Variables affecting the deaf student's achievement in reading

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Abstract
Reading and writing skills are generally considered to be the primary educational needs of deaf children. Although the field of deaf education is fraught with controversy regarding the most desirable communication mode for the deaf (i.e., oral or sign language or a combination), on one thing the experts agree: The deaf need to learn to read and write the language of their peers with normal hearing. It may appear on the surface that reading and writing instruction would be obvious tools in helping these individuals develop language proficiency. However, years of experience have shown that typical deaf individuals do not attain the language level of typical hearing persons, in spite of intense efforts directed towards increasing their language level through use of written language forms. King and Quigley (1985) found that at the school-leaving age of 18 years, the typical deaf student scores at only about the fourth or fifth grade level on standardized reading achievement tests, or about the same level as a typical 9 or 10 year old hearing student. In fact, 3 only 10% of all eighteen-year-old deaf individuals can read at or above 8th grade level (Trybus and Karchmer, 1977). Deaf students’ written language skills also vary greatly from that of their hearing peers. Children with normal hearing communicate fluently through the aural-oral modes with their parents and others. This allows them to internalize their childhood experiences in auditory form. It also helps provide them with real-world language experiences which they can bring to the reading task, and use to develop the linguistic and cognitive skills needed for success in reading.
Variables Affecting the Deaf Student’s Achievement in Reading

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Variables Affecting the Deaf Student's Achievement in Reading

Introduction and Statement of the Problem

Reading and writing skills are generally considered to be the primary educational needs of deaf children. Although the field of deaf education is fraught with controversy regarding the most desirable communication mode for the deaf (i.e., oral or sign language or a combination), on one thing the experts agree: The deaf need to learn to read and write the language of their peers with normal hearing.

It may appear on the surface that reading and writing instruction would be obvious tools in helping these individuals develop language proficiency. However, years of experience have shown that typical deaf individuals do not attain the language level of typical hearing persons, in spite of intense efforts directed towards increasing their language level through use of written language forms. King and Quigley (1985) found that at the school-leaving age of 18 years, the typical deaf student scores at only about the fourth or fifth grade level on standardized reading achievement tests, or about the same level as a typical 9 or 10 year old hearing student. In fact,
only 10% of all eighteen-year-old deaf individuals can read at or above 8th grade level (Trybus and Karchmer, 1977). Deaf students' written language skills also vary greatly from that of their hearing peers. Children with normal hearing communicate fluently through the aural-oral modes with their parents and others. This allows them to internalize their childhood experiences in auditory form. It also helps provide them with real-world language experiences which they can bring to the reading task, and use to develop the linguistic and cognitive skills needed for success in reading.

In contrast, the deaf child brings none of these to the reading task. Therefore, learning to read is a laborious endeavor which includes building experiences, developing language and increasing cognitive skills.

Reading is a very complex process involving cognitive, metacognitive and linguistic skills (i.e., inferencing, syntax, and semantics), as well as decoding skills such as letter and word recognition. The beginning reader with normal hearing can readily apply these already-developed skills to top-down reading processes (applying what we know about the world) while concentrating on developing the new bottom-up (decoding) skills needed to turn the orthography on the page into
meaning. The deaf child, on the other hand, must struggle with both the top-down and the bottom-up processes. Furthermore, typical reading materials and teaching techniques pre-suppose an auditory language base; this is foreign to the deaf reader.

From this brief introduction, one can conclude that improving reading for deaf students requires development of real-world knowledge, cognitive abilities and linguistic skills. It also involves development of techniques for teaching reading that relate to the communication mode of the deaf child, and development of reading materials that match the real-world knowledge and skills of the deaf child more closely than most materials developed for hearing students.

This paper is a synthesis of current literature regarding both research and instruction. Information sources include Gallaudet University Library, University of Northern Iowa Library, Educational Resources Information Center Database, National Technical Institute for the Deaf, and personal communications.

Teachers and others involved in the education of deaf students may not be aware of the many variables which affect the deaf student's academic progress in reading and reading related courses. The purpose of this paper is to be a source of enlightenment and to
suggest possible instructional strategies, based on the research. What, then, are the variables which most affect hearing impaired students' reading performance?

Personal Variables

Personal variables within the hearing-impaired reader affect reading achievement. Some of these variables are degree of hearing impairment, age at onset of hearing impairment, parents' hearing status, and use of amplification.

Degree of Hearing Impairment

There is an inverse relationship between degree of hearing impairment and vocabulary and comprehension skill development. The greater the degree of impairment, the lower the performance (Jensema, 1975).

Age at Onset of Hearing Impairment

Reading performance is related to age at onset of hearing impairment. Prelingually impaired students read less well than those impaired after language has developed, according to Jensema (1975) and Rogers, Leslie, Clarke, Booth and Horvath (1978).

Parents' Hearing Status

Deaf children of hearing impaired parents typically function at higher levels of reading achievement than deaf children of hearing parents. However, there is inconclusive evidence available regarding the
relationship between method of communication used with deaf children and their later reading skills (Kampfe and Turecheck, 1987). Therefore, such a connection should not be assumed.

**Amplification**

Students who utilize amplification score higher in reading comprehension than those who do not. Also, there is a positive correlation between the early use of amplification and reading achievement (Jensema, 1975; Rogers, Leslie, Clarke, Booth, and Horvath, 1978).

**Internal Variables**

The skills which the reader brings to the reading task impact greatly on the degree of achievement attained. These internal variables can be categorized into linguistic variables, cognitive variables, and internal mediators of thought.

**Linguistic Variables**

**Vocabulary.** The primary determiner of text difficulty has consistently been found to be vocabulary. In a study by Trybus and Karchmer (1977), the average vocabulary score for nine-year-old deaf students on the Stanford Achievement Test for Hearing Impaired Students (SAT-HI) was 1.1. The average score for eighteen-year-olds was 2.0. LaSasso and Davey (1987) had similar findings. They correlated deaf students' performance on
the Gates-MacGinitie Vocabulary Test and performance on the SAT-HI Reading Comprehension Subtest and on six other measures of reading comprehension. They found that there was a moderately high correlation between vocabulary knowledge and performance on each of the comprehension measures. The vocabulary measure was a stronger predictor of performance on the comprehension measures than the SAT-HI.

**Syntax.** The way in which words are put together to form phrases, clauses, and sentences (syntax), is another variable within the reader which has an effect upon his achievement. Here again, the reader with normal hearing has learned the various syntactical structures through listening and use. However, the deaf child comes to the reading task with an impoverished syntactical base. According to Russell, Quigley, and Power (1976), the acquisition of various language structures in the hearing impaired often parallels the hearing, but at a greatly reduced rate. Therefore, there is a mismatch between the hearing impaired child’s language system and the commonly used reading materials; this early introduction of advanced language structures gives difficulty to the deaf reader.

**Figurative language.** Idioms and other figurative language forms also plague the deaf in their efforts to
comprehend. Such phrases as "cut it out," "he ran into her at school," and "I think I’ll hit the sack" are interpreted literally by the deaf. Giorcelli (1982) found that ten-year-old hearing students performed better than eighteen-year-old deaf students in figurative language assessments.

**Question forms.** WH questions (who, what, where, when, why), must be specifically taught, and have traditionally been an important part of the curriculum for the deaf. However, a study by LaSasso (1979) suggests that completion statements are even more difficult than WH questions for the deaf.

**Cognitive Variables**

Only a limited amount of research has been done in regard to the relationship of cognition and language development of the deaf. Furthermore, there are enough inconsistencies in the findings to warrant caution in reaching any definite conclusions. The differences revealed in the literature suggest differences in specific aspects of cognition, rather than differences in performance in overall quantitative ability between deaf and hearing individuals. Blair (1957) found that deaf students were equal to or superior on spatial memory tasks. On Piagetian tasks, King and Quigley (1985) conclude that deaf students progress normally
through the stages, but are delayed, especially in the later stages of concrete operations and formal operational thought.

The literature suggests deaf people are superior in some areas and hearing people are superior in others. Quigley and Kretschmer (1982) summarize the important elements for the educator:

Most researchers and most educators of deaf children presently accept that any differences that do exist in intellectual and cognitive functioning between deaf and hearing persons are not significant for adequate functioning in society, and that educational, occupational, and other deficiencies in deaf people are the result of our present inability to fully help deaf people to develop and use their abilities rather than the result of any inherent deficiencies in those abilities (p. 63).

**Internal Symbolic Mediators of Thought**

Internal symbolic mediators of thought also appear to play a part in deaf students' success in reading. Lichtenstein (1983) has done the most extensive research in this area. He studies students' working memories with word and sentence memory tasks, using extensive self-reports through questionnaires to learn about conscious coding and recoding strategies. He also
collected data on students' auditory, intellectual, and linguistic abilities. He then analyzed the relations among these data. Among the findings of Lichtenstein were the following:

1. Deaf individuals typically use more than one coding system. The most commonly used codes are speech and sign.

2. There is clear evidence that working memory is related to the extent students can make use of a speech-based (phonological) recoding strategy. (The form in which the memory of the material is stored.)

3. The better readers rely more heavily on speech recoding.

4. Speech recoding is not limited to deaf students with intelligible speech.

5. Signs are rarely used consistently for recoding by most skilled readers, although many use signs selectively for specific memory purposes.

6. The primary relationships of working memory capacity and recoding processes seem to be with syntactic skills. Speech recoders appear to be better readers because speech recoding can better represent the grammatical structure of English than sign or visual coding. This permits short term retention of enough
information to decode grammatical structures which are not linear (e.g., passive voice, medial clauses).

Environmental Variables (Outside the Reader)

A number of variables external to the reader exist which come to bear on the progress of the deaf reader. These are the variables over which the educator of the deaf should have some control.

Inappropriate Materials

A national survey of 474 programs indicated that 81.43% use basal readers as the primary or supplementary approach to reading instruction (LaSasso, 1987a). Since the language structures which are difficult for deaf readers appear early and with great frequency in basal readers, deaf readers cannot be comprehending much of what they read in them.

Readability formulas. Standard procedures for determining readability do not accurately predict difficulty of reading passages for deaf students. Even the predicted difficulty by experienced teachers of the deaf is frequently not accurate in terms of deaf students' performance. However, deaf teachers' rankings of difficulty of material were found to more closely correspond to deaf students' performance (LaSasso, 1987a). This suggests that deaf teachers may be better predictors of text difficulty than hearing teachers.
Inappropriate assessment materials. Most standardized tests used with hearing students are inappropriate for deaf students because students are assigned to a battery solely by age or grade, hearing impaired students progress is uneven across content areas, directions do not accommodate the special communication needs, and test items may be biased in format. Furthermore, certain sections may be dependent on oral comprehension of language and thus poorly match the curricula of the hearing impaired student.

Due to their language deficiencies, deaf students do better on questions requiring literal information than on questions requiring an inference. Likewise, they perform more favorably on recognition tasks than production tasks. This is often not taken into account on tests. They also do better when permitted to look back in the text to locate the answers. However, deaf students use a strategy called visual matching (locating a word in the text matching a word in the question and responding by writing verbatim the words near the word in the text). LaSasso (1985) found that 76% use this strategy at least one-fourth of the time. This suggests a lack of true comprehension.
The standardized test scores of the hearing impaired, though low, nevertheless tend to provide an inflated measure of the deaf student's reading performance. Moores (1967) compared deaf and hearing students' scores on a cloze test. The deaf and hearing were initially matched on standardized test performance. The hearing students outperformed the deaf students on the cloze measure, suggesting that the standardized test procedures inflated the achievement scores of the deaf.

Appropriate assessment instruments for testing the reading achievement of hearing impaired students must be used to address the program deficiencies and recognize program strengths. Their use also aids in planning special education goals at a national level and provides effective and valid instruments for use in research. The SAT-HI '83 is the most reliable and valid instrument to-date to meet those needs. The prudent educator, however, needs to exercise care in using the SAT-HI results. Instructional decisions based solely on its use need to be considered capable of revision. For example, a grade level score on the SAT-HI cannot be the exclusive deciding factor in matching appropriate material to the reader. Likewise, it is of questionable value in measuring growth in reading from year to year, due to the fact that the average amount of gain is .2
years per year, which is less than the standard error of measurement.

**Variables in Teachers' Beliefs About Reading**

An important variable in teaching reading to the deaf is the teacher's own beliefs about it. In a study by Lanfrey (1975), 93.6% of the teachers of hearing impaired students responding to the survey preferred a meaning-emphasis approach to beginning reading. However, there appears to be a contradiction between the teachers' reported preference and classroom practices. In response to Lanfrey's question regarding how initial instruction should be carried out, 48% favored the use of letters of the alphabet. This result would suggest that while a majority of the teachers believe they favor a top-down approach to reading, a significant number of them are indeed practicing a bottom-up approach.

Being aware, on a conscious level, of one's own beliefs about teaching reading cannot be overemphasized. Harste and Burke (1977) discuss how all aspects of the process are affected by theoretical orientation. A teacher's theoretical beliefs affect the goals of instruction, the strategies used, the assessment procedures employed, and criteria used as evidence of success. Teachers need to make educated decisions which agree with what they believe, base their
instructional practices on them, and then evaluate accordingly. They need to know why they are doing what they are doing. Their beliefs about reading make this possible.

**Variables in Teacher Preparation**

Coley and Bockmiller (1980) and Bockmiller and Coley (1981) reported information about teacher preparation for teaching reading to the hearing impaired. Almost 40% of the teachers surveyed had no graduate courses in reading. More than 20% of the teachers had only one or no courses in reading. This is especially significant information since only teachers directly responsible for teaching reading were included in the survey. It is likely that preparation for teaching reading is even lower among the general teaching population.

Coley and Bockmiller (1980) also found that teachers with more training used no wider range of techniques than teachers with less training. Not surprising, however, was the finding that the degree of confidence in using a specific technique correlated with greater use of that technique.
Current Practices in Teaching Reading to the Deaf

Much of the available information on current instructional practices in reading with deaf children comes from survey studies. Five such studies have been conducted in the last fourteen years (Coley & Bockmiller, 1980; Bockmiller & Coley, 1981; Hasenstab & McKenzie, 1981; Lanfrey, 1975; LaSasso, 1978b; LaSasso, 1987b; Marshman, 1974)

For the most part, the survey studies provide data which is consistent. Therefore, the information is presented in the categories which follow.

Materials/Approaches

Since reading materials and teaching techniques for the normal hearing student pre-suppose an auditory language base, the deaf are at a great disadvantage in learning to read by using regular materials and techniques. Prior to beginning to teach reading to the deaf, and concurrently with teaching the reading process, language development must take place.

This would suggest that linguistically-controlled materials (materials in which vocabulary, syntax, figurative language and discourse are controlled), would be valuable in teaching the deaf to read; yet, according to a 1984 study, only 37% of the programs surveyed
throughout the United States use linguistically-controlled basals, while 44% use other basals developed for normal hearing readers (LaSasso, 1987b). Eighty-seven percent of those who use linguistically controlled readers report being moderately or very satisfied.

Fifty-four percent of the programs using basals (linguistically-controlled or uncontrolled) use them because they believe it to be the best approach, 19% are required by a state or school district to use them, and 39% use them for various other reasons. These reasons include: the continuity and comprehensive coverage of reading skills, the fact that children are mainstreamed into classes using a basal, and the fact that the teachers believe them to be a good supplementary approach.

Another approach to reading reported in the LaSasso study was the Language Experience Approach (LEA). Seventy-one percent of the programs responding to the survey reported using LEA as a primary or supplementary method. Sixty-eight percent of these do so because they believe it to be the most effective approach, 19% because appropriate basals have not been found, and 25% because teachers believe it to be a good supplementary method and students find it more interesting than other materials.
Decisions concerning the vocabulary and reading skills to be introduced in the Language Experience Approach are primarily teacher-made decisions. These decisions are seldom made on the basis of a curriculum guide. The manner in which teachers communicate information about which skills have been taught varies widely. Eighteen percent report they have no policy, 50% communicate informally among teachers, 57% keep formal records, and 8% communicate through the student’s Individual Educational Plan (IEP). Another 8% use some other method of communicating their Language Experience Approach information.

Forty percent of these who use the Language Experience Approach reported modifying the student’s language to correspond to standard English. Thirty-six percent reported having no policy on this matter, and 23% reported recording the language exactly as received. While the language experience approach is normally most effective when the thoughts and the language expressing them come from the student, modification to English by the teacher is effective for the older deaf student who has difficulty comprehending and generating language in English (LaSasso, 1983). This modification does not need to result in the lowering of the student’s self-esteem, and can result in an effective source of printed
materials for expanding reading vocabulary, improving word recognition abilities, and increasing comprehension of printed materials.

**Calculation of Reading Levels**

Eighty-three percent of the programs surveyed in the LaSasso study calculate the reading level of their students. Eighty-two percent of these state they do so in order to know what levels of printed material to select for instructional purposes. Although 60% of the programs in this study use Informal Reading Inventories (IRI's), according to another report by LaSasso (1987c), standardized tests are also used. Standardized tests usually inflate a deaf student's reading level. Therefore, printed material selected on this basis would be too difficult for the student.

Seventy-five percent of the programs in the LaSasso study state that they calculate students' reading levels because it is a good way to measure growth in reading. This is a questionable response, since the standard error of measurement is greater than the average amount of yearly gain of the hearing impaired student. Others state that they calculate reading levels because that information is needed for IEP's, because parents want that information, or because the school district or a government agency requires it.
**Calculation of Text Difficulty**

In regard to the calculation of text difficulty through formal readability formulas, only 20% of the programs participating in the LaSasso survey study report using them. Reasons cited for not using them were: unfamiliarity with procedures for using the readability formula (35%), believe teacher judgment to be superior (22%), and materials used already have readability levels determined (14%).

To date, findings do not support the validity of readability formulas with hearing impaired students. This is largely because no matter what measure of text difficulty is used, it most likely does not provide a complete picture of the text’s difficulty for a hearing-impaired child. Also, factors other than the one being manipulated can contribute to the difficulty of a text.

**Suggested Practices in Teaching Hearing Impaired Students to Read**

There is not much evidence that any one method of teaching reading will yield any significantly better result than any other. There is also no preferred approach (Clarke, Rogers, & Booth, 1982). Indeed, Calfee (1982), in his review of several large-scale experiments on reading instruction, draws these rather
depressing conclusions on reading instruction in general:

-- The "method" does not seem to make much difference.

-- Spending time reading is better than spending time doing something else.

-- Teachers make a difference, though why and how are not altogether clear.

-- Most of the variance in student performance can be predicted by background characteristics.

-- Growth in reading (as presently measured) does not depend greatly on program variables.

It is, then, with full knowledge of their probable lack of impact, that the following modest suggestions are offered:

Approaches/Materials

Reading Milestones. Specially developed readers and workbooks have been developed to help address the mismatch between the language of reading materials and the language of the hearing impaired child. The series is called Reading Milestones, published by Dormac, Inc. These materials, as well as having linguistic controls, incorporate a technique called "chunking" (i.e., "The boy ran home.") This technique assists in processing the largest meaningful unit into short-term
memory, thus helping overcome the limits of memory. These materials have found user satisfaction among 87% of the programs using them (LaSasso, 1987b).

**Language experience approach.** The language experience approach to reading is effective with the hearing impaired student. In this method, the class participates in an activity, preceded and followed by the teacher's recording of the students' thoughts regarding it on chart paper. This then becomes the reading material for the class. This approach is desirable because it assures that what the child is attempting to read is a part of his knowledge of the world. Properly developed, the LEA plays an important role in the anticipatory aspect of an activity, the concept development, and ultimately in its culmination. Vocabulary, sentence structure, concept development, and comprehension can all be emphasized. Additionally, the LEA has auxiliary benefits in developing pleasure and pride in the students and their parents as well. It seems unfortunate that while 88% of teachers believe they are well prepared to develop their own reading materials (Coley & Bockmiller, 1980), only 71% use the LEA approach (LaSasso, 1987b).

**Read-aloud.** While increasing the effort in teaching children how to read, we have been decreasing
the effort in convincing them to want to read. According to Trelease (1982), children’s literature has five primary goals: to provide enjoyment, to provide vicarious experiences, to develop imagination, to develop insight into human behavior, and to develop an appreciation for literature. It should be the responsibility of educators (and parents) to spark the imaginizations of children. Reading aloud is an excellent way to do this (Trelease, 1982).

Many studies have shown that hearing students who were read to made significantly greater gains in vocabulary and reading comprehension than students who were not read to (Trelease, 1982). Deaf students should not be the exception to this practice. The read-aloud time may vary from a few seconds to an hour, but it should be done frequently. Read-aloud materials should be of interest to both the teacher and the children. Occasionally, it may relate to other class work.

Students should not be asked to discuss, analyze or answer questions over material that is read to them. Materials that the teacher has read aloud should be made available for students to read on their own. A wide variety of materials utilizing appropriate meter, pace, and subject matter should be selected. Not all books are good for reading aloud.
Trade/predictable books. Recent innovative practices in the teaching of reading stress the use of trade books and predictable books as primary or supplementary reading material for the normal hearing. Gormley (1982) established the merit of predictable text in enabling hearing-impaired children to make connections between their "knowledge of the world" and the printed text. Trade books, with their wide choice of subject matter and variety of presentation, provide a welcome change from the basal and content text approach.

The more familiar or predictable the content, the greater the likelihood of success of the reader. "Predictable books," books in which a student can quickly begin to predict what the author is going to say, are invaluable in sparking the initial interest in reading. For books to be predictable, they should encompass familiar concepts or story lines. Repetitive, rhyming, or cumulative patterning may also be a part of making a story predictable. Familiar sequences, such as numbers or days of the week are often characteristic of predictable books.

For group instruction, the printed page could be enlarged on an opaque projector, or the teacher could print the words on chart paper and the illustrations could be produced by the students. After examining the
story as a whole, the children can be instructed in smaller parts such as words or phrases. Skills developed in these small groups can then be reinforced with individual activities. The activities can be structured to address any goal in the child's Individual Education Plan (IEP).

**Teaching Comprehension Processes**

Marshall (1983) feels that reading difficulties are the result of two things: inadequate textbooks and an oblique approach to the teaching of reading comprehension. A study by Durkin (1980) revealed that less than 1% of reading instructional time was devoted to teaching the child to comprehend. Many teachers falsely assume they are teaching comprehension when they ask questions or give a test. Teachers generally look for products of comprehension, rather than teaching the processes of comprehension. Children need to be provided with sensible and meaningful reading material, to have their interest raised by drawing on their existing knowledge, and to have a purpose for reading. Questions asked of them should promote thinking rather than merely testing memory. Teachers should rely less on teaching manuals and more on their own teaching ability.
Readers differ by age and ability in how well they can judge whether or not they are comprehending what they are reading. Collins and Smith (1980) describe the process of comprehension as including two aspects; comprehension monitoring and hypothesis formation and evaluation. Their goal is to teach students to hypothesize in their reading about what will happen next, become alert to various comprehension failures and to learn how to remedy them.

Comprehension failures occur at three levels: words, sentences, and relationships between sentences. Students need to be taught to determine when the text is not making sense and to adjust rate, re-read, predict, and seek help with unknown vocabulary (Stewart & Tei, 1983).

The formation of a hypothesis involves using the expectation of events (as in fiction), the text structure expectations, and the interpretation of main points, theme and the devices the author uses to lead the reader to a viable prediction. One way to teach the students to hypothesize in their reading is to model the procedure of making those predictions. Teachers can do this by talking through their own predictions while reading to the students. The next step is to encourage the students to do this while they are reading aloud,
and finally, the technique can be encouraged in the students' silent reading.

Good teaching is dependent upon skillful diagnostics, the type that allows a teacher more insight into his/her students with each response. Teachers need to be flexible enough to take advantage of accidental happenings, to be knowledgeable, and to know when enough of a given technique is enough. Reading instruction should start with an "action" stage to motivate the student to read, followed by an "interaction" stage where he or she actually reads. Finally, there should be a chance for reflection, where the teacher actively works with the student (not against him) to see if his purpose for reading was fulfilled (Hammond, 1983).

In measuring a student's comprehension, it is important to remember that it is possible to learn necessary or significant statements in the classroom by rote only. Whether a test item measures comprehension depends upon the relationship of the wording of the test item to the wording of the instruction (Anderson, 1972). Printed verbal stimuli are encoded phonologically and if committed to long-term memory, are semantically encoded. However, this step is not automatic. To be effective in assessing comprehension, the questions must be
constructed so that the student can answer them only if they have been semantically encoded.

Verbatim and transformed-verbatim questions do not require comprehension to answer. Paraphrase and transformed-paraphrase questions do measure comprehension. Comprehension is also demonstrated if a student can apply a principle to an unfamiliar case. Teachers must use caution in how their objectives and subsequent assessments are chosen. The most clearly understood objectives are those which specify the type of test questions to be used.

The Reading/Writing Connection

Talking and writing are sometimes referred to as production processes and listening and reading as receptive processes. This is a simplistic view and reading and writing should not be separated in the curriculum. There is a unique connection between learning to read and learning to write. Each has a positive influence on the other, develop out of the child's natural desire to communicate, and should be integrated because of their dependence upon each other.

When children view themselves as authors, they interact with reading in a totally new way. Just as they should hypothesize in reading, students should form and test hypotheses about language and how it can be
used to record ideas. To test their hypotheses, they should write.

Wilson (1981) believes that experience-based writing provides the natural context for learning to write; this is a point of view similar to that expressed by Smith (1978) in regard to learning to read:

No one can teach them directly what the relevant categories, distinctive features, and interrelationships are, yet children are perfectly capable of solving the problem for themselves provided they have the opportunities to generate and test their own hypotheses and to get appropriate feedback. In quite a literal sense, learning to read is like learning spoken language (p. 179).

Reading and writing are clearly developmentally interrelated. There is ample evidence that shows we should provide activities in the classroom which emphasize this interrelatedness.

Assessment

An examination of currently available assessment tools in reading reveals little agreement concerning what should be assessed in reading. According to King and Quigley (1985), the major problems with formal assessment tools include: (a) lack of standardization,
(b) the uneven performance of hearing-impaired students across subtests of general achievement tests, (c) difficulties in test administration, (d) the mismatch between the interests of older hearing-impaired students and the interest level of the tests, (e) the use of test-taking strategies that may make the distractors on standardized tests seem implausible to hearing-impaired students, and (f) the fact that yearly growth and the standard error of measurement are about equal, resulting in the inability of standardized tests to measure year-to-year growth.

The ways in which test scores are reported and the ways in which results are used for purposes for which they were not designed are also problems. Schwartz (1977), describes it well:

The most blatant misuse of test results is the not infrequent practice of equating a grade level score with a graded reading level... the teacher erroneously assuming a connection between the grade level equivalency on the test and the level of difficulty of the reading text. No such connection exists!...

A grade equivalent for a given score is simply the average score achieved by all children at that grade level in the standardized sample, and has
nothing whatsoever to do with graded texts. As
a matter of fact, the level of difficulty
represented in a 3rd reader is usually higher
than the material which receives a third grade
designation on a reading test. The poor
youngster who is given a 3rd reader on the basis
of achieving such a score is surely in trouble
(p. 367).

A major factor that impacts the selection of
assessment measures is the theoretical orientation of
the individuals involved in the assessment process.
Tests, in and of themselves, may not necessarily be good
or bad, appropriate or inappropriate. Rather, one's
point of view as to what constitutes reading and reading
instruction may well be the most important factor in
evaluating and choosing a test.

A second major factor is the type of tasks involved
and the purpose for which the assessment is being done.
It must be remembered that reading achievement tests, at
best, provide only a range of the student's actual
achievement. When understood as to purpose,
limitations, and reporting manner, the following testing
instruments may prove useful to the educator of the
hearing impaired.
1. **Stanford Achievement Test-HI Reading Comprehension**

Two different kinds of comprehension are assessed in this subtest: 1) comprehension as it relates to the type of material read, and 2) comprehension as it relates to the particular questions asked.

Since different kinds of reading material often require somewhat different reading skills, three types of reading passages have been selected for inclusion in this subtest. These can be best described as passages that are typical of the kinds of material found in grade-appropriate textbooks (expository, or textual reading); passages that reflect the printed material one finds in daily life, such as directions for doing something and advertisements (functional reading); and passages that represent the kinds of material one reads for enjoyment, such as fiction, humor, or poetry (narrative reading for recreation). The questions that follow each passage are designed to assess the reader’s literal and inferential comprehension.

Literal comprehension refers to the ability to understand what has been explicitly stated in the passage, and inferential comprehension refers to the ability to make inferences, draw conclusions, and predict outcomes. The questions are multiple
choice in modified cloze and WH-question format. The grade equivalent scores reported from this test compare the student with normal hearing students. The percentile scores compare the student with his/her hearing-impaired peers, no matter what level of the test was taken.

2. **Tests to Determine Level of Silent Reading Comprehension and Comprehension of Materials Read/Signed to the Student**

   **Spache Diagnostic Reading Scales**
   This is an informal reading inventory consisting of short (2-3 paragraphs), graded, narrative and expository passages. The student’s task is to answer 7-8 literal and inferential questions, using either a recall or locate format.

   **Woodcock Reading Mastery Tests: Passage Comprehension**
   This test measures a student’s comprehension of short narrative and expository passages using a modified cloze test. One word has been deleted in each paragraph and the student’s task is to read the paragraph silently and tell the examiner what word used by the author belongs in the blank.
Cloze Test of Comprehension

A fifty-item test can be constructed from any reading passage. Every fifth word can be deleted and a 15-space underline (blank) inserted in its place. The student is instructed to fill in the blank with the word he believes to be the exact word of the author. A score of between 44-57% would indicate the material was written on the student's instructional level. The reliability of this measure for use with deaf students was established by LaSasso (1978a); however, the validity was not.

3. Tests to Determine Level of Vocabulary Comprehension and Comprehension of Idioms

Woodcock Reading Mastery Test Word Comprehension

This subtest measures a student's knowledge of word meanings through an analogy format. The student is given three words and is to supply the fourth, (e.g., red-stop, green-____). The student responds orally or with signs. A practice test is administered to be sure the student understands the task.

Botel Word Opposites Test

This test measures the student's knowledge of word
meanings by determining if the child can identify a word's antonym. The student's task is to read a stimulus word and three other words. The student must choose from the three words the one which is opposite in meaning to the stimulus word, (e.g., father: birthday, mother, children).

**Conley-Vernon Idiom Test - Forms A and B**

This test was developed to provide diagnostic information about deaf students' comprehension of idioms. One hundred idioms were selected randomly from the essential idioms listed in the appendix of *A Dictionary of Idioms for the Deaf* (Boatner & Gates, 1969). A sentence using each idiom was constructed. The idiom was then deleted from the sentence and included as one of five responses in which the subject would choose the correct answer to fill in the blank.

4. **Measures of Syntactic Ability**

**Test of Syntactic Abilities**

This is a multiple-choice test of the student's ability to select correct English structures in nine syntactic areas. This test yields information concerning whether a student is above or below average in comprehending these specific structures.
when compared with other deaf students 10 to 18 years of age.

5. **Tests of Word Recognition**

   **Dolch Basic Sight Word Test**

   This test determines how many of the 220 most frequently used words in our language are instantly recognized by the student. Each word is shown briefly to the student and the student is to demonstrate his recognition of the word by either saying or signing the word.

   **Knowledge of Contractions Test**

   This test consists of 48 of the most commonly used contractions in our language. The student writes the pair of words represented by each contraction.

6. **Reference Skills**

   It is suggested that in assessing a student’s overall reading ability, the teacher-made informal assessments of book parts and their uses, as well as knowledge of appropriate sources to locate information to be assessed. Skills needed to use an encyclopedia and skills needed to use a phone book should also be tested. The student’s knowledge of test-taking skills, how he prepares for a test, and what he does if he doesn’t know the answer should also be assessed.
Summary and Conclusions

Most deaf students have difficulty learning to read the English language. This has been substantiated by studies of achievement, surveys, and studies of the reading process itself. This lack of success seems to be present in all aspects of the reading process, not just one or two. The hearing child brings to the reading process a broad knowledge base, acquired and internalized through spoken language interaction with parents and others. The deaf child brings to the process a very impoverished knowledge base, due to the lack of a well-developed language and communication system.

Many variables, both internal and external to the reader, come to bear on the reading achievement of the deaf reader. One would hope to impact on the environmental variables, at least in the educational environment. A wide variety of materials and techniques, geared toward helping the student to bring his knowledge of the world to interact with the printed word may prove helpful. Teachers of the deaf need more in-depth training in teaching reading, and more confidence and drive to use the knowledge they have.

Regarding the assessment techniques to be used, teachers must remember that written and oral assessments
always use the medium in which the child is disabled: written and oral language; thus poor test scores may reflect inability to comprehend and respond to the questions themselves. There are a few formal reading assessments for the deaf, but most have been developed for the normal hearing only. Therefore, at best, a battery of tests provides only a range within which the students reading level falls. Consequently, reading assessment of the deaf student requires trained examiners to select and administer the instruments, appropriate assessment tools to provide reliable and valid information about the student’s skills, and knowledgeable interpretations and appropriate inferences about the results.

Considering the great language deficits of the deaf, and the fact that little is known about how to meet these deficits in relation to reading, it is amazing that the deaf learn to read at all. Yet, many learn to read exceedingly well. There is a need to learn more about the factors which account for their success.
References


