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Code Switching Ability of Deaf Students and its Relationship to Reading Comprehension Performance

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CODE SWTICHING ABILITY

OF DEAF STUDENTS

AND ITS RELATIONSHIP

TO READING COMPREHENSION PERFORMANCE

THESIS

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ABSTRACT

The purpose of this study was to investigate the relationship between deaf students' ability to code switch for ASL to written English and their reading comprehension performance.

A t-test was used to test the hypotheses presented in this study. The correlations between code switching ability and reading comprehension performance were established.

The findings of this study indicated that a strong correlation exists between deaf students' code switching ability and their reading comprehension performance. The findings of this study also showed a significant difference between the code switching scores of deaf students of deaf parents and deaf students of hearing parents. A signficant difference between the reading comprehension performances of deaf students of deaf parents and deaf students of hearing parents was not found.

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Chapter I

Statement of the Problem

Educators of the deaf have recognized for years that deaf students do not achieve reading grade levels equivalent to those achieved by their hearing peers. In recent years, many deaf educators have examined the role of manual communication in helping deaf students attain sufficient language skills to enable them to become competent readers since deaf children of deaf parents generally obtain better scores on standardized reading tests than deaf children of hearing parents. Many sign systems, especially American Sign Language, commonly called ASL, are not equivalent to English. Therefore, the ability of the deaf student to code switch from a manual communication system to written English and its effect on reading comprehension needs to be examined.

Purpose

The purposes of this study were to investigate the relationship between deaf students' ability to code switch from ASL to written English and their reading comprehension

scores and to investigate whether a difference in this relationship exists between deaf students of deaf parents and deaf students of hearing parents.

Questions to be Answered

The following questions were investigated:

1. Does a strong correlation exist between deaf students' written English scores and their reading comprehension scores?

2. Is there a significant difference between the code switching scores for deaf students of deaf parents and deaf students of hearing parents?

3. Is there a significant difference between the reading comprehension performance for deaf students of deaf parents and deaf students of hearing parents?

Need for the Study

The role of language in the reading process has been extensively researched and discussed. Smith (1973) recognizes the need for a reader to be proficient in the language in which he is expected to read. The reader, according to Miller (1965), uses three primary cue systems, including the graphophonic, the syntactic, and the semantic, in a simultaneous manner as he reads.

Syntactic structures in the English language of deaf students have been extensively studied (Power & Quigley, 1973; Quigley, Smith, & Wilbur, 1974; Quigley, Wilbur, & Montanelli, 1974; Quigley, Wilbur, & Montanelli, 1976). These studies identify the order in which syntactic structures are learned by the deaf student, how well established English syntactic rules are for deaf students, and how similar rule development is to that of hearing children. In addition, acquisition of syntactic rules by the deaf is examined as a delayed, but normal process. Development of incorrect syntactic rule generalizations for English by the deaf have also been examined in these studies. Not only do these studies show that deaf students develop English syntactic rules at a slower rate than hearing students, they also show that deaf students develop incorrect or inappropriate rules governing English syntax. Without the proper English syntactic framework, reading becomes a more difficult task for the deaf student than it is for the hearing student who has mastered English syntax.

English language deficiencies alone do not explain the poor reading achievement of deaf students. Studies examining the reading and

written English of deaf students of deaf parents
who are native users of ASL verify that these
children do better than deaf children who have
hearing parents and are raised with oral English
or Signing Exact English methods (Meadow, 1968;
Stuckless and Birch, 1966). Since ASL is not
English, deaf children raised as native users of
ASL must be acquiring important language skills
which they can later apply to their learning and
reading of English.

Definition of Terms

Terms requiring definition are American Sign
Language, code switching, deaf, Signed English,
total communication, linguistic competence, and
familiar rater.

American Sign Language is the language system
used by most deaf people in the United States as
their native language. It is the third most
common non-English language in the United States.
Commonly called ASL and sometimes Ameslan,
American Sign Language is a manual/visual language
not an oral/auditory one. ASL is not based on any
spoken language and it is definitely not "deaf
English," as it is sometimes mistakenly called.

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ASL has its own linguistic constraints and its own syntax (Wilbur, 1979).

Code switching is the ability to go from one communication mode to another, either within a language or between languages. When a person listening to English begins to write English, that person must code switch. Likewise, a person changing from spoken German to written French must code switch. In the second example, two switches have occurred: from one language to another and from one modality to another.

Deaf is having a hearing loss of 85 dB or greater in the better ear and not acquiring spoken language before the onset of the hearing loss.

Signed English is a communication system used primarily in educational settings for the deaf in which signs and fingerspelling are combined to approximate English syntax.

Linguistic Competence is the ability to function adequately in a given communication environment by having acquired sufficient language skills which are to be used in that environment.

Familiar Rater is one of two teachers of the deaf with no less than 8 years of classroom experience and the ability to evaluate students'

written language for meaning based on a knowledge
of the effect of ASL on communicative intent.

Limitations of the Study

This study was limited to 25 deaf students
who attended a residential program in western New
York and were enrolled in the junior/senior high
school department of that program. The students,
randomly selected from their reading classes,
passed a screening procedure demonstrating
comprehension of a videotaped ASL story.

The data for this study were limited to
results of small-group testing.

Summary

Research indicates a need for further study
in the area of code switching from ASL to written
English and the effects of this ability on reading
comprehension. This study was designed to inves-
tigate whether code switching ability can be
related to the deaf student's reading comprehen-
sion. The differences between code switching
ability as it relates to reading comprehension for
the deaf student of deaf parents and the deaf
student of hearing parents were also investigated.

Chapter II

Review of the Literature

Purposes

The purposes of this study were to
investigate the relationship between deaf
students' ability to code switch from ASL to
written English and their reading comprehension
scores and to investigate whether a difference in
this relationship exists between deaf students of
deaf parents and deaf students of hearing parents.

This paper's review of current literature
examines four major areas. English language
deficiencies in the deaf, reading instructional
procedures used with the deaf, reading problems of
the deaf, and the use of a native language system
(ASL) with the deaf and its effect on the reading
process are the areas investigated.

English Language Deficiencies

In the field of deaf education, it has long
been recognized that deaf individuals who have
become deaf prelingually have great difficulty
mastering competency in English. Several areas of
English semantic, syntactic, and pragmatic

weaknesses found in the deaf are noteworthy due to
the important role these areas play in the reading
process.

Quigley, Power, and Steinkamp (1977)
conducted a six-year study of 450 prelingually
deaf children between the ages of 10 and 18 to
examine syntactic structures in their language.
In developing their investigation, these
researchers were guided by five questions. They
wanted to know the order of difficulty of various
syntactic structures for the deaf and if the order
were the same as it is for hearing children. They
wanted to know how well established various
syntactic rules were for this deaf population.
They wanted to know if there were developmental
stages deaf children went through and if these
stages were similiar to those of hearing children.
They wanted to know if acquisition of these rules
were merely delayed or if deaf students develop
rules hearing students do not. Lastly, they
wanted to know how deaf children's understanding
of various syntactic rules compares to the
frequency with which these rules need to be

utilized in reading materials children typically encounter.

Using the Test of Syntactic Abilities (TSA), which contains a battery of 22 tests designed to measure syntactic structures comprehended and produced by the deaf, the 450 deaf students were tested by sixteen persons who had been specially trained in the use of the TSA and its administration.

One of the findings of the study was that the order of difficulty was similar for the deaf and hearing children in the sample, but not identical. In particular, deaf students found tests involving disjunction and alternation to be the most difficult, although these tests were not particularly difficult for the hearing children. In disjunction, the validity of two or more sentences is understood in terms of alternatives (alternation) as in the sentence, "Either Bob will play basketball or Tom will join the swimming team." The deaf students also would try to force a subject-verb-object pattern on the sentences, even changing passive to active sentence, thereby completely changing the meaning in some cases.

It was also found that most syntactic structures

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tested were not well established, even by age 18, except for simple transformations such as negations, question formation, and conjunctions. The hearing students, on the other hand, had mastered most syntactic structure much before age 18.

As to the developmental nature of these syntactic structures, since the population of deaf students was between the ages of 10 and 18, prior language instruction influenced the subjects' language. The TSA is also a test to determine presence of various structures rather than their emergence. Even with such considerations in mind, the authors stated that syntactic structures develop in deaf children in much the same ways as they do in hearing children albeit at a much slower rate. The deaf students, in an effort to impose subject-verb-object order on sentences displayed several rule-generated structures which are not found in English.

Because of the difficulties deaf students found with many syntactic structures, even at age 18, the authors suggested that reading materials be selected for the deaf with the deaf students' syntactic competencies in mind. An example given was that only 30% of 18 year old deaf students demonstrated mastery

of agent-deleted passives, yet this structure appears in first-grade reading materials. Obviously, a major problem exists. Quigley, Power, and Steinkamp strongly recommended that teachers of the deaf rewrite existing materials and/or write their own materials based on their students' stage of language development as determined by the TSA.

In a study which compared the complementation abilities of deaf and hearing students, Jones and Quigley (1979) used the that-complements test of the TSA. An example of a that-complement would be That Buddy did not receive first place at the dog show disappointed me. In the above example, the that-complement functions as the subject of the sentence but that-complements also function as objects in a sentence. When examining hearing children's language acquisition, Limber (1973) determined that complement structures appear in children's speech as their first complex construction.

In the Jones and Quigley research, 93 deaf students between the ages of 10 and 18 years and 20 hearing students each at ages 8, 9, and 10 were given a test of 100 items which investigated their mastery of that-complements, including that-complements in the

subject position, the object position, that-deleted
complements, and that-complements which were
extraposed. A recognition task and a comprehension
task were given to test that-complements in each of
the four syntactic environments given above.

The differences in performances between the
hearing and deaf populations were found to be
statistically significant beyond the .01 level, with
8 year old hearing children scoring much higher than
the 18 year old deaf students. In order of increasing
difficulty for the deaf students were that-complements
in object position, that-complements in subject
position, extraposed complements, and finally that-
deleted complements.

Given the results of their study, the authors
recommended that there be syntactic control of reading
materials used with the deaf. They also recommended
that teachers of the deaf make more effort to teach
these structures.

In a further study using the TSA, Quigley, Smith,
and Wilbur (1974), results from three tests involving
relativization, including processing, copying, and
embedding, were analyzed. Although results showed
improvement with increasing age in the 10 to 18 year

old population tested, much younger hearing students received higher test scores in all three areas.

Major findings of the study were that the position and function of the relative clause affected its difficulty, that students tended to join the noun phrase of the relative clause to the verb phrase of the main verb, thus changing the meaning of the sentence, that when conjoining two sentences, students would frequently delete coreferential subjects and objects, and that instead of accepting the possessive form whose, which was the correct form, the students accepted the possessive form noun phrase plus an apostrophe.

The same basic subject-verb-object order which had been found in other studies using the TSA (Jones & Quigley, 1979; Power & Quigley, 1973) was confirmed by the present study. The authors questioned why these syntactic deviations exist in the English language of deaf children and if these deviancies may be a result of an interaction between sign language and English.

In analyzing the language of 20 three to five year old deaf children, Schirmer (1985) looked at video-taped one hour sessions of interaction between a child and an investigator who was using stimulus

materials. Three components of language, syntax,
semantics, and use, were the focus of the inves-
tigation.

Four analytical systems were used to assess the
process of learning the relationship between objects,
events, and ideas, and expressing this relationship in
a rule system shared by those in the community. The
four systems for analysis were Brown's five stages of
language acquistion, Bloom and Lahey's plan for
language development goals, Lee's developmental
sentence analyses, and Halliday's phases of functional
language. By using these four different systems of
analyses, it was possible to gain comprehensive
information about the three components of syntax,
semantics, and use.

In this study, Shirmer found that the language
of hearing-impaired children is not different from that
of normally hearing children, but that the hearing-
impaired children develop their language at a delayed
rate. Shirmer recommended that hearing-impaired
children be exposed to all components of language and
have the freedom to use non-adult forms as they develop
language.

Vocabulary development was the focus of a study by

Howell (1984). As reported by Howell, most deaf

children enter school at age 4 with an expressive

vocabulary bank of 158 words as compared with an

expressive vocabulary bank of 2,000 words for the

average hearing kindergarten student.

In her study, although with a limited population

of four children, Howell found that through use of a

signing system, the children had between 750 and 1301

words in their expressive vocabularies, representing

ten categories which included nominals, modifiers,

verbals, temporals, spatials, negations, questions,

connectives, pronouns, and articles. They achieved

these expressive vocabularies by the time they were

four years of age. Two of the children had deaf

parents and two of the children had hearing parents

who were going through the process of learning sign

language at the same time they were trying to use these

new signs with their young children.

The data from this study indicated that hearing-

impaired children go through a similar process of

vocabulary development that normally hearing children

go through. The hearing-impaired children exhibited

higher percentages of nominals, verbals, and modifiers,

as these word classes are more concrete and more

easily represented in a sign system. Howell suggested that because of the limited number of children in the study, interpretations of the findings must be made with caution and that perhaps the study could be replicated with a larger population.

Additional studies involving the language development of deaf children have frequently compared communication modes. One such study, by Knell and Klonoff (1983), sampled the language of deaf children who received their language by a primarily oral mode or by sign language and then compared the two groups.

The subjects involved in the study were eight children from total communication classes, six children from oral classes, and seven children who were not hearing impaired. The groups of children were given three tasks, including a task to retell a story which had been read to them, to retell a story which they had read themselves, and to answer a series of questions about some pictures which were shown to them. The children's expressive language was measured in three ways: verbal output, syntactic complexity, and communicativeness.

As expected, the group of children with normal hearing performed significantly better on all tasks

than did either groups of hearing-impaired children.
The significant difference between the two groups of
hearing-impaired children was that the children in the
oral group had a higher percentage of noun phrase -
verb phrase constructions. The oral group also pro-
duced a significantly higher number of syntactically
appropriate utterances than did the total communication
group.

The results of the study showed that regardless of
communication mode, hearing-impaired children fall way
short of their hearing comtemporaries in language com-
petency. One needs to question the measures for
syntactically appropriate utterances as features of a
non-English based language, such as ASL, which would
predictably appear in the language of the children
using total communication. It is conceivable that
certain measures which would not allow for ASL con-
structions would favor the oral group in terms of their
syntactically appropriate utterances.

Some investigators have examined possible causes
for syntactic deficits in hearing-impaired children
when looking at these children's English language
competence. Scholes, Cohen, and Brumfield (1978),
using a population of 188 deaf high school students

attending the Florida School for the Deaf formulated

four hypotheses to explain the deviant nature of deaf

students' English. Their syntactic hypothesis stated

that congenitally deaf are unable to acquire the syn-

tactic components of the language used by their commun-

ity. The delay hypothesis stated that the deaf can

acquire full linguistic competency in the language used

by their community, but at a delayed rate. The reading

skill hypothesis stated that the deaf do poorly on

sentence comprehension tasks designed to test their

syntactic abilities because they are poor readers. The

"wrong methodology" hypothesis stated that the deaf

have poor syntactic abilities because they have been

taught with inadequate teaching methods.

The subjects were given a sentence comprehension

test with involved various active, passive, and double-

object constructions. The test comprised a series of

sentences presented by slide projection. Each sentence

was accompanied by four line-drawing pictures. The

students were given an answer sheet and had to circle

the number which best corresponded to the picture re-

presenting the given sentence.

The analyses of the data called for rejection of

all but one hypothesis. In this study, it appeared

deaf students, or any language learner with a significant auditory impairment, will show an inability to acquire certain syntactic structures of the community language.

The authors noted more recent research which points to a critical period for language acquisition suggesting that complete language competency can be attained if the early communicative environment is rich enough. The authors suggested if this arguement proves to be valid, conclusions of their study will obviously need revision.

Pragmatic, as well as semantic development, was researched by Curtiss, Prutting, and Lowell (1979). These investigators sought to determine the specific pragmatic intentions, the specific semantic intentions, and the relationship between pragmatic and semantic development in the communicative system of young hearing-impaired children.

The population studied was made up of 12 students enrolled at the John Tracy Clinic. The children were videotaped in four distinctly different settings, with the tapes analyzed for every conceivable communicative act, including utterance, gesture, facial expression, body movement, and vocalization. Communicative acts

were classified as verbal or nonverbal and analyzed for pragmatic intention or effect and semantic content.

In the 12 hours and 20 minutes of videotaping, 1549 communicative behaviors were identified. Not surprisingly, the numbers of communicative acts per minute increased with age.

Sixteen pragmatic functions were identified. Examples of these pragmatic functions are command, demand, labeling, request for approval, and response to a question. All age groups displayed all of the 16 pragmatic functions identified. The two year old group demonstrated the greatest amount of labeling behavior.

In general, results from the study suggested that the hearing-impaired children, while being deficient in linguistic ability, displayed considerable communicative ability. Semantic functions appeared to develop much more slowly than did pragmatic functions.

The authors suggested using a number of pragmatic intentions when teaching a new semantic function. Coding pragmatic and semantic behaviors using a non-verbal modality necessarily limits the amount of communication which is possible. The authors also

suggested in depth research into the effects of
signs as a first language on the second language,
which in the United States, would, of course, be
English.

In yet another investigation of language
deficits in hearing-impaired children, Tweney and
Hoeman (1973) studied the semantic associations in
profoundly deaf children by examining syntagmatic-
paradigmatic shifts. In a young child, a syntagmatic
response is elicited when the response belongs to a
different grammatical class from the stimulus word.
Thus, a young child might respond bark when given the
stimulus word dog, whereas older children shift to
paradigmatic responses in which the response belongs to
the same grammatical class as the stimulus word. Cat
would be considered a paradigmatic response to dog.

In testing 46 profoundly deaf children using ASL
and 30 hearing children using English, the researchers
found that both groups clearly exhibited syntagmatic-
paradigmatic shifts, although the level of paradigmatic
responding was lower for the deaf children, possibly
due to the lack of an early rich linguistic environ-
ment. The deaf children performed like younger hearing
children, suggesting that early deprivation of lin-

quistic experiences decrease langauge performances in both English and ASL. Because the subjects produced more sign language responses than English responses, the investigators concluded that the syntagmatic-paradigmatic shift is not due to increasing numbers of English associations but rather to linguistic and conceptual development in manual language which follows processes found in the development of a vocal language.

Syntactic development in the hearing-impaired child has been of interest also because of the effects this development has on cognition. Dolman (1983) investigated the relationship between syntactic development and concfrete operations in hearing-impaired children by examining the linguistic and cognitive skills of 59 hearing-impaired children between the ages of 7 and 15. Dolman formulated two major hypotheses for his study. His first hypothesis was that there would be no significant differences on a test of English syntactic comprehension between deaf children classified as operation and deaf children classified as non-operation. His second hypothesis was that there would be no significant differences in operational ability amoung deaf childen who had a strong ASL background, who had a MCE (manually coded

English) background, and who had no consistent language background. The operational tasks chosen for the study included a classification task, a conservation task, a seriation task, and a numeration task.

The findings of the study called for rejection of Hypothesis One for all tasks except the classification task. This task, more than the other tasks, called for directions which called upon more linguistic ability in the deaf children. Hypothesis Two was also rejected. This study offered support to the Piagetian view that a strong language background does not insure the development of operational structures. Although Dolman acknowledged that research has shown that syntactic comprehension skills increase rapidly once the child reaches the level of concrete operations, he felt that one cannot establish a case for cognition as being a prerequisite for language or for language as being a prerequisite for cognition. He did conclude, however, that when deaf children begin to think operationally, there must be changes which simultaneously occur or have already occurred in their ability to interact with language.

In an effort to analyze the language of hearing-impaired children, Green (1974) developed semantic

differential scales which were characterized by a com-
bination of scaling and association methods. The
children were given pairs of antonymous adjectives
which were separated by a seven-point scale. Then the
children were given a concept word and required to
place that concept word somewhere along the scale. The
investigation was designed to provide a series of modi-
fiers which, when paired with antonyms, could be used
to construct a semantic differential scale to be used
specifically with deaf children.

In his findings, Green determined that the
responses of the hearing-impaired children were simi-
lar to the responses elicited by younger hearing
children. The sample from the deaf children included
45 responses which could not be classified as modi-
fiers. However, there was a significant body of modi-
fiers which could be used to construct the semantic
differential scales.

Reading Instructional Procedures

In attempting to determine causes for deaf
children's difficulties in reading, various materials
and instructional procedures have been examined.
LaSasso (1978) conducted a national survey of materials
and procedures used to teach reading to hearing-im-

paired children. LaSasso attempted to determine the major instructional approaches used, which basal readers were used most frequently, how teachers assess strengths and weaknesses of various basal readers, how teachers match materials with their students' needs, and where the focus of future research should be.

The major findings of LaSasso's study were that 74% of the programs responding did use basal readers as either a primary or supplementary approach to teaching reading and that 18% of the programs responding used a formal procedure for selecting appropriate materials. LaSasso questioned whether inappropriateness of reading materials may be a contributing factor to the poor reading achievement of deaf students.

In considering the question, "Why can't the deaf read?" Gormley and Franzen (1978) hypothesized that the deaf reader is viewed as linguistically deficient, but perhaps too much emphasis has been placed on the syntax of written English, confusing it with the deep structure or meaning level of language.

The authors proposed that preteaching of vocabulary and syntactic structures may be unnecessary if the children have an internalized schema which can provide a framework for predicting and reconstructing content.

They questioned whether the hearing-impaired student must have receptive understanding of certain syntactic structures as a requisite to reading for meaning. They cited the superior reading achievement of deaf children of deaf parents, although in many cases these children do not receive spoken English or even signed English in the home, rather they are receiving ASL.

Gormley and Franzen called the deaf reader unique since he will not be able to read in his native language, which has no written equivalent. However, in defining reading as an active process of constructing meaning by using the experiences the reader brings to the reading situation, the importance of looking at the deaf reader as inadequately equipped with English syntax may be reduced.

When reading instructional methods for the hearing impaired were examined by Hammermeister and Israelite (1983), an integrated language arts approach was advocated after investigating the theoretical principles underlying the Mount Gravatt Research Project in Australia. The steps in the reading program used in this project included setting up pragmatic situations that encourage discussion and interaction among the students, reinforcing phrases used by the students

through repetition and expansion, introducing of the written form after the children have mastered the oral unit, practicing the use of the written unit through unit cards to form sentences, practicing word attack skills, and presenting the reading of books which have been chosen expressly to use the natural language only after the children have received enough oral and written practice in manipulating signaling sequences and content units.

The authors concluded that the Mount Gravatt approach supported Halliday's (1973) belief that language which is functional to children is the language which they will learn to speak. The authors criticized traditional reading stories, citing a lack of experience and knowledge with the language structures involved in these materials.

Ewoldt (1981), through an examination of deaf children's miscues, cloze responses, and story re- tellings, attempted to develop a model of reading of the deaf. Four children were used in the study, ranging in age from 6.11 to 16.11. Ewoldt's findings revealed that the deaf children's reading behaviors were greatly similar to those of hearing children with the exception that certain options available to hearing

children during oral reading were not available to the deaf children. She also concluded that when the deaf students were provided with whole, meaningful, interesting, and predictable stories, they were frequently able to read proficiently.

Ewoldt recommended that deaf children be provided with reading stories or passages that include more content than do isolated sentences and that deaf children be given the opportunity to use their knowledge of the structure of stories, their past experiences, and their need to make sense of what they read. According to this investigator, "This contextual support substantially reduces the necessity for preteaching sentence structures and vocabulary, allowing deaf readers to become more independent readers."

Quinn (1981), in examining the reading skills of hearing and deaf children, investigated the extent of phonological coding and chunking used by the two groups. The deaf group comprised two subgroups, including a group from an oral program and a group from a total communication program.

This research provided evidence that deaf children, regardless of their communication background, will utilize the same stategies to obtain meaning from

reading materials. Some of these strategies, including differential processing of various grammatical word classes, use of orthographic context, and differential processing of "pronounceable" and "unpronounceable" words had previously been associated with hearing children only.

The major findings of Quinn's research were that deaf children demonstrated sophisticated psycholinguistic strategies, exhibited chunking at the whole-word level, and most significantly, used phonological encoding. Perhaps a sensitivity to orthographic regularities could explain what appeared to be phonological encoding for children who had only minimal acoustic experience.

The findings of this study suggest that educators cannot attribute deaf children's reading difficulties on a lower-level information processing deficiency, such as a reliance on visual coding or an inability to utilize phonological information to access psycholinguistic rules.

Selected Reading Problems

Although a great amount of literature has been written about specific reading deficiencies of the deaf, examining the English language problems of the

hearing-impaired furnishes adequate evidence that reading will be a difficult task with numerous inherent problems.

In investigating the effect of context on deaf students' comprehension of difficult sentences, Nolen and Wilbur (1983) found that context did have a significant effect in facilitating comprehension of relative-clause sentences across reading levels. In a two-part test, students first matched pictures to active, passive, or relative-clause sentences. In the second part of the test, the students also matched pictures to the same three kinds of sentences, however, this time the sentences were imbedded in a context-providing paragraph. The results of this study added support to the theory that deaf children are able to make use of context to help minimize their deficiencies in English syntax, semantics, and use.

Additional study into the effects of context on deaf students' reading comprehension was conducted by McGill-Franzen and Gormley (1979). In their study, deaf students at the fourth and second-reader level were given two tasks to assess their comprehension of truncated passive sentences. In the first task, the sentences were presented in isolation. In the second

task, the sentences were given in familiar prose, specifically fairy tales, "Goldilocks and the Three Bears" and "Little Red Riding Hood." In both tasks the students were to pick the picture which best represented the given sentence. For students at the reading levels tested, sentences given in the context of familiar prose were significantly easier to comprehend.

The major recommendation by the authors of this study was that deaf children be exposed to complex syntactical structures in meaningful context. By increasing the meaningfulness of the task, the ability of deaf students to comprehend complex structures can be enhanced.

LaSasso (1978), in examining the use of the cloze procedure as a device to measure readability and comprehension for deaf students, found that the cloze was an unsatisfactory measure for matching reading materials and deaf children. She also found that the Fry and Dale-Chall readability formulas were not appropriate measures to determine difficulty of materials for deaf students until further research had been conducted on the validity of these formulas when used for the purpose given above. LaSasso suggested that WH-question forms be used instead of completion of

Incomplete statements for teachers wishing to assess

deaf students' comprehension of text-explicit informa-

tion.

To examine the role of idiomatic expressions in

the reading of deaf children, Conley (1974) used the

Conley-Vernon Idiom Test to assess deaf students' com-

prehension of idiomatic expressions. When matched with

hearing students for reading levels ranging from 2.0 to

9.0, Conley found that at all levels, the hearing

students' ability to comprehend idiomatic expressions

was significantly better than that of the deaf

students.

The author suggested that teachers of the deaf pay

more attention to the teaching of idiomatic expressions

due to the important nature these expressions have in

the English language.

Code Switching

Researchers in the field of deaf education, as it

has been previously noted, have recognized the English

language difficulties hearing-impaired children have

and their resulting reading difficulties. In recent

years, a growing body of research has recognized the

linguistic competency deaf children have demonstrated

when using ASL. Recent research has begun to look at

the role of the native language (ASL) can play in
facilitating reading success in the second language
(English). To make the change from the visual language
of ASL to written English involves the process of code
switching. Although to date, there is little research
in this newly investigated area, those studies done
have strong implications about what may lie ahead in
the field of deaf education.

In examining the language of a three year old girl
of deaf parents, both of whom were college graduates,
Collins-Ahlgren (1974) noted that the diglossic langu-
age continuum of this child ranged from use of her own
invented and imaginative signs through conventional
signs which followed English syntax without inflections
to use of signed American Standard English complete
some English markers.

By her third and fourth years, the subject of the
study used signs which represented articles, auxili-
aries, and inflections. A transitional stage was
determined in which the subject partially omitted verb
inflections that were presented to her. Collins-
Ahlgren summed up her findings by stating that hope-
fully this child will serve as a prototype of many
deaf children who understand various language functions

and grammatical relationships through their native language and can use this language base to help them acquire standard English. ASL can be used successfully as a language base through which to teach a second language.

Barnum (1984) also supported bilingual/bicultural education for the deaf in outlining the inherent differences between learning an oral/aural language and a manual/visual language. Because research has demonstrated time after time that deaf children from deaf families, in other words, native signers, do consistently better than deaf children from hearing families throughout their academic years, Barnum avocated instruction in ASL through the fifth-grade level with transition to standard English at that time.

Summary

Considerable research has demonstrated that most deaf children have great difficulty mastering the English language sufficiently well to become age-appropriate competent readers. Several factors have contributed to their lack of English language competence and consequently, their reading achievement.

Recent research focusing on the role of context in aiding hearing-impaired children to comprehend syntac-

tically difficult passages has supplied the deaf educator with evidence that it may not be necessary to do a large amount of preteaching of new vocabulary and unfamiliar syntactical structures to insure comprehension of reading materials.

Because the deaf child is striving to become a proficient linguist, perhaps ASL, which may be a more natural language for him to use during the most critical period for language acquisition, may be used as a springboard to facilitate development of English as a second language. By learning pragmatic, semantic, and syntactic functions of a language, the deaf child can apply his knowledge of a language system to learning and reading in a second language.

Chapter III

Design

Purpose

The purpose of this study was to investigate
the relationship between deaf students' ability to
code-switch from ASL to written English and their
reading comprehension scores.

Questions to be Answered

1. Is there a significant difference between deaf
   students' scores for their written English and
   their reading comprehension scores?

2. Does a significant correlation exist between
   deaf students' written English scores and
   their reading comprehension scores?

3. Can the written English scores be used as
   predictors for the reading comprehension
   scores?

Methodology

Subjects

The subjects for the study were 25 deaf
students who attended a residential program in
western New York and were enrolled in the
junior/senior high school department of that

program. Students were randomly selected from their reading classes and had to pass a screening procedure to demonstrate sufficient comprehension of the ASL story which was used in this study.

Instruments and Procedures

The subjects viewed a videotape of a short story given by a native user of ASL. The story was previously agreed upon to have been delivered in ASL by a recognized authority in ASL research and a registered interpreter for the deaf. After viewing the videotape, ten questions were asked to ascertain that the subjects had adequate receptive ASL skills to sufficiently obtain the literal content of the story. Each subject was given an opportunity to view the videotape for a second time before answering the ten screening questions, which were given by the same native user of ASL who signed the story on the videotape. To be included in the study, a subject had to correctly answer a minimum of 7 out of the 10 questions.

The videotape then was shown to groups no larger than five subjects per group. Segments of the videotape were replayed as many times as requested by the group of subjects, as the

subjects' task was to code-switch from ASL to

written English and was not intended to be a

memory task. No assistance was given by the

investigator and there was no exchange of

information among the subjects. The subjects were

instructed to write in English the story they had

been viewing. It was stressed by the investigator

that the students were to tell exactly what

happened in the story, using their best English.

The investigator then graded the subjects'

written English versions of the ASL story after

interrater reliablility had been established using

another writing sample from each subject. A

investigator-developed scale which was an

expansion of the National Technical Institute for

the Deaf's Grading System to Evaluate Written

Composition used by its English department was

applied to the subjects' written English versions

of the ASL stories. See Appendix C for the NTID

Grading System to Evaluate Written Composition and

for the investigator-developed expansion of that

scale.

The researcher's score for each subject's

written English version of the ASL story was then

correlated to his Stanford Achievement Test score

in reading comprehension from February, 1984.

Statistical Analysis

A t test of differences between two scores

was used to compare the mean code switching scores

of the deaf students of deaf parents and the deaf

students of hearing parents and to compare the

mean reading comprehension performance percentiles

of the deaf students of deaf parents and the deaf

students of hearing parents.

The investigator established the correlations

between code switching and reading comprehension

performance for the total sample, for the deaf

students of deaf parents, and for the deaf

students of hearing parents.

Summary

This study investigated the relationship

between deaf students' ability to code-switch from

ASL to written English and their reading

comprehension scores. The students viewed a

videotaped ASL story, then wrote their English

version of that story after demonstrating their

comprehension of the literal content of the ASL

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story. The investigator rated each subject's
written English story using an expanded version of
the NTID Grading System for Written Composition
and correlated the obtained score with each
subject's reading comprehension score on the
February, 1985 Stanford Achievement Test.

Chapter IV

Analysis of Data

Purposes

The primary purpose of this study was to
investigate the relationship between deaf
students' ability to code switch from ASL to
written English and their reading comprehension
performance.

Two secondary purposes of this study were to
investigate the differences between deaf students
of deaf parents and deaf students of hearing
parents for ability to code switch and for reading
comprehension performance.

Findings and Interpretation of Data

The null hypotheses in this study were as
follows:

1.   There is no statistically significant
correlation between code switching ability and
reading comprehension performance.

2.   There is no significant difference
between the mean code switching scores for deaf

students of deaf parents and deaf students of

hearing parents.

3. There is no significant difference

between the mean reading comprehension performance

for deaf students of deaf parents and deaf

students of hearing parents.

Table 1

Code Switching Scores, Reading Comprehension
Performance, and Parental Hearing Status

Student Number	Code Switching Score	Reading Comprehension Percentile	Parental Hearing Status
1	8	93	Deaf
2	7	95	Deaf
3	4	65	Deaf
4	7	85	Hearing
5	8	83	Deaf
6	5	81	Hearing
7	8	89	Deaf
8	4	65	Hearing
9	2	53	Hearing
10	5	74	Hearing
11	5	77	Hearing
12	7	90	Hearing
13	2	44	Hearing
14	7	94	Hearing
15	7	73	Deaf
16	7	84	Deaf
17	3	45	Hearing
18	8	90	Deaf
19	8	88	Hearing
20	7	71	Hearing
21	8	85	Hearing
22	8	85	Hearing

For code switching, the mean for the total
sample was 5.95, the mean for the deaf students of
deaf parents was 7.13, and the mean for deaf
students of hearing parents was 5.29.

For reading comprehension performance, the
mean for the total sample was 77.68, the mean for
the deaf students of deaf parents was 84.00, and
the mean for deaf students of hearing parents was
74.07.

Eight students made up the sample of deaf
stduents with deaf parents. Fourteen students
comprisded the sample of deaf students with
hearing parents.

Table 2

Code Switching Ability of Deaf Students
and Its Relationship
to Reading Comprehension Performance

Sample	r	r^2	Relationship
Deaf Students with Deaf Parents	.78	.60	Moderate
Deaf Students with Hearing Parents	.94	.89	Strong
Total	.91	.83	Strong

The relationship between the ability to code switch and reading comprehension performance was strong for the total sample population, calling for a rejection of the first null hypothesis which stated there was no statistically significant correlation between deaf students' ability to code switch and their reading comprehension performance (see Table 2).

The relationship between the ability to code switch and reading comprehension performance was stronger for the deaf students with hearing parents than it was for deaf students of deaf parents. The relationship between the ability to code switch and reading comprehension performance was in the moderate range for deaf students of deaf parents while the relationship between the ability to code switch and reading comprehension performance for the deaf students of hearing parents exceeded the same relationship for both the total sample population and the deaf students of deaf parents.

Table 3

t test of Differences between
Deaf Students of Deaf Parents and
Deaf Students of Hearing Parents
on Two Variables

	Code Switching	Reading Comprehension Performance
Deaf Students of Deaf Parents		
df	8	8
X	7.125	84
s.d.	1.269	9.657
Deaf Students of Hearing Parents		
df	14	14
X	5.286	74.071
s.d.	1.906	15.913
t value	2.429	1.597
t (crit.) = 2.074		
p<.05		

A significant difference at the .05 level of confidence was found between the mean scores for code switching between the deaf students of deaf parents and the deaf students of hearing parents, calling for rejection of the second null hypothe-

sls.

No significant difference at the .05 level of
confidence was found between the mean scores for
reading comprehension performance between the deaf
students of deaf parents and the deaf students of
hearing parents, calling for retention of the
third null hypothesis.

Summary

The findings of this study reject the first
null hypothesis that stated there was no statis-
tically significant correlation between the
ability of deaf students to code switch and their
reading comprehension performance. The results
have indicated that a strong relationship exists
between code switching ability and reading
comprehension performance.

A significant difference was established
between the code switching ability for deaf
students of deaf parents and deaf students of
hearing parents.

However, there was not a significant
difference established between the reading
comprehension performance for deaf students of
deaf parents and deaf students of hearing parents.

Chapter V

Conclusions and Implications

Purposes

This study was designed to investigate the
relationship between deaf students' ability to
code switch from ASL to written English and their
reading comprehension performance as measured by
the Stanford Achievement Test - Special Edition
for Hearing Impaired Students. The possibility of
a significant difference at the .05 level of
confidence between the mean code switching score
for deaf students of deaf parents and deaf
students of hearing parents was investigated as
well as the possibility of a significant
difference at the .05 level of confidence between
the mean reading comprehension performance score
for deaf students of deaf parents and deaf
students of hearing parents.

Conclusions

The results of the study rejected the null
hypothesis which stated that there would be no
statistically significant correlation between the
ability to code switch and reading comprehension

performance. The null hypothesis which stated

that there would be a significant difference

(p < .05) between the mean code switching score of

deaf students of deaf parents and deaf students of

hearing parents was retained, as was the null

hypothesis which stated that there would be a

significant difference (p < .05) between the mean

reading comprehension performance score for deaf

students of deaf parents and deaf students of

hearing parents.

    The findings of this study showed that the

mean code switching score of deaf students of deaf

parents was 1.81 points higher on a 10 point scale

than the mean code switching score of deaf

students of hearing parents. Further findings

showed that the mean reading comprehension

performance score of deaf students of deaf parents

was 10 percentile points higher than the mean

reading comprehension performance score of deaf

students of hearing parents.

Implications for Educators of the Deaf

    Educators of the deaf need to assess their

students' code switching ability if any form of

manual communication, be it ASL or Signed English,

is used with their students. Good communication

skills in ASL do not necessarily mean that good
English language communication skills exist.
Since the deaf student must deal with written
English as he reads and writes, he must be able to
code switch from his manual form of communication
to English.

Since the deaf students of deaf parents did
not exhibit as strong a relationship between their
code switching ability and their reading compre-
hension performance as did the deaf students of
hearing parents, educators of the deaf need to be
aware of pragmatic features of communication that
their students need in order to become effective
communicators, and in turn, proficient readers.

Educators of the deaf should make every
effort to utilize techniques which draw relation-
ships between their manual communication system
and written English. Even when Signed English is
being used, students still need to see how this
communication system compares with written
English. Without taking the time to make the
parallels, educators cannot assume that good
communication skills in one communication system
will necessarily transfer to good written English
skills.

Implications for Further Research

This study could be replicated with a larger sample population, especially a sample which contains equal numbers of deaf students of deaf parents and deaf students of hearing parents. Because of uneven numbers between the two groups within the sample population, results may not have accurately shown the difference between deaf students of deaf parents and deaf students of hearing parents.

This study could be replicated with a more diverse population of deaf students. In the sample population used for this study, only two students out of 22 were below the 50th percentile for hearing impaired students on the reading comprehension test of The Stanford Achievement Test. With a larger distribution of percentiles, the relationship between code switching and reading comprehension performance may be affected.

Certain factors other than code switching ability seem to affect the reading comprehension performances for deaf students of deaf parents. Further research is needed to investigate communication skills these students seem to acquire that help them achieve higher reading comprehension performance scores. Additional

research could focus on the function pragmatics has on reading comprehension.

Summary

The findings of this study showed that there is a strong relationship between code switching ability and reading comprehension performance. Educators of the deaf need to be sensitive to the needs their students have of seeing how their through-the-air communication system compares to written English. Educators of the deaf cannot assume that good manual communication skills will translate into good reading and writing skills.

Further research is needed to investigate code switching from communication systems other than ASL and their relationships to successful reading and writing skills as well as additional communication parameters that affect the deaf student's ability to read and write English.

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Appendix A

Written English Version of the ASL Story

Quite awhile ago, Mr. Schofield owned an old
VW. The gas gauge on this car was broken, so he
never knew how much gas was in the tank.

Once, while driving through a rural area very
late at night, Mr. Schofield ran out of gas. He
took a gas can out of the trunk and walked to the
nearest town, about two miles down the road.

When he reached the center of town, he found
four gas stations, one on each corner. Unfor-
tunately, they all were closed and the nearby
houses were dark.

Each gas station had two pumps and each pump
had four hoses. Mr. Schofield knew a little bit
of gas would still be in each hose, even though
the pumps were now locked. He went around to each
hose and drained the gas into his gas can. After
going to all four stations, Mr. Schofield had
about a gallon of gas. He now had enough to drive
back to an all-night station he passed before
running out of gas.

Screening Questions to Assess
Comprehension of the ASL Story

1. Who is the story about?

2. Where does this story take place?

3. Why did Mr. Schofield run out of gas?

4. How far did Mr. Schofield go to get gas?

5. What did he use to put the gas in?

6. How did Mr. Schofield get the gas?

7. Why couldn't he get gas out of the pumps?

8. Why were all the stations closed?

9. How much gas did he get all together?

10. How did he plan to get more gas?

Appendix C

Adaption of the NTID Grading System
for English Composition

The students received the following scores
for their English versions of the ASL story as
follows:

10 - The written English version is characterized
by sentences using perfect English syntax,
with correct spelling and punctuation.

 9 - The written English version is characterized
by semtemces using almost perfect English
syntax, with isolated errors. Spelling and
punctuation are not counted.

 8 - The written English version is characterized
by sentences with occasional errors involving
bound morphemes, articles, and/or phrases,
and clause series "and" errors.

 7 - The written English version is characterized
by sentences with frequent errors listed for
the scores of 8.

 6 - The written English version is characterized
by sentences with occasional errors involving
word substitutions, omissions, and additions
not included in higher ratings.

 5 - The written English version is characterized
by sentences with frequent errors listed for
the score of 6.

 4 - The written English version is characterized
by sentences with occasional errors involving
word order, omissions of contentive phrases,
and two clauses of which one is unintelligi-
ble.

 3 - The written English version is characterized
by sentences with frequent errors listed for
the score of 4.

 2 - The written English version is characterized
by sentences for which the meaning can be
discerned only with great difficulty.

1 – The written English version is characterized
    by sentences for which the meaning is not
    discernable.