates the children with severe-to-profound deficits from the entire sample. The percentage of implanted children among only those who are the best candidates audiologicaly for the procedure now moves to nearly 15%. It is also the case that the number of children receiving CI has been increasing each year. There is no reason to expect this trend to be reversed. Thus, the number should be expected to grow. It is not clear what the top number will be because age limitations and other candidacy conditions change regularly, but they tend to change to include more children as candidates, rather than to restrict the size of the candidate pool.

Table 2 – Cochlear implantees with severe to profound hearing loss. Source: Mitchell (2004)

2002-03	Number Surveyed	Implantees	Percentage of Children Implanted
All children	40,282	3189	7.9%
Sev-Prof HL	19,909	2950	14.8%

With regard to the numbers of implantees, it is notable that the demographics of the population receiving CI procedures are predominantly White and predominantly from families with relatively high incomes. Allen (2000) and The Gallaudet Research Institute (1993-2003) report that the percentage of White children receiving CI was 86% and 65% in the 1992 and 2002 academic years, respectively and that in 2000 (ALLEN, 2000) 57% of implantees were from families with household incomes above \$50,000. Thus, though the balance seems to be swinging toward a more balanced accessibility for all children, CI remains largely a phenomenon for children from White, upper middle class families.

Variability in the Results of the CI Procedure

Examination of statements from the surgical community about the advisability of implantation illuminates an interesting fact about the outcomes of the procedure. Namely, virtually all commentaries address the fact that there is substantial variation in the outcomes of CI surgery. In addition to variations that might be caused by the medical uncertainties and risks associated with the procedure itself, it is clear that there is notable variability even among those for whom the surgery was a medical success. The conclusions of the Consensus Statement on Cochlear Implants of the National Institutes of Health illustrate this (see Appendix 1). In these conclusions it is stated that the results are more variable and more limited for children than for adults and for prelingually deaf individuals than for those who had acquired a spoken language before losing their hearing. At the time of the statement, results were more variable for prelingually deaf children implanted after the age of 6, though more recent results (to be discussed below) are more mixed on this topic. It also points out that there is a substantial amount of *unexplained variability* in the results of the

procedure, which I take to mean variability that cannot be attributed to the sorts of explanations above.

While there are many statements in the literature noting the existence of variability, there is little documentation of the nature or degree of variation. It tends to be noted but does not appear to be addressed with respect to the question of whether it is a condition that might affect the advisability of CI as a procedure. In certain cases, particularly the materials produced by the companies that manufacture the CI equipment, the variability is remarked upon and parents are advised not to have overly optimistic expectations. We will see later that this caution is generally background to much more prominent and optimistic predictions about the successes of the procedure.

One question that arises is, “variability in what?” The two significant kinds of variability in this situation would be either variability in ability to perceive and recognize sounds or variability in the outcomes of implantation on linguistic abilities. Data suggest that both kinds of variability exist in the population. Though they do not present audiometric data, Lux and Mahaffey (1998), in reporting the results of multi-site clinical trials for the Nucleus Spectra 22 cochlear implant system, mark extensive variability in the functional hearing and in the linguistic abilities of recipients of the system. They include the following observations on outcomes for two groups of recipients:

Postlinguistic Adults(##)

- Adults are able to hear conversation and environmental sounds at comfortable loudness levels.
- Almost all adults improve their communication abilities when using the implant in conjunction with lipreading.
- Adults are able to understand speech in quiet and noise without lipreading (these benefits are described on the following pages). Some adults have a limited ability to use the telephone.

Children

- Children are able to detect conversational level sounds, including speech, at comfortable loudness levels.
- Some(##) children can identify everyday sounds, such as car horns, doorbells and birds singing, from a set of alternatives. Many children can distinguish among different speech patterns.

- Many children can identify words from a set of alternatives without lipreading.
- Some children exhibit improved lipreading.
- A few children can recognize speech without lipreading.
- After training and experience with the device, many children demonstrate improvements in speech.

(##)NOTE: Prelinguistically deafened adults demonstrate limited benefit from a cochlear implant. Many improve in detection of sound, but only a few demonstrate improved lipreading after extensive training. Prelinguistically deafened adults who do not have functional oral speech and language and are not motivated to participate in rehabilitation, are more likely to become nonusers of the device than other adults.

(\$\$)NOTE: When the words “few”, “some” and “many” are used, they represent the following percentage of children who participated in clinical trials: Few – greater than 5% and equal to or less than 34%; Some – greater than 34%, less than 52%; Many – equal to or greater than 52%” (LUX; MAHAFFEY, 1998).

In this statement, it is clear that there is wide variation in hearing level and in linguistic functioning, especially in children, and, though there are no actual values attached to the statements, the interpretations of the words *few*, *some*, and *many* indicate that the variability is substantial.

Allen (2000) surveyed parents of implanted children about the outcomes of the procedures for their children. The following numbers indicate the percentages of parents reporting their impressions of how well their children could hear. Their children could:

Hear nothing	1%
Hear loud noises	4%
Hear loud voices and a few words	5%
Hear and understand a few words	18%
Hear and understand many words	28%
Hear and understand most words	43%

Note that the estimates of hearing above are conceived in terms of hearing words and noises. This is a common part of most audiological reports as well, where hearing is often evaluated on the basis of response to single words. The word-based tests of broad hearing ability take many forms from simple spondee recognition to various mixes of words in different logical and physical environments, such as closed set, open set, with noise, with lip reading, etc. Many scholarly reports of the results of implantation

note the same kinds of variability in such hearing tests. The degree of variability is difficult to assess from the reports alone however because the focus is typically on a positive shift in the mean hearing ability or word recognition ability of a group of recipients. We return to this point below.

It is critical to note that the ability to perceive words in isolation or in context is not the same as the ability to use a language receptively and may have nothing to do with the ability to use it expressively. Some audiologists have been aware of this fact for many decades and often include assessments of syntactic abilities and of speech intelligibility. Variability is typically noted in these assessments, as well. Much of the discourse about the success of implants remains focused on words, however, especially that discourse aimed at assisting parents make educational and medical decisions.

Assessing functional hearing abilities of a child is somewhat more difficult than measuring word reception. One approach is to ask a professional working in the school setting to provide a global assessment of a child's ability to use their hearing for normal communication. The goal of such global estimates is to focus on the child's entire functionality in the auditory form of the language rather than on audiological hearing or details of grammatical structure or on the ability to identify words in a carefully constructed test. It concerns the child's use of the language in everyday school contexts rather than in closely constrained experimental situations. This approach has obvious limitations but can be instructive in getting an overall picture of the child's use of their hearing as they function in the language. Such ratings provide information from people who see the children in the everyday school setting and thus can provide a very different picture from observations in experimental contexts. In addition, it is not measuring isolated laboratory tasks that might present more easily achieved positive results than an examination of the globally complex task of using a whole language to communicate in rich social environments.

One such assessment is requested as a part of the Annual Survey of Deaf and Hard of Hearing Children and Youth conducted by the Gallaudet Research Institute. Table 3 summarizes the responses of the school professionals for the more than 40,000 children identified in the survey year 2003-2004. Mitchell (2004) separated the functional hearing ability data on children with implants, noting also whether or not the child used the CI in instructional settings. The possible responses are: *functions normally*, *mildly limited*, *severely limited*, and *no functional hearing*.

Table 3 – Functional Hearing Ability of Severe to Profound Implantees.
Source: Mitchell (2004)

Children with Implants Functional Hearing Ability	Cochlear Implant Use for Instruction		
Functions Normally	Ceased or Never Used	0	4.4%
	Currently Using	131	
Mildly Limited	Ceased or Never Used	12	33.4%
	Currently Using	973	
Severely Limited	Ceased or Never Used	114	50.5%
	Currently Using	1375	
No Functional Hearing	Ceased or Never Used	143	11.7%
	Currently Using	202	

Several interesting facts emerge from these data. The first is that we see once again substantial variability in the data. Rather than a uniform picture of successful functional hearing use, we see scores that are skewed toward limited functionality. According to the hearing professionals, only slightly more than 4% of the implanted children have normal functional hearing ability, slightly more than 33% are mildly limited in their functioning, 50.5% are severely limited, and nearly 12% are reported to have no functional hearing. Note that this sample does not separate children by etiology of deafness, age at implantation, audiological scores, or previous experience with spoken language. Looking at this holistic picture of the population demonstrates that over 62% of children with CI have severe limitations in their abilities to use spoken English in their everyday school lives. This is not to suggest that the children are not getting a benefit from the CI. Testing of word recognition, speech intelligibility, syntactic abilities, discrimination of gross environmental sounds, and so on, generally yields more positive results than these data. These benefits, however, may not be sufficient to justify uniformly placing the bulk of implanted children in speech based educational settings. We will return to this point later.

The second interesting fact to emerge from these data is the degree to which children with implants continue to use them. There is a popular notion among CI professionals and educators who defend speech-based education that failure to acquire functional abilities in spoken language stems

in part from rejection of the device by the child. Here we see that over 90% of the children with CI are still using them in the classroom. More critically, although the proportion of children not using their CI devices in instructional settings increases as functional hearing abilities decrease (100% of the normally functioning children, nearly 99% of the mildly limited children, over 92% of the severely limited children, and almost 59% of those children with no functional hearing are using their CI devices), discontinuation of use could not account for the variability. Thus, although not using one's CI device would logically inhibit functional hearing abilities, these numbers suggest that non-use cannot be the only causal factor. That is, almost all the children who demonstrate severe limitations in functional hearing are still using their devices, as are almost 60% of those who are judged to have no functionally useful hearing at all. It is likely that the cause and effect relationship is reversed. Namely, it could be that some children who are finding little functional value in their CI systems choose – quite logically – to suspend their use. It is likely as well that the high cost of implantation and the high levels of emotional investment in the systems engendered in parents lead children to continue the use of their systems when they are not getting substantial benefit from them.

Concerns with Variability

In summary, despite didactic claims to the contrary, there is only slim evidence that CIs coupled with speech based methodologies have been impressively successful at establishing widespread, native-like spoken language abilities with prelingually deaf children. All statements hedge this success and studies of language abilities in various forms are quite mixed, supporting the idea that even with implants educating prelingually deaf children in a speech based environment is challenging and not wildly successful.

In examining virtually any of the materials concerning CI in children, one encounters a picture of great variability in the audiological, linguistic, and educational outcomes of the procedure. But it is the case that the population of deaf and hard of hearing children has always exhibited great variability in each of these domains. No matter what audiological or educational treatments have been applied to deaf children over the past 150 years, there is variability in the outcomes. In the 2003 Survey of Deaf

and Hard of Hearing Children and Youth (GALLAUDET RESEARCH INSTITUTE, 2003b), for example, of the 34,782 children for whom hearing loss data were reported, 16.3% had normal hearing, 11.7% had a mild impairment, 13% had moderate impairments, 12.3% had moderate to severe impairments, 15.4% were severely impaired, and 31.2 % had profound impairments. Though this cannot be compared directly to the functional hearing data, its wide range of variability and predictions we might make about functional hearing use and degree of hearing impairment suggest that the population being created by implantation is reminiscent in variability of the deaf populations that exist without implantation.

In any population of deaf children under virtually any educational regimen, we can predict that a small percentage will function well with their hearing, a larger but still small proportion will exhibit some limitation, and a large proportion will be more severely limited. Thus, variability in the population is neither new nor surprising. In fact, professionals working with deaf children have attempted to account for it by improvements in methodology for many years. Claims of success for any educational approach are always ultimately couched in terms of reducing variability and moving performance upward from the more limited poles to the less limited poles of any measure. During the last three decades of the 20th Century, it was exactly this sort and degree of variability of results that led to a widespread rejection of the oralist approach, which was a one-size-fits-all, speech based, approach that chose not to look at the unacceptable levels of variability in its results.

One might expect variability to decrease in children treated with technological systems such as CI, especially considering the immense investment of economic, scientific, and human resources that have been put behind them. If variability does not decrease, one expects the researchers to ask why. Such levels of unexplained variability in a sample or a population should be cause to take a serious look at the utility of CI systems as the central figure in the language acquisition picture and to reexamine the notion that all children with CI should be pressured to enter speech based environments. It is significant that most treatments of the utility of implantation argue that the language acquisition benefits are the central aspect in a cost-benefit analysis and that these benefits outweigh the simple benefits of improvement of access to environmental sounds. To the extent that they believe this, more researchers should be asking hard questions

about the validity of their assumption. Few other domains of research or commerce would accept such high levels of variability. Carmakers, airlines, and tobacco manufacturers are required to account seriously and publicly for levels of variability that are miniscule by comparison. In addition, if medical CI researchers are finding, as they report (HOUSE, 1995), that the audiological variability of the population is in fact reduced through implantation, then they might do well to examine their generally unwavering commitment to speech based educational approaches, which could ultimately be found to be contributing to the increased variability.

It is interesting that some supporters of CI do not seem to be bothered by the variability, sometimes implying more impressive results than one would see on careful examination of the literature. DeNoon (2005) again quotes a highly placed hearing professional:

Madell says there's nothing wrong with high hopes – providing children and their parents are willing to work hard for success. 'We expect outstanding results,' she says. 'I believe there is virtually nobody who doesn't do well with cochlear implants if they are managed appropriately.'

It is significant that she cites her belief in this regard, since the data seem to suggest that many children do not do well. The remainder of this paper will be addressed to the question of why proponents of CI are prone to believe in the success of their systems, even in the face of contradictory evidence.

ASL/ESL Approaches in a Highly Variable Deaf Population

The predominance of speech only, oral models of deaf education began to wane in the 1970's, as the proponents of total communication and bimodalism² made use of emerging statistics to show that the outcomes of the practices had failed to produce acceptable numbers of literate, English-proficient children. Bimodal approaches reintroduced the use of natural sign languages into educational practice, but only as coterminous representations of speech. Johnson, Liddell and Erting (1989, p. 3-9) argued that the practice of bimodalism in the classroom in the form of what they label as *sign supported speech* in practice constitutes a speech based methodology. From this perspective, it is not surprising that bimodalism had little success

at reducing variability in achievement and literacy in the young deaf population during its years of prominence. The results look like those of other speech based approaches because the practices are essentially the same. Though there is great variability in the capabilities of the children to deal with spoken language, only spoken language is presented or condoned and so the large proportion of children who do not function well through hearing alone do not – and, in fact, Johnson, Liddell and Erting argue, cannot – succeed in the development of linguistic, social and educational skills. In other words, in both oral and bimodal approaches, rigid adherence to one, form-prominent means of communicating provides access to success only for the small percentage of the children who happen to be able to communicate in that way. Most often, it has been exactly those who hear (hard of hearing) or who have heard (postlingually deaf) spoken English, who do best in a spoken English environment. Thus, the larger share of the population is left without access to information and often without sufficient attainment of the things they should know and the skills they should have at the time they should have them.

In the 1990's a movement toward ASL/ESL approaches emerged and became quite influential. For various political and social reasons, the bulk of children have remained in speech based, inclusion settings, but there was a strong movement, especially in traditional deaf education, to begin to employ ASL/ESL techniques. Referred to broadly as bilingual approaches, and encouraged during the past decade by the organization of the STAR Schools Project (NOVER; ANDREWS, 1998), a number of schools throughout the United States and Canada have instituted such programs. There is ample argument in favor of considering such approaches to educating deaf children, as elucidated in a number of publications from this period (STRONG 1988; JOHNSON; LIDDELL; ERTING, 1989; JOHNSON, 1994; LIDDELL; JOHNSON, 1992; KUNTZE, 1992; RAMSEY, 1993; MAHSHIE, 1995; NOVER, 1995; LANE; HOFFMEISTER; BAHAN, 1996; ERTING; PFAU, 1997; BAILES, 2001). Perhaps the most distinctive characteristic of ASL/ESL programs is that they focus on and take advantage of what deaf children are rather than what they are not. In this regard, they attempt to recognize and respect the integrity and vitality of what we might call *deaf personhood*, which begins with the notion, alien to medicalized approaches to deafness, that being deaf is inherently neither a problem nor a tragedy, either for the person

who is deaf or for society, and that the set of linguistic and social facts surrounding deafness actually present an effective avenue to providing deaf children with a first language, with access to the things that schools teach, and with a means to becoming literate in English.

Normal Language Acquisition Environments for Deaf Children

These approaches are based in the observation that deaf children in normal first language acquisition environments acquire language in a complete and timely way, while developing age-appropriate cognitive, physical and social capacities. A *normal* language acquisition environment from this perspective is one in which the child has full sensory access to the signals of a natural language that is used by a community of adults and children. It is also one in which first language acquisition occurs naturally through a combination of the inherent abilities of the children and indigenous linguistic, cultural and social practices of the community in which the child is embedded. The only logical candidate for a first language in these terms is a natural sign language such as ASL, since deaf children, by definition³, do not have full sensory access to spoken English. ASL/ESL approaches attempt to create environments that provide full first language access to a natural signed language in as timely a manner as is possible⁴.

Other Outcomes

The social and cognitive benefits of timely first language acquisition are apparent, but there are also important consequences for the development of literacy and for the ability to access the content of a school curriculum. Specifically, it is clear in virtually all the studies of deaf children's educational achievement that those who have had early exposure and sensory access to a natural language perform at a consistently higher level, a fact repeated widely in the CI public relations literature. This group comprises those who have a postlingual hearing impairment, those who have significant amounts of functional residual hearing, and those born into deaf families. These groups tend to outscore other children both in academic achievement and in literacy. Several factors certainly contribute to these outcomes. First, they have acquired their first language as a member of some community of users. Bringing all the concomitant linguistic, social, cultural, and cognitive skills that this implies

to the first day of school provides a significant advantage over those children who must acquire a first language and many of these aspects of functional success as a part of the process of schooling itself. Secondly, most have had sensory access to important aspects of the culture of literacy as it is presented to children from infancy by parents and others. Third, for those who begin life in an environment containing substantial numbers of deaf people, developing facility with a natural signed language provides linguistic experience with variation (aspects of English structure mixed into signed utterances in certain contexts), manual representation of text (fingerspelling), and access to indigenous practices of the integration of literacy with proficiency in a signed language (JOHNSON, 1994; ERTING; PFAU, 1997; BAILES, 2001). Fourth, the approach to both first and second language acquisition, takes advantage of deaf children's capabilities as people who see rather than as people who do not hear but should be made to (LANE; HOFFMEISTER; BAHAN, 1996). Thus, the acquisition of ASL as the first language, accomplished naturally through normal interaction, is visual, as is the acquisition of English, accomplished through written and signed interaction around print. Such approaches do not discourage or otherwise hinder the development of speech for those children who benefit from it, and, in fact, encourage the development of "oracy" (NOVER; CHRISTENSEN; CHENG, 1998)⁵. The critical fact with respect to spoken English is that, in the practice of these approaches, speech and hearing abilities function as the primary and central determinant of the accomplishment of first or second language proficiencies nor does their absence function as an impediment to access to curricular content.

Finally, and perhaps most pertinent to the topic at hand, programs such as these provide a much more flexible and responsive set of pedagogical conditions, in which the great variability among deaf students is anticipated and in which the variability is met with a variety of educational tools, in an attempt to bring the largest proportion possible of deaf children to the highest possible levels of linguistic competence, educational achievement, and English literacy. The approaches accommodate children with a variety of functional hearing abilities and a variety of linguistic needs, focusing and capitalizing on the linguistic capabilities present in the child, rather than demanding a slavish and rigid adherence to the form of the communication. Thus, they attempt to accomplish their goals without giving an unintended advantage to those who are more proficient at speech.

As a result of all these considerations, such programs in the United States are reporting promising successes in a broad range of educational and linguistic indicators (NOVER, 2002)⁶. These advances span the last 25 years and coincide closely in time with the emergence and proliferation of cochlear implantation. Thus, on first inspection, it seems odd that they have had so little influence in the discussion of how implanted children might be dealt with after they are out of the operating room. To understand why, I turn to an examination of cultural and logical impediments to the acceptance of ASL/ESL approaches by the CI and speech based educational community.

Cultural and Logical Impediments to the Acceptance of ASL/ESL Approaches

In an earlier paper (JOHNSON, 1998) I proposed that Geertz' model for religion and magic as interpretive systems had apparent applications in the field of deaf education (GEERTZ, 1966). Geertz (1996) proposes that those systems typically referred to as religious or magical have their basis in the human need to interpret one's surroundings. Interpretation is, he proposes, the primary tool by which humans adapt to their surroundings and conditions. Thus, the ability to interpret in such a way and the confidence that one's interpretations are sound has serious consequences for survival and success. Knowing that one's interpretations are correct leads to a kind of adaptive security – the feeling that the world as one sees it is right with actual facts and that our interpretations will help us manage it more successfully. Building on this assumption, Geertz (1996) acknowledges that conditions do not always match the established interpretations. In such cases, the incongruence between what is and what one thought it was leads to a kind of insecurity, which in turn leads to attempts to right the incongruity.

It is a part of human character, he suggests, that when we cannot do anything about the facts of the situation, we construct sets of beliefs that propose a reality different from that we observe and that permit us to forget about the situation over which we are powerless. We then relate to our new constructions of reality, calling up our belief in them when our interpretations are threatened. In addition, we develop sets of ritual practices that support the perception that the beliefs are correct. In Geertz' terms these ritual practices become "models of" and "models for" the beliefs

we have constructed. This results in a circular kind of logic that supports sets of irrefutable assumptions about the world. It is circular in that the beliefs function to support the conduct of the practices and the performing the practices supports the validity of the beliefs. This circular logic permits the denial of the original observed situation that was in conflict with the interpretations. Most importantly, the relationship between the beliefs and practices creates systems of belief that are largely unassailable exactly because they cannot be refuted. Any assault on one part of the system is dismissed by reference to another and, thus, the basic assumptions cannot be disproven. Figure 1 diagrams this flow of argumentation.

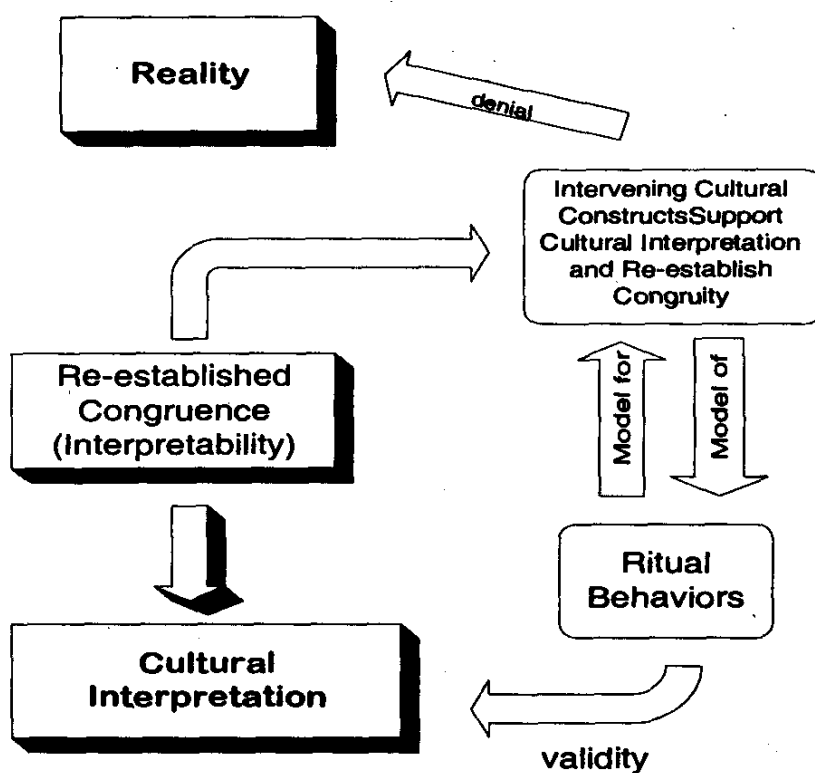


Figure 1 – Ritual behaviors as models of and models for constructed beliefs and the support of denial of observed reality (JOHNSON, 1998 after GEERTZ, 1966).

Geertz (1996) was attempting to explain the function of religious beliefs and ritual practices in human societies, but his principles apply to the systems of belief and the practices we employ around them in dealing with language acquisition, provisions of curricular content, and literacy for deaf children. If we were to seek something akin to Geertz’ observed reality, we might note, among other things, that deaf children do not hear well enough to function in ordinary social and educational contexts and

that this fact tends to remain true through a deaf person's life. That is, historically, there has been little that educators could do to change the fact of deafness and its associated limitations on acquiring information from ordinary environments and there has been little that immense effort from parents and positive, cooperative attitudes of children could change about the fact of deafness.

Improvements in assistive hearing technology have been touted widely as means of overcoming the fact of deafness so that children can function normally in ordinary social and educational situations. The museums of schools for the deaf and the closets of families with deaf children are full of such innovations. The lesson of the debate about educational practice at the end of the 20th Century was that even these things had had little impact on the bulk of deaf children and their literacy and educational achievement (JOHNSON; LIDDELL; ERTING, 1989). The discussion earlier in this paper suggests that cochlear implantation has not had a decidedly different impact on the situation, with a large proportion of the children still not achieving acceptable or age appropriate levels of literacy.

Cultural Beliefs that Moderate the Discussion

The discussion about deaf educational practice is moderated by a set of cultural assumptions that construct attitudes about various phenomena associated with the topic of deafness. It is apparent that participants in the discussion typically do not address these issues directly, but often assume that they share the beliefs and attitudes. Two examples make this point clear. The first is a reflection on life in a residential school by Francis LaFlesche:

[...] we youngsters were fond of companionship and of talking. [...] we chattered incessantly of the things that occupied our minds [...] When we entered the [residential] School, we experienced a [...] hardship, for there we encountered a rule that prohibited the use of our own language, which rule was rigidly enforced, so that the newcomer, however socially inclined, was obliged to go about like a little dummy until he had learned to express himself in English. (LAFLESCHE, 1978).

When I show this quotation to students in my classes they consistently guess that Mr. LaFlesche was a deaf man, writing about his experiences in a residential institution for deaf children. In fact, he was a hearing Omaha Indian, who went to an Indian boarding school in the late 1800's. The point is that the insistence on English and the suppression of other, non-English languages is not entirely an issue faced by deaf education. It has something to do with more general notions that our society applies to education at large and to ideas about what constitutes a successful citizen.

The second is a report of a conversation I had with a distinguished CI surgeon over lunch at an NIH panel meeting. In chatting, I asked him about what problems his center was facing around the issue of implantation. His response was that they had a problem with deaf adults wanting CIs. I asked why that was a problem. He answered that deaf adults just wanted the implants to improve their hearing. Puzzled, I naively told him that I thought that the purpose of a CI was to improve hearing. He said, no, that the CI is not primarily a hearing device but is a language acquisition device and, as such, would somehow be wasted on adults who only wanted to improve their access to environmental sounds. This conversation taught me that in our debates around this topic, though we are using the same words, we often mean different things by them and that we may thus have very different notions about the purposes and applications of specific practices.

It is clear that the proponents of speech based approaches are not alone in holding tightly to cultural beliefs. Both sides of the discussion adhere to particular principles that they assume to be shared and that they assume to be correct. In fact, there exist a number of recurrent, contrastive cultural constructs that tend to oppose each other in all these discussions, but that seldom are addressed directly. In this way, the speech based-ASL/ESL controversy stands as a metaphor for these more fundamental sets of beliefs. As basic constructs in our belief systems, our affiliation to a particular value can be determinant of our approaches to practice. In Geertz' (1996) terms the beliefs function as models for practice, but also in accord with his observations, their cultural force may obscure observations we would otherwise be able to make about deaf children and their performance in educational settings. These constructs appear in contrastive sets, apparently polar in their values and intractable in their opposition. Below, I briefly address some of them.

Beliefs about the Nature of Deafness

This issue has been addressed in the literature of supporters of sign language based educational programming at length and for many years. Its essential contrast is between a notion that says that deafness is at its core a condition and one that proposes that deafness, though informed by a physical disability, is essentially a cultural attitude. Represented widely as the *medical* vs. the *cultural* views of deafness, the discussion is neatly documented, summarized and exemplified by Lane, Hoffmeister and Bahan (1996).

Deafness as a Condition: the proponents of the first notion argue that deafness is hearing impairment – nothing more and nothing less: a physical phenomenon, a medical deficiency, and a life-limiting tragedy if not treated. In this view deafness is best met with physical solutions that attempt to overcome its effect and make the deaf person hear better. The ultimate outcome of such solutions, from this perspective, would be prevention and cure of deafness. Short of these ultimate solutions, any treatment that improves access to sound is seen as beneficial. This definition of deafness stems from attitudes of people who are not deaf and thus may be seen as exocentric in its construction (JOHNSON; ERTING, 1989).

Deafness as an Attitude: the second argument suggests that, while the essential definition of deafness grows from an inability to hear, the critical facts about deafness lie in the unique cultural manifestations that have grown around social groupings of deaf people. This focus suggests that the language, culture, and society of deaf people are more important facts about them than their oppositional contrast to people who can hear. It is, then, an endocentric construction of deafness, that argues that deaf people do not need to be made into hearing people; that they are sufficient as they are.

Beliefs about Diversity in our Society

Assimilation vs. Cultural Pluralism: the history of the United States and much of the rest of the modern world has been characterized by vast movements of a variety of populations to unfamiliar cultural milieus and an ensuing requisite assimilation of those populations into the mainstream of the host societies. In many countries, immigrant families become largely assimilated within two generations of the original arrivals. This tendency toward rapid assimilation is marked especially by the acquisition of native

linguistic abilities in the host language and is accompanied by a set of assumptions about the positive value of a society in which everyone uses the same language and shares all cultural assumptions. The pressures toward assimilation and the ease with which it was accomplished by many immigrants from Europe, combine to create a notion that people who do not assimilate are somehow exercising a form of stubbornness, and, thus, cannot expect to achieve the same levels of access to the goods of the society as those achieved by those willing to assimilate. From this perspective there is little value placed on cultural or linguistic pluralism, which is its contrastive opposite. The perspective of pluralism would claim that there is benefit to the society in maintaining a variety of linguistic and cultural traditions and that it is possible to design a social order in which people are free to practice different ways of being and still able to participate in the activities that provide the goods of the society.

Inclusion vs. Segregation: the assimilation – pluralism opposition found its most forceful form in discussions in the United States about school desegregation in the second half of the 20th Century. Many of the individuals now in a position to make decisions about the form of deaf educational practice grew up with the emerging notion that the educational separation of any group is a form of cultural evil, to be defeated through programs that foster a mixture of all kinds of children in our classrooms. To the extent that institutional racism has inhibited access and success of a group of people on the basis of their race or ethnic origin, these attitudes are well taken. As a result of the cultural turmoil around this issue in the 1950's and 1960's, these attitudes now carry the force of law and have led to the notion of *inclusion* in special education and deaf education. Inclusion suggests that it is detrimental to disabled children to be separated from "able" children, and that adaptations must be made to include such children in the society of the ordinary classroom.

Bring to this discussion the observation of proponents of ASL/ESL that deaf children prosper in an environment in which they have access to sign language as a primary language and in which everyone uses that language. To many people this smacks of segregation and of the creation of a "deaf ghetto," one in which deaf children are not allowed to learn to live in the "hearing world." The tension between these views is a particularly powerful emblem in the debate about deaf educational methods, and though often unspoken, is apparent in most treatments of the topic.

Beliefs about Language in our Society

New World societies tend to be determinedly monolingual. Whereas in Europe and Asia bilingualism is common, it tends to be undervalued and sometimes even disparaged in the United States and other American countries. In the early 1900's, largely as a result of the First World War, attitudes of chauvinism overcame a widespread and native bilingualism in the United States. This period came on the heels of the universal education movement, which proposed to create a uniform and widespread populace, literate in English and adept at American cultural practices, and which spelled the end to a long tradition of bilingual schools for the offspring of immigrants. From the perspective of deaf education, it grew from the oral movement, which claimed that bilingualism was actually harmful to deaf people, inhibiting the ability to speak English and integrate with the society. The result is that English stands in opposition to all other languages and functions as an emblem of acceptable levels of assimilation to the United States.

As Reagan (2005) suggests, bilingualism for anyone – but especially for deaf people – becomes framed as a problem rather than as a natural condition or as a resource for the society. In addition, he points out, bilingualism is typically seen as an undesirable characteristic of the children of immigrants – a problem that can be overcome by a form of bilingual education designed to replace children's native languages with English.

Standing in opposition to this view is the idea that bilingualism is actually beneficial, both to the bilingual individual, who is portrayed as having certain social and even cognitive benefits (JOHNSON; LIDDELL; ERTING, 1989) and to society. Speaking from this standpoint, Moraes (1996), arguing that bilingual education should foster both languages rather than replace one, asks who benefits from bilingualism? Her answer is that everyone does. The encouragement of bilingualism as a resource then stands in contrast to the notion that English alone is necessary and sufficient.

Beliefs about how we should deal with deaf-related issues

Intervention: it is the case that most practices concerning deaf children through the years have assumed that in order to succeed with the establishment of literacy, one must intervene with carefully designed and programmed English language and speech curricula. In the absence of

such interventions, it is assumed, deaf children will either follow the natural but undesirable path of using a sign language or will not learn anything. This notion is not exclusive to deaf education, of course. American schools in general, from pre-schools through graduate programs, are designed according to the principle that the teacher teaches and the child absorbs what is offered. Thus, in most American classrooms the teacher is the expert, designates what the students will learn, and evaluates them according to how closely they are able to demonstrate mastery of that material.

This practice has been extended widely to the enterprise of establishing literacy in deaf children. Most methods for teaching deaf children are designed as interventions and most have very structured and teacher-driven designs. Some have been behaviorist in orientation, making use of learning objectives and lockstep lessons, each designed to train the student in some component of the complex process of language use and literacy. Noticing that things were not working well, practitioners have pushed the interventions ever earlier in an attempt to bring children up to speed on time. And though some such programs have now been renamed to the politically more correct "early childhood education," early intervention is still seen as a necessary activity in many programs.

Naturalism and Indigenous Practices: in contrast to this is a set of practices that attempt to take advantage of natural abilities and tendencies that children bring to the classroom. In particular, proponents of these approaches note that deaf children are not in any way restricted in their ability to acquire a language naturally as long as they can get sensory access to the signals of the language. From this perspective, it is largely unnecessary to structure the learning experience of the child or to teach the details of the language, except in so far as it is necessary to put the child in contact with adults and other children who use the language in an ordinary way. In addition, building on the principle of natural acquisition, natural sign languages are encouraged and used as the language of instruction with the assumption that children who have acquired a language can use it effectively to talk about curricular matter.

The development of literacy in English likewise benefits from children's natural abilities to acquire languages. In such programs access to English is through print, which is accessible to deaf children. Moreover, such programs make use of what we now know to be indigenous practices employed by deaf parents as their children acquire English and learn to be

literate. Many of these practices can be modeled and built into the design of classroom interaction in such a way that children who do not come from deaf homes have access to literacy through them.

Models of Educational Discourse for Deaf Children

Audio-Centric Model: some educators believe that all social and educational discourse with deaf children should be auditory, to take advantage of whatever functional hearing abilities they have. The notion appears to be that hearing must be exercised constantly and excessively and that if it is not, the ability to use it will atrophy, allowing the child to revert to the undesirable practice of visually processing the language. Such models tend to exclude sign languages, arguing that their use inhibits the learning of speech and speech reading.

Visio-Centric Model: this model is built on the observation that deaf children are not only children who do not hear, but that they are also children who *do* see and who, therefore, tend to process the world primarily through their eyes. In general, programs built on this model do not attempt to exclude auditory processing strategies, but simply do not rely centrally on them for first language acquisition. Rather, the emphasis in the central pursuits of language acquisition, instruction, and the teaching of literacy is on visual models of discourse, with speech-based discourse being treated as a desirable, but not necessary, aspect of what children learn to do. The central idea underlying this is that all hearing impaired children (given the absence of visual impairments) can see and do tend to process things visually. Thus, the critical activities of a classroom are available to all, equitably.

Notions about Deaf People

Implantee vs. Deaf Person: there also exist beliefs about what constitutes a “deaf” person. The DeNoon (2005) article refers to implanted children as “once-deaf kids,” implying that an implanted child is not a deaf child. The deaf community in some quarters agrees, arguing that an implanted child lacks the linguistic, cultural, and social attributes to be called “Deaf” (CHRISTIANSEN; LEIGH, 2002).

In contrast to this, are those who notice that the greater proportion of implanted children still function poorly with their hearing and from this perspective need to be considered as deaf when planning educational

programs for them. This is especially true in signing schools in which there has been an influx of implanted children who have not excelled in the speech based environments into which they were initially placed.

Values of the Medical Community vs. Values of the Deaf Community

In the literature on implants there also appear many discussions of the ethics of implantation. These center on a number of issues, including the child's right to bodily integrity, the parents' ethical right to decide on interventions that alter who that child might be as an adult, society's tolerance of experimentation and innovative research on very young children, and the deaf community's right to its membership in contrast to genetic and surgical manipulation of the population. The medical community, including much of the speech based community, tends to support any medical intervention, feeling that they are improving the conditions for deaf children. The ASL/ESL education community and the deaf community at large has tended to be less optimistic about medical intervention, tending to favor the rights of the child and the integrity of the community.

Practices that Support the Belief in Speech-Based Education

When this collection of cultural constructions is stacked up together it appears to constitute two polar views of all things connected to deafness (Table 4). The cluster of attitudes and beliefs associated with the left side of the list tends to motivate the discussions of educators who support the speech based approach while those on the right tend to inform the arguments of the ASL/ESL educators. Moreover, each vertical listing tends to function in discussions to support each of the others, so that if one is challenged, one of the others can be called upon to shore up the overall belief system. If, for example, one challenges the issue of using speech only with deaf children, claiming that they have better access to signed languages, the response might admit that this is true, but then remind the critic that we believe that English is important and that people who speak are more successful in life. This has the function of diverting the argument from principles of observation to principles of belief. This complex of beliefs stands to support the use of speech based methods in the face of

levels of variability that should cause an examination of the value and validity of the methods.

Table 4 – Summary of the Values in Contrast

Deafness as condition	vs.	Deafness as attitude
English	vs.	ASL
Monolingualism	vs.	Bilingualism
Intervention	vs.	Naturalism
Audio-Centric Models	vs.	Visio-Centric Models
Implantee	vs.	Deaf Person
Medical community values	vs.	Deaf community values

But the use of speech based education is supported by more than just belief. In ethics, arguments based on principle or belief alone are seen as fallacious, since they cannot be disproven. Nonetheless, they are effective at deflecting criticism and refocusing or deflating the debate. Consider, for example, a response to arguments about the ethics of implantation. Lane and Bahan (1998) illuminate three ethical dilemmas posed by the practice of implantation on children, and Lane and Grodin (1997) argue that implantation constitutes a form of eugenics. In response to the latter paper Davis (1997) dismisses it largely on the basis of her own beliefs about what constitutes cultural membership.

Because I reject the notion that physical characteristics constitute cultural membership, I argue that, even if the claim were persuasive that deafness is a culture rather than a disability, there is no reason to fault hearing parents who choose cochlear implants for their deaf children. (DAVIS, 1997, p. 253).

In response, one could try to change her mind, but in the end there is no argument with belief, and therefore there is no argument at all.

More critically, much of the justification for speech based educational practices is also supported by research practices governed by fallacious argumentation and inductive of spurious conclusions, but, because they are supported by the belief systems we have examined, are not questioned with the logical rigor that they might be in another field of scientific endeavor, less governed by principled belief.

Commitment to Paradigm

At the core of the problems with research conclusions about the effectiveness of CI is its commitment to the paradigm of speech based education. It clings tenaciously to its authoritarian demands for oral education, bolstered by its affiliation with the long-time oral education establishment. This is evident in observations cited earlier in the paper and is inherent in virtually all materials that purport to inform parents about the benefits and risks of implantation. The FDA statement on the benefits of cochlear implantation, for example, suggests that,

- Benefit of an implant depends, in part, on the type of communication training (total communication, auditory-oral communication, cued speech, etc.) a student used before the implant;
- Type of communication the student uses after the implant;
- To get maximum benefit from a cochlear implant, a student will need individual training, such as speech training, lip reading training, auditory training. (UNITED STATES FOOD AND DRUG ADMINISTRATION, 2005, p. 1).

Denial of Variability

We mentioned earlier that the results of CI appear to have yielded a population with a great degree of variability, both in functional hearing abilities and in educational and linguistic outcomes. Virtually all materials on the topic mention what is often called unexplained variability, but few reflect on that variability as challenging the validity of either the implantation systems as hearing enhancement devices or the educational practices as rehabilitative paradigms. In certain cases, it is identified and even quantified, but seen to be a positive outcome anyway: “Overall, Haensel’s team found that 14 of 16 kids who got implants now say they can hear. Four of the kids learned to hear and speak well enough to enter mainstream schools. But six of the kids never learned to understand normal speech.” (DENOON, 2005). Given that this research claims an impressive success when only 28% of the participants function well enough to enter ordinary educational contexts, one is left to assume either that they didn’t notice that

the other 72% didn't do well (and in fact that a striking 43% did extremely poorly) or that they have a notion of success that is less rigorous than that we would apply to other endeavors. Botelho (2002, 2004) illuminates a range of examples of this practice within deaf education. She terms it "minimizing the difficulty" and describes it in logical terms as "the admission but subsequent exclusion of exceptions to maintain the former assumption" (BOTELHO, 2004).

Alternatively, we can think of their claims as constituting an example of the sort described by Geertz. In this case, the variability is dismissed by a competing explanation:

The kids in the German study were 3 to 12 years old when they got their implants. Those who never learned to understand normal speech got their implants latest. That's because there's a window of opportunity for children to get the maximum benefit from cochlear implants, says Douglas Mattox, MD, professor and chair of otolaryngology at Atlanta's Emory University. (DENOON, 2005, p. 456).

It is interesting to discover, however, that first, the critical period hypothesis has been under examination and has been largely dismissed by linguists studying language acquisition, especially with reference to the acquisition of syntax. Though plasticity in language acquisition tends to decrease with age for some people, it does not for all, and there is no hard and fast milestone after which the acquisition of the syntax of a language is universally inhibited (BAILEY; BRUER; SYMONS; LICHTMAN 2001; BIRDSONG, 1999). Secondly, and much more critical to the argument at hand, is the fact that the results of the research on CI, performed by the advocates of CI and speech based education themselves, do not support the oft-stated belief that earlier implantation necessarily leads to better language acquisition.

In fact, they are quite mixed. Geers (2004) states: "For children who receive a cochlear implant between the ages of 2 and 4 years, early cochlear implantation does not ensure better speech perception, speech production, language, or reading skills," and Geers, Nicholas, and Sedey (2003, p. 46S) report, "Age at receiving an implant did not affect language outcome." On the more mixed side of the discussion, Chin, Tsai, and Gao (2003) say that "Results showed that for children with cochlear implants, greater intelligibility

was associated with both increased chronological age and increased duration of cochlear implant use.” Logically, this does not argue that age at implantation alone accounts for better language acquisition results, as those who received the implant earlier also have a longer duration of use by the time they are tested. Similarly, Oh (2003, p. 148) found that:

Children fitted with implants at a younger age showed better speech perception ability than those fitted with implants at an older age. Interestingly, prelingually deaf children aged 5-7 years at implantation showed the widest variation in individual outcomes.

Again, age at implantation is not the only logical explanation. It is notable, however, that the claim about critical period by the surgeon in DeNoon’s story diverted notice from the fact that an uncomfortably small percentage of the children in his study had good outcomes.

Using the Exception to Prove the Case

Some argue that because a few children succeed in functioning well in ordinary surroundings, the whole enterprise of CI and speech based education is justified. This approach has been used by oral education for generations. Historically, the bulk of deaf children would at the beginning be brought into speech-primary or speech based educational environments. Over the years, those who were unsuccessful, for whatever reason, would leave this environment for other, often sign language based, programs. This culling effect would leave the “oral successes” in the oral programs to be exhibited as evidence of the ultimate success of the approach. Measuring only the successes does not logically demonstrate that an approach is successful, except for those children, and if, upon comparison with the population as a whole, many of whom have in fact received the same treatment before attrition from the programs, it is found that the proportion of successes is small, then it is questionable whether the program has successful results at all. From this perspective, it may have actually failed with a significant proportion of the sample, and the positive results for the small proportion of “successes” may have less to do with the program than with some attribute of the children themselves or with some other, unconsidered phenomenon.

Much of today's literature on the outcomes of CI children in speech based environments is similarly flawed, choosing to examine those children who have stayed in speech based programs (and thus represent in some way those for whom it works). I have been unable to find studies that sample large numbers of implanted children without regard to educational placement, continued use of the CI system, or other variables that would constrain the sample to more successful subjects.

The Syllogism of Four Terms

In discussions of CI and speech based education there is a basic logical fallacy being employed. It is a syllogism with four terms, which may appear to make sense on the surface, but is illogical at its core. In some sense, it is the fundamental argument for employing a method of speech based education and therapy for implanted children. I discovered it in thinking about the conversation with the surgeon I reported earlier. It is as follows:

- children who hear normally acquire spoken languages through ordinary, spoken interaction with other users of the language;
- CI converts deaf children to children who hear;
- therefore, children with CIs should be able to acquire spoken languages through ordinary, spoken interaction with other users of the language.

The difficulty with this syllogism is that the word "hear" means different things in part a and in part b. Thus, though it appears to be a valid syllogism with three terms, the different meanings of this word actually create a fourth term and the syllogism becomes fallacious. It is not the case that CI creates children who hear in the way that children with normal hearing do. There are vast differences between the two groups in terms of functional hearing abilities. Nonetheless, the logical fallacy is a part of the support for recommending speech based programs.

Standards of Practice and the Avoidance of Maleficence

It is possible to look at the data we have been discussing and to conclude that the numbers, though not 100% positive are good enough and in fact that they represent a great advance over untreated deafness. One

belief that would support such a conclusion is the notion that any medical or technological advance is justifiable with even very small benefits. This, of course, is a general belief in our society, where technological frills quickly become needs, the value of which is often judged by the recency of the technology rather than by other, more tangible benefits. If, for example, medical research can invent a treatment for breast cancer that reduces its incidence by 20%, it will be hailed as a great accomplishment. This is because the population without the treatment can be shown to be in a worse situation than with it. Such standards of practice have become common in modern medical research, but may lead to a fallacious argument in the case of CI.

The question is, how much is enough to qualify a medical treatment such as this as a success. It is likely that the standards are, in fact, different from those employed for the treatment of life-threatening maladies. First, we cannot accept an underlying assumption that medically untreated deafness is life threatening or even "life-ruining." Throughout the history of the world, deaf people have managed to have successful and satisfying lives without medical treatment. The exocentric assumption that any treatment that reduces deafness will be a benefit to the deaf person is also a fallacy. Unless it can be proven that some sufficient majority of deaf children are actually better off under such treatment than they would have been without treatment, there is little reason to support it, except for its force as a medical and technological advance. Thus its appeal as a technological advance alone is probably not sufficient to justify the expense and medical risk to children and their families (STEWART-MUIRHEAD, 1994).

In fact, we do not know much about the benefits of a CI as long as the syllogism of four terms is being employed, because the question is confounded by the intrinsic relationship between CIs, hearing improvement devices, and the educational methods employed with the children who receive CIs. Until these two things are disentangled, the question of medical and auditory benefit cannot be answered. That is to say, if we could disentangle CI from the assumption that it is primarily a language acquisition device, we might find that it enhances hearing in other ways that are useful to the recipients, but we cannot do that as long as success is measured solely in terms of the measures of spoken word and sentence discrimination that dominate measurement in studies conducted by advocates of speech-based approaches. So from this perspective, it has not been shown that CI is substantially beneficial to its childhood recipients⁷.

Moreover, it is difficult to assess the research findings on the results of the CI cum speech based practice, because of the wide use of measures of central tendency in reporting outcomes. Means tells us something about the overall behavior of a population, but tend to mask the variability that is present in the sample. The issue here is that a population does not have a language or a set of abilities in literacy. Individuals do have these things or do not have them, but the use of means to report findings tends to obscure the presence of people who do not do well. Thus, a mean of 50% on a test could mean that everyone performed at the 50% level, or that a few people performed extremely well and a lot of people performed relatively poorly, or even that half were perfect and the other half had no abilities. Means alone do not make a good basis for making educational decisions about a group of people. It is necessary also to ask about the variability of the scores and to ask about the benefits of the treatment for all the individuals in the group with respect to their specific abilities. Thus, for example, the fact that studies show that deaf children in their teens read at the fourth grade level, does not suggest that all children should be taught with fourth grade materials. Somehow, the educational decisions need to get beyond statistical generalizations.

The other side of this issue for medical ethics is that of maleficence, which is the ethical obligation not to do harm through the practice of medicine. So we must also ask if the children would have been better off without the procedure. Stewart-Muirhead (1994) suggests that doing harm in the case of CI may not be a matter of simple medical risks. She argues that if a procedure makes a child more marginal, it has done harm. So the issue of marginalization of CI children must be addressed.

Many statements about CI, especially those from manufacturing entities, either say or imply that children with an implant will be better able to participate in activities with their hearing peers and with their families. Allen (2000) asked parents to assess the degree to which their children interacted with hearing children. The results are reported in Table 5. The picture here is mixed as well and does not reflect the happily integrated child implied by implant doctrine. To see that this might be evidence of social marginalization we need only wonder if this question has ever been asked about deaf children in environments with other deaf children. The question, "Does your child interact with other deaf children?" is largely unnecessary outside the speech-based educational community. Do

unimplanted deaf adults interact with hearing people? Virtually every day. By definition, a deaf child in a speaking environment is marginalized.

Table 5 – Parents' Estimate of Frequency of Interaction with Hearing Children (ALLEN, 2000)

	1-4 years	5-7 years	8-11 years	12+ years
Almost never	11%	3%	4%	7%
Very little	10%	7%	14%	15%
Fairly often	32%	28%	16%	26%
At almost all opportunities	47%	62%	66%	51%

On a broader scale, it can be argued that the sorts of data we saw earlier in the paper are also evidence of marginalization. What is the impact of speech based education on that rather large proportion of children who do not do well with it? It must be seen to create limitations in literacy and perhaps even certain levels of semilingualism. Both of these conditions are socially and economically marginalizing. Children given more linguistic options tend to have access to a complete first language and also have access to literacy through their vision. Thus, the treatment as it stands may be doing more harm than if the children were left alone. Earlier, we argued that it is fallacious to focus only on the successful children. Here we propose that it is maleficent not to examine the other, less-successful children for evidence of harmful marginalization.

Using Vague Identifiers in a Way that Suits One's Conclusions

In scientific reporting, it is expected that researchers be as exact and clear as possible and that operational definitions of terms in behavioral research reflect some level of validity and adherence to common usage of the notions. The CI literature, however, is filled with vague terminology that, if not examined carefully, could lead the reader to false assumptions about the success of the procedure and the validity of the therapeutic and educational treatments. Appendix 2 contains the text of a report to a scientific conference on the outcomes of FDA clinical trials on a particular CI system. Note the use of the words: *few*, *some* and *many* in the text as well as those places where no quantifier appears ("Children are able ...", for example.) The definitions

of these terms in the notes suggests that the authors of these findings are attempting to paint a better picture than they found. The notion, for example, that the word *many* refers to the top half of the sample, would probably not coincide with most readers' common conception of the meaning of this word. More critically, in common usage and in most thesauruses the word *few* is the antonym of the word *many*. To apply the value of 5-34% to the word *few* and the value of 52-100% to the word *many* can only be seen as a deliberate attempt to inflate the results of the study.

Misrepresenting Levels of Significance

Statistical measures of significance are used for the purpose of claiming that one's findings have particular meanings and are unlikely to be the result of chance. Lack of statistical significance is not the same as the presence of significance, even if the call is close. Kane (2004) make the following statement:

RESULTS: We found positive, though weak, correlations between prelinguistic communication skills (CSBS scores) and language learning after cochlear implantation (RDLS scores). Linear correlation between test results failed to reach statistical significance (receptive comparisons, $P = .17$; expressive comparisons, $P = .13$). CONCLUSIONS: Evaluating the quality of prelinguistic communication behaviors potentially adds important predictive information to profiles of children who are candidates for cochlear implantation. Correlative analysis suggests that early CSBS testing may provide useful clinical information. (KANE et al, 2004, p. 619).

The responsible conclusion here would be: "We cannot at this point assert that the quality of prelinguistic behaviors adds important predictive information to profiles of children who are candidates for CI."

False Attribution of Causality

An implication present in most presentations of CI, is that success will depend upon three things: entry into a speech based educational setting, a good attitude on the part of the child, and intensive and dedicated effort

by the parents of the child. The citation by Madell earlier in this paper is an example of such statements. These three conditions serve a useful function in discussions about the value and utility of CIs and of speech based educational methods. Any or all of them may be used to deflect attribution of the cause of failures of these treatments away from the treatments themselves and onto the patients or students or their parents. The difficulty with this is the fact that measuring effort or attitude is tenuous at best, and the attribution of bad attitude or weak effort on the part of the parents may in fact result from the fact that the child did not do well, rather than from any kind of reliable or valid measure of degree to which the attitudes or behaviors are either present or had a causative effect on the outcomes. Botelho (2002, p. 69-94) argues that this form of requirement on parents constitutes a form of *super investment*, which places virtually impossible demands on families. There is a sense in which these demands guarantee someone to blame if the treatment itself is not successful.

The attribution of sign language as a cause of failure of speech based approaches is likewise logically flawed. There is virtually no hard evidence that the learning and use of a natural sign language impedes the spoken or written language abilities of prelingually deaf children. Most evidence about the influence of sign language on English competence in general and on literacy in particular suggests the opposite: that early sign language acquisition actually has a positive effect on these attributes. Moreover, to my knowledge no researcher has been able to show that signing has a deleterious effect on speech. As we noted above, students who do not succeed in speech based settings often move to signing programs, where they may learn to sign proficiently. But typically the failure of the oral program caused the move to the signing environment rather than the signing causing the oral failure.

For the speech based and CI materials to continue to claim that visually based communication systems will impede the success of CIs represents neither the correct take on the research nor an ethical approach to informed consent. In fact, the CI medical community would do well to come to terms with the fact that a substantial number of prelingually deaf, implanted children do not hear at a level that will enable them to succeed in the environments that are being recommended and would be benefited by the provision of a visual environment. This fact is recognized even in the research on CI. Clark (2003, p. 7) reports:

Studies were also undertaken to look at plasticity and visual dominance particularly through cognitive studies and the use of the McGurk effect. This demonstrated that deaf children with implants rely heavily on visual information and there is a great need to have unambiguous auditory stimuli to get best results.

This observation stands as a particularly good example of the processes of denial we have been discussing. The observation that deaf children with CI rely on visual information does not lead to the logically obvious conclusion that we should therefore provide them with visually based educational methodologies. Rather, it implies that we must overcome this fact by presenting even better auditory information.

Depolarizing the Debate

Contradictory Values and the Fallacy of Disjunction

In the discussion above I presented a number of contrasting beliefs and showed how these tend to inform the discussion of deaf educational methodology and CI results. I also propose that a number of practices of proponents of speech based education with CI either use or support these values to divert discussions away from observed deficiencies by calling on the broader values and beliefs.

It is clear that the values presented in Figure 1 represent contrastive notions. In our discussions of any of these beliefs we tend to treat them as semantically and culturally polar opposites – as logical disjunctions. Burke (2004) proposes that the notion of logical disjunction in many of the issues related to deafness is in fact a fallacy. Disjunctions of this sort are linked by *exclusive-or* operators. Thus, if one is true the other logically cannot be true. Burke argues that most of the concepts we deal with are, in fact, linked by *inclusive-or* operators, which permits either concept to be true independently or both to be true simultaneously. That is, many of these seeming polar opposites could both be true. Thus, recognizing one does not necessitate rejecting the other.

Finding the Inclusive-Ors

Following this logic, it is possible to convert each pair of concepts in Table 4 to inclusive-ors by replacing the word *vs.* with the word *and*. Could it be, for example, that deafness has aspects both of a condition and of an attitude; that English and ASL could co-exist in a common environment or in an individual; that bilingualism might have a place in a highly monolingual society such as ours; that certain aspects of the education of deaf children would do well to take advantage of natural capabilities (sign language acquisition) of the children and that others might require certain levels of intervention (spoken language acquisition through print); or that a person with an implant is also a deaf person, both in the audiological sense and the social sense? It is certainly true that well thought out ASL-ESL paradigms such as the STAR Schools Project, rejecting doctrinaire ASL-only notions, have attempted to devise systems that recognize such conjoint pairs and to build recognition of them into their curricula and their goals. Is it possible for the medical community to consider a similar move, accepting notions of bilingualism, cultural deafness, and non-traditional forms of literacy? Divorced from the paradigm of speech based education, implants could become what they are: another technology aimed at improving the hearing of people who don't hear well and, as such, another tool in the vast technological arsenal of assistive devices for hearing impaired people. And standing separated from this educational paradigm, CIs could stop trying to be what they are not: single source language acquisition devices.

If we can undertake a discussion of these issues, there are a number of questions that must be asked.

- What is the actual audiological outcome of implantation, and what does that mean educationally for people with that kind of hearing loss? Such a question must be asked of the entire population of implanted children, not just those who have been successful or who are in surgeon-approved, oral or mainstream, speech based placements.
- What is the actual educational and linguistic outcome of current practice with implanted children? What things argue for keeping it that way? What things argue for changing it, based on what we know about how hearing impaired children acquire languages?

- If things are actually not working like we believe they should, what is the motivation for maintaining the current practices? Is it misplaced moral principle or is it educationally sound thinking with the interests of the largest number of deaf children in mind?
- If there is, as reported, extensive variability in hearing outcomes among implanted children, how does it make sense to recommend only one educational option, especially when it is yielding unsatisfactory results?
- Which fallacious logical systems support unsuccessful practices? How can we see through them and arrive at logically more sound conclusions?
- Which values among the deaf community drive the notion that hearing habilitation is an undesirable practice or one that is at odds with being Deaf, and given the reality the CIs are here to stay, how can the presence of such individuals in the community be embraced?

Summary and conclusion

The issue at hand is variability in the product of CI and the outcomes of CI's requisite speech based method of education. Current practices appear to be producing a population with great variation in hearing ability and in functional spoken language use – one that is not unlike the historical non-implanted population. To the extent that these observations are accurate, it does not make sense to have only one educational option, especially when it cannot be shown that that option is successful for the bulk of the children. Moreover, it makes good sense to get all implanted children involved with sign language at a very early age. This would not only provide them with early access to a first language (virtually without fail if the environment is right), but would provide more options for that large proportion of children who clearly are not succeeding under the current speech based paradigm. Table 6 summarizes my assessment of the potential linguistic outcomes of speech based approaches as they have been reported in the literature for a variety of deaf children. As we have seen, current, speech based practice tends to leave certain kinds of deaf children with more limited potential for the expected linguistic outcomes. And we have seen that this group represents a sizeable proportion of the total population.

For the most part, the successes represent conditions that would have predicted spoken language success regardless of methodology. Table 7 presents my estimates of the potential linguistic outcomes for the same types of children under an ASL-ESL approach, in which ASL is present as a natural first language and English is acquired through print as a second language⁸.

One of the benefits of the ASL-ESL approach, then, is likely to be that virtually all children acquire a first language and can use it with teachers to learn the content of the classroom. The other, is that a larger proportion of the overall population is likely to achieve useful levels of literacy. And, quite critically, the ASL-ESL approach will probably have the same outcomes for the children who would have succeeded in the speech based paradigm – that is, there is likely to be no loss of benefit for them, and they are likely to gain the additional benefit of knowing a visually accessible language.

Table 6 – Estimate of linguistic potentials for a variety of deaf children in a speech based educational environment

Speech based Educational Environment	Potential for near-normal spoken language function	Potential for having very functional speech	Potential for having very functional spoken language reception?	Potential for having good written English?	Will have a full and timely first language?	Potential for being able to learn through the air from teachers?	Potential for using an accessible language with peers?
Prelingual, deaf, no CI	Low	Very Low	Very Low	Very Low	Probably not	Low	Very Low
Prelingual, deaf, not very functional CI	Low	Very Low	Very Low	Very Low	Probably not	Low	Very Low
Prelingual, very functional CI	Medium	Medium	Medium	Low to Medium	Possibly	Low to Medium	Low to Medium
Hard-of-Hearing, no CI	Medium to High	Medium to High	Medium to High	Medium to High	Probably	Medium to High	High
Post-lingual, not very functional CI	High	High	High	High	Certainly	High	Very High
Post-Lingual, deaf, very functional CI	Very High	Very High	Very High	Very High	Certainly	High	Very High

Table 7 – Estimate of linguistic potentials for a variety of deaf children in an ASL-ESL educational environment

ASL-ESL Educational Environment	Potential for near-normal spoken language function	Potential for having very functional speech	Potential for having very functional spoken language reception?	Potential for having good written English?	Will have a full and timely first language?	Potential for being able to learn through the air from teachers?	Potential for using an accessible language with peers?
Prelingual, deaf, no CI	Very Low	Very Low	Very Low	Medium	Certainly	High	High
Prelingual, deaf, not very functional CI	Very Low	Very Low	Very Low	Medium	Certainly	High	High
Prelingual, very functional CI	Medium	Medium	Medium	Medium	Certainly	High	High
Hard-of-Hearing, no CI	Medium to High	Medium to High	Medium to High	High	Certainly	High	High
Post-lingual, not very functional CI	High	High	High	High	Certainly	High	High
Post-Lingual, deaf, very functional CI	Very High	Very High	Very High	Very High	Certainly	High	High

It is incumbent on the community of educators of deaf children to think about how to meet the needs of the ever-increasing number of children with implants in a way that preserves options and encourages the greatest levels of literacy and social competency. This does not mean attempting to replicate speech based education in a program that already knows how to deal with a variety of deaf children, including those that hear fairly well.

A part of this process must be for the educational community and the deaf community to address these issues with the medical community and to offer to work with them toward the provision of better results than they are currently getting.

Notes

- 1 Thanks to Steve Ackley for help in finding research reports on the outcomes of cochlear implantation and to Debbie Chen Pichler and for bibliographic assistance. The paper benefits substantially from reviews and commentary by Marin Allen, Paula Botelho, and Michael Karchmer and by an anonymous reviewer chosen by the editor. The paper would be diminished without their assistance. Through the years I have learned much from discussions with Scott Liddell, Boris Fridman, Lon Kuntze, Carol Padden, Carol Erting, and scores of students and colleagues. The mark of their influence is apparent in my work.
- 2 Bimodalism involves the use of speaking and signing simultaneously. This practice is known by a number of terms, including signed English, simultaneous communication, SimCom, the simultaneous method, manually encoded English, and Total Communication. It is also represented by several “systems,” most notably Signing Exact English, usually called SEE – II (GUSTASON; PFETZING; ZAWOLKOW, 1972), which were sets of principles and vocabulary lists purported to enhance the match between the visual and auditory signals involved in bimodalism.
- 3 The phrase *deaf children* is used here to refer to children who do not hear well enough to acquire spoken English in a natural, timely, and effortless way, through everyday interaction with a community of English users, and who, consequently, have difficulties acquiring the topical content presented in regular classroom settings where only spoken English is used.
- 4 Because the identification of deaf children as deaf is typically not accomplished until some months after birth, certain aspects of timing may be delayed by comparison to deaf children born into deaf, signing families.
- 5 This concept is similar to that of “orality,” which has become a common part of discussions of the acquisition of literacy.
- 6 It is notable that programs in other parts of the world, especially Scandinavia, have been reporting such results for some time (MAHSHIE, 1995).
- 7 The picture is quite different for those adults who have heard and used English through their lives prior to their hearing loss. For these, the benefits are clear. But these results must be kept carefully separated

from conclusions about the results of implantation in prelingually deaf children, whose life experience does not provide the underlying and pre-existing conditions for the success that adults may enjoy.

- 8 Note here that these are my estimates of potentials reflect my assessment of the vast body of literature on deaf education. It is crucial to remember that potentials are conditioned by the realities of situations and the differences among people. Thus, they are not intended to represent specific probabilistic predictions for any given individual, for whom the vagaries of situation and context might create outcomes quite different from those predicted.

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What educators need to know about their students with cochlear implants.

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Construtos culturais que impedem as discussões sobre a variabilidade dos modelos Educacionais Baseados na Fala para crianças com implantes cocleares

Resumo:

Este artigo identifica e discute a existência de relevante discrepância nos resultados de implantes cocleares, bem como a variabilidade nos resultados da educação baseada em metodologias de ensino de fala a que são submetidos os sujeitos surdos implantados, considerando que este tipo de educação se coloca como condição para os que submetem a esse procedimento clínico. As práticas educativas vigentes parecem criar uma população de sujeitos surdos que possuem enorme variabilidade em termos de sua capacidade de ouvir, e também de usar a língua falada de modo funcional. Ao mesmo tempo, os resultados de sujeitos surdos implantados não diferem substancialmente daqueles que não possuem implantes cocleares. Muitas das conclusões que apóiam o uso de práticas educativas baseadas no ensino de fala para crianças surdas com implante coclear buscam respaldo em princípios filosóficos construídos a partir de falácias argumentativas. Tais falácias, por sua vez, se baseiam em sistemas de crença e práticas que produzem a negação de fatos observáveis. Considerando que há intensa variabilidade nos resultados de surdos implantados, assim como em seus resultados educacionais após o implante, é inadequado oferecer uma única opção educativa e lingüística, especialmente

Constructos culturales que impiden las discusiones sobre las variaciones de los modelos educacionales basados en el habla para niños y niñas con implantes cocleares

Resumen:

Este artículo identifica y discute la existencia de discrepancia en los implantes cocleares, como así también los diferentes resultados de la educación basada en metodologías de enseñanza del lenguaje en que son sometidos los sordos implantados, considerando que este tipo de educación se coloca como condición para aquellos que se someten a este procedimiento clínico. Las prácticas educativas vigentes parecen crear una población de sujetos sordos que poseen enormes variantes de su capacidad de escuchar, y también de usar la lengua hablada de modo funcional. Al mismo tiempo, los resultados de los sujetos sordos implantados no difieren sustancialmente de aquello que no poseen implantes cocleares. Muchas de las conclusiones que apoyan el uso de prácticas educativas basadas en la enseñanza del habla para niños y niñas sordas con implante coclear buscan respaldo en principios filosóficos construidos a partir de falacias argumentativas. También, tales falacias está basada en sistemas de creencias y prácticas que producen la negación de hechos observables. Considerando que hay una intensa variación de sordos implantados, así como resultados educacionales después del implante, es inadecuado ofrecer una única opción educativa y

quando não se pode demonstrar que tal opção tem sido bem sucedida para a educação de uma parcela significativa da população total de crianças surdas. Por fim, esse artigo conclama os oponentes do clássico debate entre metodologias que utilizam língua de sinais versus aquelas baseadas no ensino de fala a rever suas posições filosóficas tão polarizadas, e iniciar uma discussão sobre modos de garantir os mais altos níveis possíveis de letramento e competência social para o maior número possível de crianças surdas.

Palavras-chave: Fala-Estudo e ensino. Crianças surdas-Educação. Implantes cocleares.

lingüística, especialmente cuando no se puede demostrar que tal opción haya tenido suceso para la educación en una muestra significativa de la población total de niños y niñas sordos. Finalmente, este artículo proclama a los oponentes del clásico debate entre metodologías que utilizan la lengua de señas versus aquellas que se basan en la enseñanza del habla a rever sus posiciones filosóficas tan polarizadas, e iniciar una discusión sobre los modos de garantizar los más altos niveles de letramento y competencia social para un mayor número posible de niños y niñas.

Palabras-clave: Habla-Estudio y enseñanza. Niños y Niñas sordas-Educación. Implantes cocleares.

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Recebido em: 05/08/2006

Aprovado em: 31/10/2006

Appendix 1

National Institutes of Health. 1995. Cochlear Implants in Adults and Children. NIH Consensus Statement, 1995 May 15-17; 13(2):1-30.

Conclusions

- Cochlear implantation improves communication ability in most adults with severe to profound deafness and frequently leads to positive psychological and social benefits as well. The greatest benefits seen to date have occurred in postlingually deafened adults.
- Cochlear implantation in prelingually deafened adults provides more limited improvement in speech perception, but offers important environmental sound awareness. Cochlear implantation outcomes are more variable in children. Nonetheless, gradual, steady improvement in speech perception, speech production, and language does occur. There is substantial unexplained variability in the performance of implant users of all ages, and implants are not appropriate for all individuals.
- Currently children at least 2 years old and adults with profound deafness are candidates for implantation. Cochlear implant candidacy should be extended to adults with severe hearing impairment and open-set sentence discrimination that is less than or equal to 30 percent in the best aided condition. Although theoretic reasons exist to lower the age of implantation in children, data are too scarce to justify a change in criteria. Additional data may justify a change in age and audiologic criteria.
- Auditory performance with a cochlear implant varies among individuals. The data indicate that performance is better in individuals who (1) have shorter durations of deafness, (2) acquired speech and language before their hearing loss occurred, and (3) if prelingual were implanted before age 6. Auditory performance is not affected by etiology of hearing loss.

Access to optimal educational and (re)habilitation services is important for adults and is critical for children to maximize the benefits available from cochlear implantation.