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**The Relationship between Preferred Language/Communication Modality and
English Literacy among Deaf First-Year College Students**

Masters' Project

**Submitted to the Faculty of the Master of Science in Secondary Education of
Students who are Deaf or Hard of Hearing**

**National Technical Institute for the Deaf
Rochester Institute of Technology**

**By
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In Partial Fulfillment of the Requirements for the Degree of Master of Science

Rochester, New York

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Abstract

This study examines the relationship between the communication modality preferences and reading skills for a group of 1,419 deaf first-year college students. These students were enrolled between the years 1984 and 2002 at the National Technical Institute for the Deaf at the Rochester Institute of Technology. First, the relationship between self-reported preference for communication and performance on a standardized assessment of English literacy is examined. Second, the relationship between self-rated sign language skills and reading performance is explored for the same group. Students preferring "Speech Alone" performed significantly better on the measure of reading ability than students preferring "Sign Alone" or "Sign and Speech together". Students who reported having *No* sign language skills or *Some* sign language skills performed significantly better on the measure of reading ability than students who reported having *Fair*, *Good* or *Excellent* sign language skills. Contrary to previous studies, neither degree of deafness nor the hearing status of parents showed a significant relationship to performance on the measure of reading ability. A discussion of these results follows at the end of the paper.

Introduction

The literacy challenges faced by deaf individuals are well-known and well-documented. The reading skills of the average deaf high school graduate plateau around the 4th grade level and never increase (Musselman, 2000; Marschark, Lang, & Albertini, 2002; Holt, 1993). Only 3 percent of 18-year-old deaf students reads with the same proficiency as an average 18-year-old hearing student (Center for Assessment and Demographic Studies, 1991). More than 30 percent of all deaf students are functionally illiterate when they leave school (Marschark et al., 2002). Information such as this is nothing new in the history of deaf education in the United States (Power & Leigh, 2000).

In 1869, during the period that many people consider to be the “Golden Age” of deaf education, Edgar Allen Fay¹ wrote:

We are none of us satisfied with the attainments in language ordinarily made by the deaf and dumb. The great majority of pupils born deaf graduate from our institutions without the ability to express their ideas in correct idiomatic language, or to understand readily the language of books. Those who have formed a taste for reading are so few in number that they are to be considered exceptions to the general rule. Even the students who enter college and who represent the greatest intelligence and the highest attainments of the deaf and dumb of this country encounter no little difficulty in the concise and often technical phraseology of college text books. (p. 194)

Half a century later, Rudolph Pintner studied the reading abilities of deaf students. The results of these efforts presented a similar picture of deaf readers. In 1916, Pintner and Patterson reported that the majority of deaf students were reading at or below the

¹ Fay was vice president of what is now Gallaudet University, editor of the *American Annals of the Deaf*, and always a strong advocate of sign language (see Van Cleve & Crouch, 1989).

fourth grade level. In this same study, the researchers reported that high school-aged students in oral communication classes performed significantly better than students in manual communication classes, although neither group was performing at an appropriate grade level. A decade later, Pintner reported that the level of academic achievement for the average 18 or 19 year-old deaf student, regardless of educational environment, was equal to that of the average 8 or 9 year-old hearing student (Pintner, 1927). By the later half of the twentieth century, little had changed for deaf students.

In 1965, the Babbidge Committee Report produced almost exactly the same results, stating that the average deaf high school graduate was reading at the 4th grade level. Again in 1988, the same trend was reported by the Commission on the Education of the Deaf (COED), although the commission also noted that considerable progress had been made since the Babbidge Report and that a percentage of deaf students were reading as well as the hearing norm (Commission on Education of the Deaf, 1988). However, at the opening of the twenty-first century, the average deaf reader continues to read at a level well below his or her hearing counterpart (Musselman, 2000; Marschark et al., 2002).

Looking at this persistent historical trend of the reading performance of deaf persons as a group, one is inclined to think that something is fundamentally wrong with deaf education as an institution and has gone unchanged over these past two centuries. Ironically, the field has been anything but static during this time and has experienced significant changes over the years.

In 1817, the American School for the Deaf – the first deaf residential school in the United States – was founded in Hartford, Connecticut. By 1851, there were 14 residential

schools for the deaf in this country. Thirty six percent of the instructors in these schools were, themselves, deaf (Editor, 1852). By 1870, the number of residential schools had grown to 28 and Gallaudet University (then known as the National Deaf-Mute College) had been established. Forty one percent of the teaching staff in these residential schools was deaf (Editor, 1870). Up to this point, the primary mode of communication and instruction was sign language (see Van Cleve & Crouch, 1989). By the late 19th century, however, the advocates of oral communication/instruction and day schools environments were growing in numbers and influence, led in large part by Alexander Graham Bell. In 1880, the Milan Conference declared that oral methods of communication and instruction were superior to all others. In the wake of this declaration, Nebraska passed a law forbidding the use of sign language in schools at the request of parents and the first day schools for deaf students (in which sign language was not permitted) were established in Wisconsin (Van Cleve & Crouch, 1989).

In 1916, the same year that Pintner conducted some of his first research, 62% of deaf schools now reported using an oral method of instruction with their students, while only 36% reported using a combination of oral and manual modes of instruction; only two schools out of 157 in the United States reported using purely manual communication at this time. Almost half of the deaf schools were now day schools. Nearly all of these day school used oral methods, while the residential schools predominantly employed combined methods. Of all the teachers of the deaf at that time, 15% were deaf. (Tabular Statement of American Schools for the Deaf, 1917).

In 1965, the same year that the Babbidge Report declared oral education a “dismal failure” and recommended that alternative methods of communication and instruction be

found, 83% of all deaf students were being taught speech. Day classes in the local public school system had effectively replaced day schools and become the overwhelmingly dominant form of education for deaf students. The number of residential schools had not changed significantly over the previous 50 years, and now accounted for only 15% of the total number of deaf learning environments. Nine percent of all teachers of the deaf were, themselves, deaf (Tabular Statement of American Schools for the Deaf, 1966).

During the 1970s, likely in response to the recommendations of the Babbidge Report, the concept of Total Communication and systems of Manually Coded English (such as SEE) were invented and gradually gained educational popularity over the years. These methods became so prevalent that the *American Annals'* annual surveys for the 1977 – 1978 and 1981 – 1982 school years did not even inquire about the mode of communication being used by schools (Holden-Pitt and Diaz, 1998). In 1975, the original version of the Individuals with Disabilities Education Act was passed and introduced the idea that children with special needs are best served along side their typical peers. This brought the theory and practice of mainstreaming deaf students into the public school environment into full force.

Enrollment in residential deaf schools dropped sharply during the 1980s. A survey of deaf children and deaf educational environments in the United States for the 1984 – 1985 school year reported that 62% of deaf students were enrolled at their local public schools while only 28% of students attended residential schools; 51% of students were in classrooms along side hearing peers. This same survey reported that 35% of deaf students were in Auditory/Oral only programs, while 65% percent were being educated in Sign and Speech environments (Schildroth and Hotto, 1993). In 1985, cochlear implants were

first made available to deaf adults; cochlear implants for deaf children were available in 1990 (Audiology Online, Inc.). Also, in 1988, the COED report emphasized the status of ASL as a full-fledged language, noted that deaf children from deaf families whose first language is ASL meet the requirements of minority status students, and recommended that ASL be used in bilingual fashion for the education of deaf students (Commission on Education of the Deaf, 1988).

By the 1991 – 1992 school year, the number of deaf students in their local public schools had increased to 69%, and the percentage of mainstreamed students rose to 54%. The number of deaf students in Oral Only programs increased to 41%, while Speech/Sign enrollment dropped to 57%. However, 2% of deaf students were now enrolled in Sign Only environments (Schildroth and Hotto, 1993). This same enrollment trend continued through the end of the decade (see Holden-Pitt and Diaz, 1998). The increased number of students in Oral Only programs may be linked to the advent of cochlear implants because the use of this technology places a latent emphasis on auditory skills and spoken communication. Similarly, the appearance of Sign Only environments may very well be the result of the COED report's recommendations regarding the use of ASL. The 1990s also saw the formal beginnings of Bilingual education of deaf students (ASL and written English), which is also likely the result of the COED report's findings.

By 2002, 25% of all schools and programs for the deaf in the United States reported using a Bilingual approach, although this was often reported along side other methods such as Auditory/Oral and Sign with Speech. Eighteen schools reported using an exclusively Bilingual approach (Schools and Programs in the U.S., 2002). Generally, the majority of students continued to be enrolled in either Speech Only (46%) or Sign with

Speech (45%) programs; the percentage of students in Sign Only programs increased to almost 8% (Gallaudet Research Institute, 2003). However, as with the Bilingual method, schools most often reported offering these methods of instruction along side other methods and modes of communication (Schools and Programs in the U.S., 2002). The most notable fact may be that the schools and programs of the twenty-first century cannot be categorized as exclusively Oral, Combined or Manual as they were nearly 100 years ago.

Note that the changes in deaf education have focused primarily on the mode of communication used. Interestingly, the advocates of one mode or another have frequently supported their position with claims that their preferred mode is more appropriate than all others because it more effectively promotes English literacy skills among deaf students (Musselman, 2000), precisely the measure of student success that has driven the numerous changes in deaf education. Although the communication debate has focused in large part on the educational environment, it has also had an inevitable impact on the communication choices that parents – particularly hearing parents – make for their children (Kampfe & Turecheck, 1987). Over the past thirty years, numerous researchers and educators have focused time and energy looking at the relationship between reading ability and the mode of communication in both the school and the family. Taken as a whole, this body of information is incomplete and at times contradictory, but valuable all the same.

Studies that find mode of communication to be a factor

Brasel and Quigley (1975) compared the reading performance of two groups of deaf children whose parents are also deaf. One group of children had parents who used ASL and had a poor command of English. The second group of children had parents who used manual English and had a good command of the English language. Children in the second group performed significantly better on measures of reading and spelling than children in the first group.

Babb (1980) conducted a longitudinal study of three groups of deaf children with hearing parents. One group of children was enrolled in an oral only preschool environment. The children in the other two groups attended a Signed English program and were differentiated according to whether or not their parents used Signed English at home. Using the Stanford Achievement Test (SAT) as a measure of reading performance, children in the Signed English program whose parents also used Signed English at home demonstrated better performance than children in the other two groups; children in the same program whose parents did not use Signed English at home performed no better than students in the oral communication program. While this study can be taken as evidence of the impact of communication mode on reading ability, it might also be seen as supporting the significance of consistent use of a single mode between home and school, similar to Morrison (1982) (described below).

Luetke-Stahlman (1988) hypothesized that deaf students exposed to a communication system that is a "complete" representation of a language (oral, Cued Speech, SEE, SEE II, ASL) would have better literacy skills than deaf students who were exposed to a communication system that is an "incomplete" representation of a language

(Manual English, Signed English, PSE). The results of this study indicated that those students within the Complete Group performed significantly better on tests of literacy than those in the Incomplete Group. Students using SEE II and oral-only English demonstrated the highest performance in comparison to all other modes of communication.

Geers and Moog (1989) conducted a study on the literacy development of a group of deaf high school students. Students were drawn from oral programs across 26 different States in the U.S. and three provinces in Canada; the majority of them were mainstreamed. The oral communication and the sign language skills (both Signed English and ASL) of the students were assessed and compared with their performance on a series of reading measures. The results show that command of spoken language, level of hearing, and age of early intervention were statistically significant predictors of better reading performance; sign language ability, socio-economic status of the family, and the age at which mainstreaming began were not significant factors. It is also important to note that thirty percent of this group of 16 and 17 year-olds scored at the 10th grade level or higher on the SAT; the average performance score for the group as a whole was the 8th grade level.

Moore and Sweet (1990) explored the factors that predict reading achievement among deaf students. Students were assessed and rated on their ability to use ASL, simultaneous communication with English-based sign, and oral communication. This fluency in the various modes was then compared to student performance on a series of literacy measures. Moore and Sweet found a moderate correlation between fluency using

English-based sign and oral communication, and reading score. There was no functional correlation for fluency of ASL and reading score.

Padden and Ramsey (1998) studied the relationship between ASL skills and reading performance. The participants were a group of 4th grade and 7th/8th grade students drawn from both public and residential schools. The public schools were self-described Total Communication programs in which different teachers used different modes of communication, while the residential school made use of a bilingual approach using ASL. The students' ASL skills were assessed through a battery of tests that focused on verb agreement production in ASL, sentence order comprehension, and the ability to remember and imitate ASL sentences. These measures were then compared with students' most recent performances on the Stanford Achievement Test that was designed specifically for deaf children (SAT-HI). The results of the study indicate that all three measures of ASL skill had a significant and positive correlation with reading performance.

These different studies paint a decidedly mixed picture of the relationship between language, communication mode and reading abilities. While they all suggest that such a relationship exists, the lack of consensus as to a single superior mode is telling. Equally important and noticeable, with the exception of Geers and Moog (1989), none of these studies compare the performance of the deaf participants with the performance of hearing counterparts. Furthermore, one must also consider the research that suggests the connection between mode of communication and reading performance is negligible, and that other factors are the key to the success of deaf readers.

Studies that do not find a communication factor, or that find some other factor

As part of a larger study, Corson (1974) compared the reading performance of two groups of deaf children whose parents were also deaf. One group was comprised of children whose parents used oral communication; the other group was made up of children whose parents used manual communication. Corson found no significant difference between the reading abilities of these two groups.

Jensema and Trybus (1978) surveyed parents, both hearing and deaf, about the mode in which they communicated with their deaf children. These self-reported results were then compared with the children's performance on the 1973 SAT-HI. While the results of this study showed that children with at least one deaf parent generally performed better on this measure of reading ability, the results also showed no relationship between the mode of communication used by the family and reading performance.

Morrison (1982), using the SAT-HI as a measure of reading performance, also reported finding no relationship between the mode of communication used by deaf students and their reading skills. However, he did report that consistency of use for a particular mode between home and school had a positive relationship to reading comprehension skills.

Using a semi-structured interview process and multiple-choice survey with parents of deaf children identified as proficient readers, Bodner-Johnson (1986) identified the factors that these parents most frequently reported as describing their families and children. Results of this study showed that intense parental involvement, parental adaptation to the child's deafness, and participation in the deaf community were all

common factors for these families. While one might naturally jump to the conclusion that the latter two factors indicate the use of sign language or, more specifically ASL, Bodner-Johnson provides no evidence to support such a conclusion. While the data does indicate that "activities related to learning sign language" was a high frequency trait among the subjects, it is by no means an indication of the actual mode of communication used by these families and is certainly not representative of all the participating families. This is the one limitation of the study in relation to the question at hand: Bodner-Johnson never focuses explicitly on mode of communication.

Toscano, McKee and Lepoutre (2002) conducted a qualitative study of deaf college students who read as well as their hearing peers. The purpose of this study was to determine factors common to deaf individuals who are skilled and successful with reading. Of all the common factors identified at the end of the study, a single mode of communication was not among them. In fact, the researchers state quite clearly that for these deaf readers "the mode of communication is less important than the quality of communication". In effect, the actual mode by which the child communicates is irrelevant as long as it allows that particular child robust and meaningful access to the surrounding communicative and social environment.

As a brief and interesting side note, Toscano, McKee and Lepoutre (2002) and Bodner-Johnson (1986) are the only studies known to this author that specifically focus on deaf readers who perform as well as their hearing counterparts. "What is notably absent from the bulk of research," write Toscano, McKee and Lepoutre (2002), "is a description of those deaf students who have surpassed English proficiency expectations and have demonstrated noteworthy academic literacy." This is surprising, given that these

deaf individuals – who have bucked the historical trends, statistical odds and general stereotypes – are most likely to provide definite clues to the question that has been an ever-present part of deaf education for at least 130 years: “Is it, or is it not, possible for the average deaf mute... [to] read all books as readily and as easily as an educated hearing man does...” (Fay, 1869).

The current study seeks to further examine the possible relationship between the communication modality preferences of deaf readers and their reading skills. Specifically: is there a significant relationship between one particular mode of communication and age-appropriate reading skills? This question will be explored in two ways. First, the relationship between self-reported preference for communication and performance on a standardized assessment of English literacy will be examined for a large group of deaf first-year college students. Second, the relationship between self-rated sign language skills and reading performance will be explored for the same group. While the results of this study cannot be taken as definitive, they certainly have to potential to:

1. address the issue of communication mode that lies at the core of the literacy debate in Deaf Education;
2. reframe the literacy debate;
3. provide a basis from which to devise practical classroom strategies and methods for teaching deaf students how to read English; and
4. provide meaningful information to parents and educators about the relationship between communication mode and reading skills for deaf students.

Methods

This study used a database of information collected from 1,419 students who entered the National Technical Institute for the Deaf (NTID), at the Rochester Institute of Technology (RIT), between 1984 and 2002. The overwhelming majority of these subjects (1,377) entered the college between 1997 and 2002. The actual number of participants used during the analyses of this study inevitably varies from the total number in the database due to the fact that the particular information needed for any given analysis was not available for all subjects. The degree of deafness for this group of subjects ranged from 20 dB to 120 dB in the better ear.

Information regarding communication preference and sign language skills was derived from a survey given to all students entering NTID. This survey is currently known as the Language/Communication Background Questionnaire (L/CBQ). The L/CBQ asks students to rate their own sign language skills. These self-ratings have proven highly valid when compared with more formal and independent measures of sign language skills (Metz, Caccamise & Gustafson, 1997).

The California Achievement Test was used as the measure of reading performance for this study. The California has been used to assess the reading abilities of incoming NTID students since 1974 in part because it has no items that contain auditory biases (Kelly & Mousley, 2001; LaSalla & Kelly, 2002). Performance on the California is reported as a grade equivalency score. Discussing reading in terms of grade-level was preferred for this study. Furthermore, "age-appropriate" reading performance was defined as reading at the high school level (9th grade or above) for the purposes of this study.

All analyses were done using the StatView software package. The data were analyzed using ANOVA or a Contingency Table.

Results

Communication Mode and Reading Performance

There are four ways that a student may state his or her preferred mode of communication (COMMODE) on the L/CBQ: Sign Alone, Speech Alone, Sign and Speech together, and Other. The 23 students that reported a preference of "Other" were eliminated from this study.

The average grade equivalency score on the California for the "Sign Alone" group was 8.5; for the "Speech Alone" group it was 9.7; and for the "Sign and Speech together" group it was 8.7. The mean performance of the "Speech Alone" group on the California was significantly better than both the "Sign Alone" and "Sign and Speech together" groups. The mean performance of the "Sign and Speech together" group was significantly better than the "Sign Alone" group. (Table 1)

In terms of simple descriptive statistics (Graph 1), 76% of the students reporting a preference for "Speech Alone" performed at or above the 9th grade level on the California; 45% of the students reporting a preference for "Sign Alone" performed at or above the 9th grade level; 49% of the students reporting a preference for "Sign and Speech together" performed at or above the 9th grade level.

Sign Language Skills and Reading Performance

There are five possible scores that a student may assign to his or her sign language skills (SIGNSKIL) on the L/CBQ: *No Skills* (1), *Some Skills* (2), *Fair Skills* (3), *Good Skills* (4), and *Excellent Skills* (5). The average grade equivalency score on the California for students reporting *Excellent Skills* was 8.6; for students reporting *Good Skills*, the average score was 8.7; for students reporting *Fair Skills*, the average score was 8.8; for students reporting *Some Skills*, the average score was 9.7; for students reporting *No Skills*, the average score was 9.7.

Students that reported having *No Skills* or *Some Skills* performed significantly better on the California than those students ranking their sign language skills as *Fair* to *Excellent* (Table 2). There was no statistical significance regarding performance between those students reporting *No Skills* or *Some Skills*. Similarly, there was no statistical significance regarding performance for those students reporting sign language skills of *Fair*, *Good*, or *Excellent*.

Of the students who ranked themselves as having *No* sign language skills, 78% performed at or above the 9th grade level on the California; 84% of the students reporting *Some Skills* performed at or above the 9th grade level. In comparison, 46% of the students reporting their sign language skills to be *Excellent* performed at or above the 9th grade level; 48% of the students who ranked their sign language skills as *Good* performed at that same level. (See Graph 2)

Communication Mode and Sign Language Skills

A statistically significant relationship was found between COMMODE and SIGNSKIL (Table 3). More descriptively, 94.5% of the students who reported a preference for "Sign Alone" also ranked their sign language skills as either *Good* (31%) or *Excellent* (63.5%). 65% of the students who reported a preference for "Speech Alone" ranked their sign language skills as either *Some* (27%) or *None* (38%). 74% of the students who reported a preference for "Sign and Speech together" ranked their sign language skills as either *Good* (47%) or *Excellent* (27%). (See Graph 3)

Degree of deafness and Reading Performance

COMMODE and SIGNSKIL were both independently compared with the pure tone average in the left and right ear (PTAL and PTAR, respectively) for all participants for whom the data was available.

A statistically significant association was found for PTAL and PTAR in relation to COMMODE (Tables 4a – 4b). "Sign only" students had significantly greater hearing loss than "Speech only" or "Sign and Speech together" students. "Sign and Speech only" students had significantly greater hearing loss than "Speech only" students. This seems to fit common sense: students with more hearing will be more likely to use spoken communication. However, for all three groups of students, the average degree of deafness was 89 dB or greater.

A similar trend was found in the comparison of PTAL and PTAR with SIGNSKIL (Tables 5a – 5b). Students who reported having better sign language skills generally had a degree of deafness that was significantly greater than the degree of

deafness of those who reported weaker sign language skills. Again, this seems to fit with common sense.

Such results are likely to lead one to another conclusion that would match common sense: the "Speech Alone" students and students who reported lower sign language skills performed significantly better on the California because they had more hearing and, therefore, better access to the English language. Following this line of thought, both PTAL and PTAR were independently compared with performance on the California. Should the "better access to English" theory hold true, one would expect to see a significant association between degree of deafness and reading ability on this particular test, especially when comparing extremes (i.e., those students reading at a 5th grade level in comparison to those students reading at a 12th grade level).

The results of this last comparison show no statistically significant relationship between degree of deafness and performance on the California (Tables 6a – 6b). Although there is a general indirect relationship between degree of deafness and reading performance, there is no statistically significant difference in hearing level between students reading at the 5th or 6th grade level and those reading at the 11th or 12th grade level. Furthermore, a closer look at the data reveals that the range of degree of deafness for students performing at any given grade level is approximately the same.

Parental Hearing Status and Reading Performance

Parental hearing status was compared with student performance on the California. No statistically significant association was found between these two factors. (Table 7)

Discussion

In summary, the results of this study focusing on the defined subject group are as follows:

1. Students who preferred Speech Alone had significantly better reading performance.
2. A greater percentage of students who preferred Speech Alone were reading at or above the 9th grade level in comparison to both the Sign Alone and Sign and Speech together groups.
3. Students who had little to no signing skills had significantly better reading performance.
4. Parental hearing status was not a factor in reading performance.
5. Degree of deafness was not a factor in reading performance.

Taken together, these results seem to suggest that preferred mode of communication was a more important factor related to reading ability than either parental hearing status or degree of deafness for this group of students.

Interestingly, these results differ from the results of previous studies that found a significant relationship between degree of deafness and reading performance. Holt (1993) found that deaf students with less-than-severe hearing loss scored significantly better than those students with severe or profound deafness. She did not explore the relationship between communication mode and reading ability. Geers and Moog (1989) did explore this relationship but also found that degree of deafness was a statistically significant predictor of reading ability.

On the other hand, the results of this present study are similar to Pintner and Patterson's (1916) findings: students who communicate orally demonstrate better reading performance. The researchers' explanation for these results is worth mentioning:

The superior performance of the oral pupils is perhaps in part due to the greater emphasis upon language training in oral instruction, but it is without doubt also due to the fact that the more intelligent pupils are selected for oral instruction. (p. 458)

The data available for this present study did not provide a measure of intelligence that could be used to explore this possibility, or to explore the possibility that innate intelligence may be a more significant factor in reading performance than mode of communication.

One point that should not be missed as one considers the results of the current study is that, although a greater percentage of students preferring Speech Alone are reading at or above the 9th grade level, some of the subjects who preferred "Sign Alone" or "Sign and Speech together" are also reading at this same level. Unfortunately, there is no way to determine from the available data the extent to which a variety of non-communication factors (i.e., parental involvement, early experiences with reading, robust involvement in the communication and social environments in the home and school, etc.) might be associated with the age-appropriate reading performance of these students (see Toscano et al., 2002; Bodner-Johnson, 1986; Morrison, 1982).

Similarly, there is no way to explore which mode of communication might predominate among students reading at the 9th grade level or above. This is due to the fact that the number of subjects within each mode of communication category is not equal. For example, because the actual number of students who prefer "Sign Alone" is so much

larger than the actual number of students that prefer "Speech Alone", this sort of analysis would inevitably show that a higher percentage of students reading at this level prefer sign language. Such results would be terribly misleading because when one looks at "Sign Alone" students as a group themselves, only 45% of these students read at or above the 9th grade level in comparison to the 76% of "Speech Alone" students.

Another point to consider about the current study is that the available data regarding communication preferences did not discriminate between different forms of sign language as done in previous studies. The L/CBQ simply lumps all different styles of sign language into a single category. The creators of the L/CBQ would rightfully argue that such accurate discrimination cannot be achieved with a survey of this sort because the vast majority of students do not genuinely know the difference between ASL and SEE, and do not even think about their own communication in that way.

This same simplicity also gives no indication of an individual's communication history, which may be an intricately woven combination of different communication modes and skills. Such self-reporting in relation to preferred mode seems most strongly indicative of the person's state of mind at the moment of reporting. However, it may be the overall combination of communication modes throughout an individual's lifetime that makes the greatest impact on his or her reading performance.

Ideally, a future study of this kind should be conducted using more specific categories of communication modes (ASL, SEE, cued speech, oral), with objective measures of participants' skills in each of these different modes and a more detailed description of their communication histories. It should also aspire to have relatively equal numbers of participants in each communication category. This would give a much

stronger indication than the present study as to whether a particular modality of communication, system or language predominates among those students reading at an age-appropriate level.

Conclusion

The results of the present study indicate that there is a relationship between mode of communication and reading performance. However, this study must be concluded on a cautionary note. These results should not be taken as an endorsement of one educational approach over another (i.e., Oral Only over Sign Only). The communication preferences used for the purposes of this study provide no definitive evidence about a student's educational background, and the L/CBQ did not collect this sort of detailed information. Furthermore, although a higher percentage of students preferring "Speech Alone" were reading at or above the 9th grade level, one cannot ignore the fact that almost fifty percent of students preferring "Sign Alone" were also reading at that level. Given the vast range of communication modes currently being used throughout the United States (see Schools and Programs in the U.S., 2002) and potentially throughout a student's life, extrapolating the superiority of one instructional approach over another from the results of this study would be a mistake.

Finally, it is important to note a critical distinction when considering which mode of communication is "better" for deaf students. This current study only examined the relationship between mode of communication and reading performance. It did not explore the relationship between mode of communication and the social, emotional and cognitive growth of a deaf individual. One form of communication may or may not accomplish

both of these important goals for deaf children. What's more, what works for one child may not work for another. Parents, educators, and researchers should all keep the human side of deafness foremost in their thoughts when addressing and exploring the issue of communication mode.

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Table 1

Communication Mode and Reading Performance

Group	n	M	SD
1. Sign Only	404	8.6	1.5
2. Speech Only	123	9.7	1.6
3. Sign and Speech together	8.8	8.8	1.6

$F(2,1165) = 24.3, p < .0001$

Groups 1:2, $p < .0001$

Groups 1:3, $p < .0483$

Groups 2:3, $p < .0001$

Graph 1
Communication Mode and Reading Performance

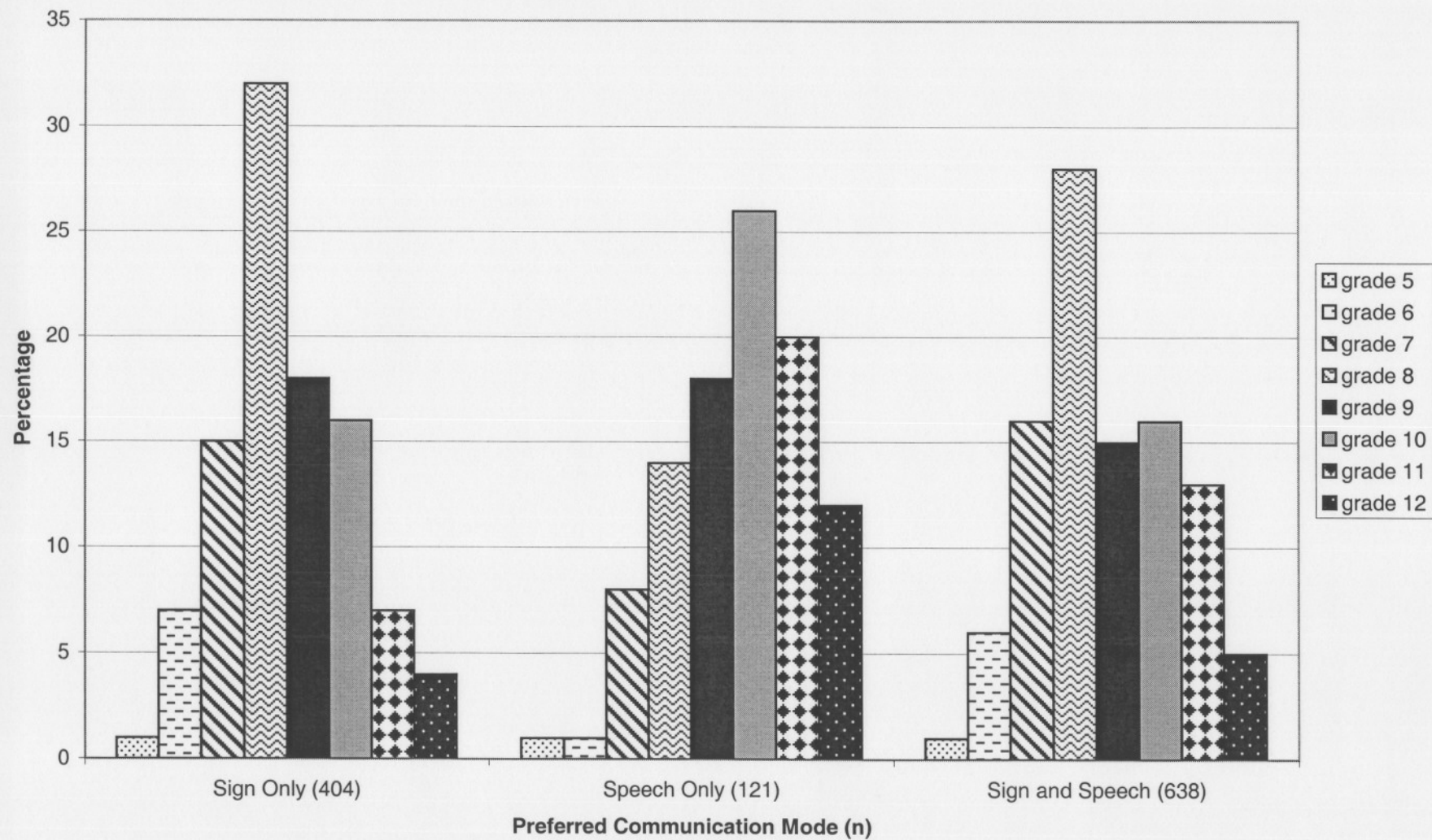


Table 2

Sign Language Skills and Reading Performance

Group	n	M	SD
1. No Skills	46	9.7	1.5
2. Some Skills	55	9.7	1.4
3. Fair Skills	197	8.8	1.6
4. Good Skills	439	8.7	1.8
5. Excellent Skills	447	8.6	1.6

$F(4, 1179) = 10.0, p < .0001$

Groups 1:2, $p < .9864$

Groups 1:3, $p < .0005$

Groups 1:4, $p < .0001$

Groups 1:5, $p < .0001$

Groups 2:3, $p < .0002$

Groups 2:4, $p < .0001$

Groups 2:5, $p < .0001$

Groups 3:4, $p < .4062$

Groups 3:5, $p < .2123$

Groups 4:5, $p < .5979$

Graph 2
Sign Language Skill and Reading Performance

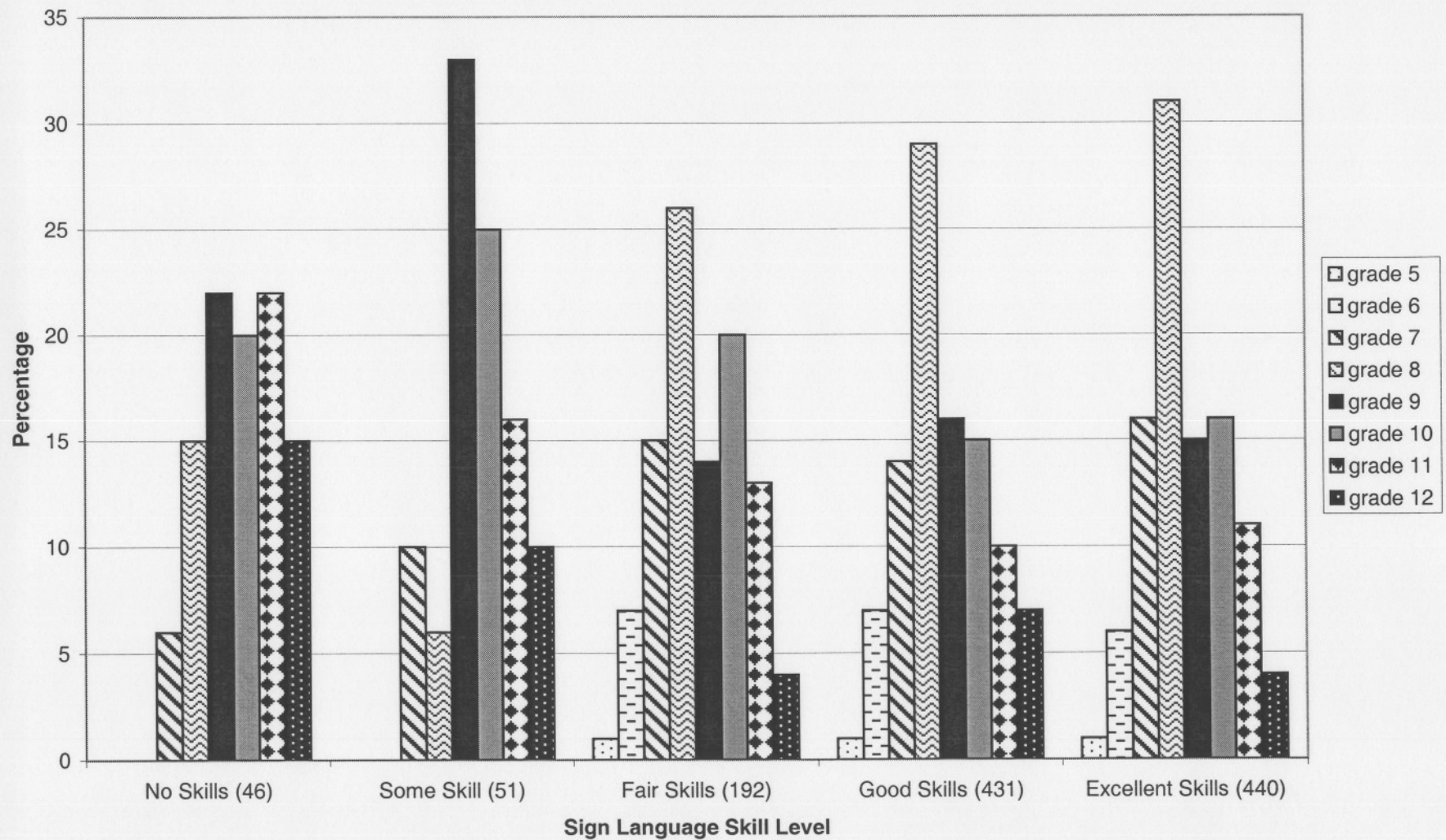


Table 3

Communication Mode and Sign Language Skills

Group	n	M (SIGNSKIL)	SD
1. Sign Only	454	4.6	0.6
2. Speech Only	180	2.1	1.1
3. Speech and Sign together	755	3.9	0.8

$F(2, 1386) = 615.3, p < .0001$

Groups 1:2, $p < .0001$

Groups 1:3, $p < .0001$

Groups 2:3, $p < .0001$

Graph 3
Communication Mode and Sign Language Skills

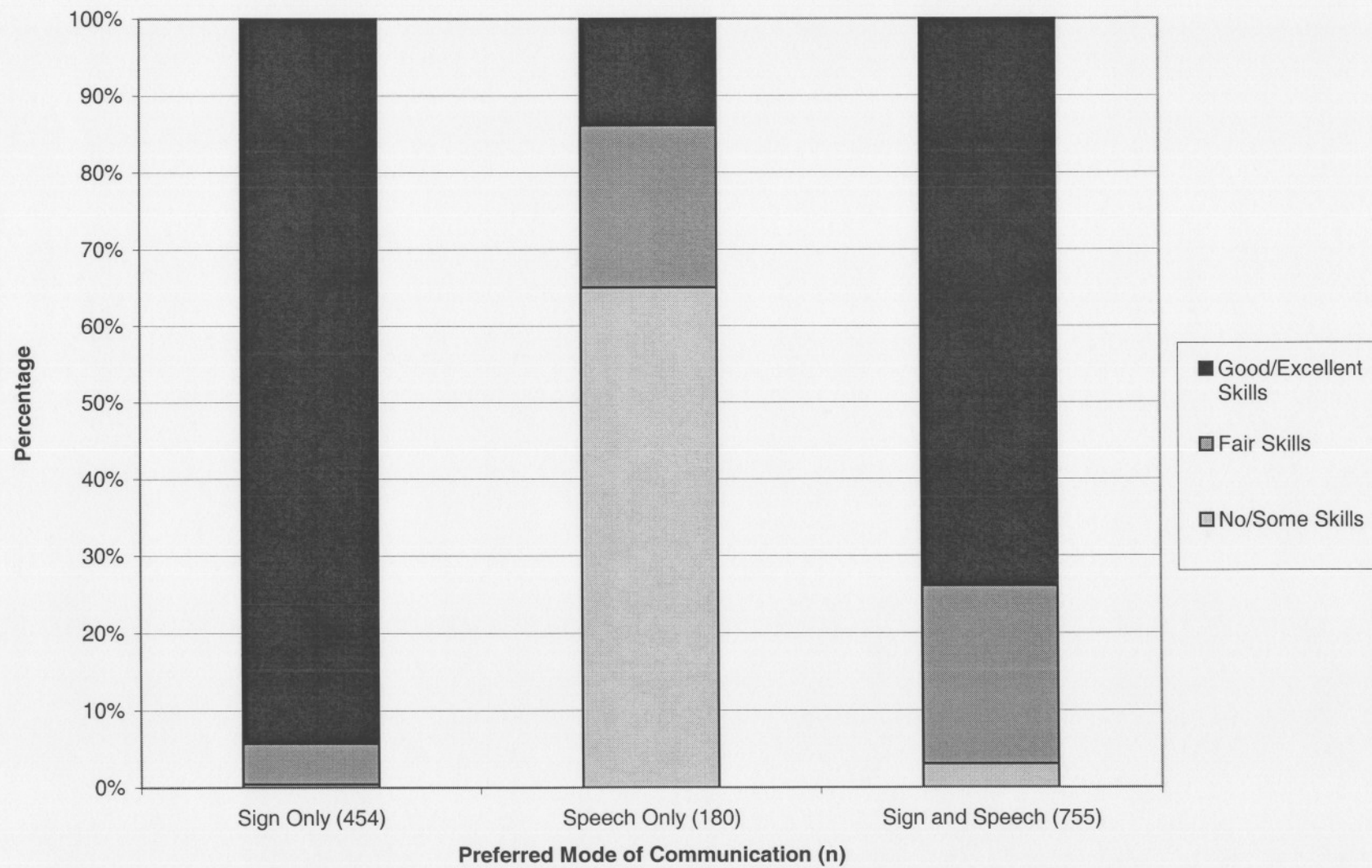


Table 4a

Degree of deafness (PTA, left ear) and Communication Mode

Group	n	M (PTAL)	SD
1. Sign Only	433	104.4	13.1
2. Speech Only	170	90.2	19.9
3. Speech and Sign together	715	98.9	16.4

 $F(2, 1315) = 50.0, p < .0001$
Groups 1:2, $p < .0001$ Groups 1:3, $p < .0001$ Groups 2:3, $p < .0001$

Table 4b

Degree of deafness (PTA, right ear) and Communication Mode

Group	n	M (PTAR)	SD
1. Sign Only	440	103.1	16.6
2. Speech Only	171	89.7	21.4
3. Speech and Sign together	718	98.0	18.0

 $F(2, 1326) = 35.2, p < .0001$
Groups 1:2, $p < .0001$ Groups 1:3, $p < .0001$ Groups 2:3, $p < .0001$

Table 5a

Degree of deafness (PTA, left ear) and Sign Language Skills

Group	n	M (PTAL)	SD
1. No Skills	67	88.3	21.2
2. Some Skills	70	92.5	19.0
3. Fair Skills	224	95.5	18.3
4. Good Skills	499	99.9	15.7
5. Excellent Skills	479	103.8	13.4

 $F(4, 1334) = 23.8, p < .0001$ Groups 1:2, $p < .1225$ Groups 1:3, $p < .0011$ Groups 1:4, $p < .0001$ Groups 1:5, $p < .0001$ Groups 2:3, $p < .1641$ Groups 2:4, $p < .0003$ Groups 2:5, $p < .0001$ Groups 3:4, $p < .0007$ Groups 3:5, $p < .0001$ Groups 4:5, $p < .0002$

Table 5b

Degree of deafness (PTA, right ear) and Sign Language Skills

Group	n	M (PTAR)	SD
1. No Skills	67	86.2	22.3
2. Some Skills	71	92.3	22.1
3. Fair Skills	224	94.6	17.9
4. Good Skills	501	100.2	15.1
5. Excellent Skills	479	103.2	13.6

 $F(4, 1337) = 27.3, p < .0001$ Groups 1:2, $p < .0259$ Groups 1:3, $p < .0002$ Groups 1:4, $p < .0001$ Groups 1:5, $p < .0001$ Groups 2:3, $p < .2771$ Groups 2:4, $p < .0001$ Groups 2:5, $p < .0001$ Groups 3:4, $p < .0001$ Groups 3:5, $p < .0001$ Groups 4:5, $p < .0035$

Table 6a

Degree of deafness (PTA, left ear) and Reading Performance

Grade Equiv. Score	n	M (PTAL)	SD
5	11	106.5	9.4
6	69	97.6	18.9
7	171	102.2	14.2
8	319	100.7	16.6
9	183	99.1	16.1
10	193	97.9	18.2
11	135	99.9	16.0
12	67	95.9	16.5

 $F(7, 1140) = 2.0, p < .0593$

Table 6b

Degree of deafness (PTA, right ear) and Reading Performance

Grade Equiv. Score	n	M (PTAR)	SD
5	11	104.2	9.0
6	69	100.2	15.7
7	171	101.1	15.0
8	318	99.8	16.1
9	184	99.5	17.2
10	193	98.7	17.6
11	135	98.3	16.3
12	69	94.8	20.2

 $F(7, 1142) = 1.3, p < .2352$

Table 7

Parental Hearing Status and Reading Performance

Group	n	M	SD
1. both Hearing	672	8.8	1.6
2. one Deaf, one Hearing	26	9.4	1.7
3. both Deaf	262	8.7	1.7

$F(2, 957) = 1.9, p < .1444$

Groups 1:2, $p < .1021$

Groups 1:3, $p < .3565$

Groups 2:3, $p < .0555$