DOCUMENT RESUME

ED 253 020 EC 171 353

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TITLE Written Discourse of Deaf and Hearing Students: Semantic Analysis.
PUB DATE 14 Oct 84
NOTE 35p.; Paper presented at the Annual Boston University Conference on Language Development (9th, Boston, MA, October 14, 1984).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Communication Skills; *Deafness; High Schools; *Reading Comprehension; *Recall (Psychology)

ABSTRACT

The ability of 20 deaf and 20 hearing high school students to recall propositions and inferences from prose was examined and compared. Ss were asked to read and then write a given story. Hearing Ss recalled significantly larger numbers of propositions than deaf students, but both deaf and hearing Ss recalled similar numbers of story inferences in their written narratives. The interaction between the deaf Ss' reading comprehension levels and their narratives revealed that better readers were more accurate in recalling explicit premise information, but were not different in recalling implicit content. Results suggested that written instructions, texts, and narratives should be viewed as communication acts requiring integrated communicative performance for implicit intentions, as well as explicit facts. (Author/CL)

Written Discourse of Deaf and Hearing Students: Semantic Analysis

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Paper presented at The Ninth Annual Boston University Conference on Language Development, Boston, Massachusetts, October 14, 1984.

Abstract

The ability of deaf high school students to recall propositions and inferences from prose was examined and compared with hearing students. Students were asked to read and then write a given story. The hearing students recalled significantly larger numbers of propositions than deaf students, but both deaf and hearing students recalled similar numbers of story inferences in their written narratives. The interaction between the deaf students' reading comprehension levels and their narratives revealed that better readers were more accurate in recalling explicit premise information, but were not different in recalling implicit content. Theoretical and therapy implications will be discussed.

For further detail, please write the author at the address listed on the front page.

Written Discourse of Deaf and Hearing Students

Over the years, researchers have studied language processes in the deaf population. Weaknesses have been documented in areas of syntax (e.g., Quigley, Wilbur, Power, Montanelli & Steinkamp, 1976), reading (e.g., Crandall, 1982; Di Francesca, 1972; Furth, 1966; Trybus & Karchmer, 1977), and writing (e.g., Blackwell, Engen, Fischgrund & Zarcadoolas, 1978; Moores, 1982; Quigley & Kretschmer, 1982). Historically, vast efforts and resources have been devoted to the problems of teaching deaf children English language skills. Yet, all too frequently, deaf students still leave high schools and enter job markets and colleges with language, reading, and writing skills inadequate for a world highly dependent on communication skills.

Recent literature indicates that the quality of written language may be "the best single indicator of a deaf child's command of English structure" (Quigley, 1980, p.13). Quigley maintains that writing samples reflect the internal psycholinguistic system that children impose on standard English when reading or recalling it. Studies of verbatim recall for written sentences (Sarachan-Deily, 1982; Sarachan-Deily & Love, 1974) indicate that deaf students are less proficient in using English syntactic rules to aid their organization and written

recall of sentences than hearing students. But deaf students seem to be able to use semantic information and coding strategies to write sentences similarly to hearing students. Sarachan-Deily (1982) reported that deaf students were as likely to retain the "gist" of recalled written sentences as hearing students were, although, as predicted, deaf subjects' sentences were more likely to contain syntax errors. These studies involved verbatim recall. Since everyday reading and writing tasks rarely involve verbatim recall of material, meaningful prose may provide more appropriate stimuli for studying the written language of deaf students.

Much of the language research with deaf populations has concentrated on their use of syntactic rules, parts of speech, vocabulary, and the other basic linguistic units. Only recently have deaf students' use of language in larger communication acts been investigated (e.g., McKirdy and Blank, 1982). These larger linguistic and discourse units also have rules and structures which must be learned and used correctly for effective communication to take place. This study focuses on one unit of discourse, specifically story-narratives, i.e., organized retellings of stories, and it compares the written narratives of deaf and hearing students.

The inferential aspect of communication, i.e, the ability to use linguistic and cognitive knowledge to go beyond literal

meaning is an important component of communication and of comprehension, in general (Bransford and Mc Carrell, 1976). When a conversation is understood or a story is read, more is comprehended than is specifically said or written. The speaker or writer expects people to go beyond the literal meaning. Children develop strategies for using their general knowledge about the world to extend their comprehension of discourse; indeed, these strategies must develop if accurate communication acts are to take place. Studies have shown that young hearing children can infer information from text and remember prose based on their semantic representation and integration of the text (e.g., Johnson & Smith, 1981; Kail, Chi, Ingram, & Danner, 1977; Paris & Carter, 1973; Small & Butterworth, 1981). There is evidence that the processes of constructing semantic representations of written material may be similar for deaf and hearing students (Ewoldt, 1978; Fischler, 1983; Sarachan-Deily, 1982). The purpose of this study is to extend our knowledge of deaf students' use of inferential skills to semantically integrate and recall relationships expressed by sentences within text, using a story recall task.

In previous investigations of story recall, the analyses of story constituents have indicated that hearing adults and children show similar patterns of recall for events in story texts, and that these patterns occur cross-culturally (Mandler & Johnson,

1977; Mandler & Goodman, 1982; Mandler, Scribner, Cole, & De Forest, 1979; Rummelhart, 1975; Stein & Glenn, 1979). These studies suggest a universal underlying system for comprehending story structure and for representing it in memory, i.e., readers reconstruct stories using similar narrative frameworks. Graybeal (1981) studied "gist" recall in normal and language-impaired children, ages 7 - 9. She found that the language-impaired children exhibited "gist recall deficits" from stories they could process at the sentence level. Although there were some similarities to the normal children, she concluded that the language-impaired children may be having linguistic or memory difficulties that are more critical when processing discourse than individual sentences. Gaines, Mandler, and Bryant (1981) investigated immediate and delayed story recall among deaf and hearing teenagers. They found more distortions and semantic confusions in the recall protocols of the deaf students than the hearing students. Inferential skills were not specifically examined. To the author's knowledge, with the notable exception of Gaines, et.al. (1981), few analyses of story recall among deaf adults or children have been reported in the literature.

The purpose of the study is to investigate written narratives as a means of assessing the recall of inferential and propositional content in text. The study is designed to compare deaf and hearing

students' performance, when the text is controlled for reading difficulty and the numbers of story inferences and premises. Further, the study examines the relevance of deaf students' reading levels to the accuracy and nature of their semantic recall.

Method

Subjects

The sample was composed of forty high school students; twenty students had normal hearing and twenty students were classified by the school as "deaf" or "hearing-impaired." The twenty hearing students were randomly selected from the population of normally-hearing students in the "average" track, with no obvious handicapping conditions. These students consisted of 9 girls and 11 boys. The deaf students were randomly selected from the population of all students enrolled in the Board of Cooperative Educational Services (BOCES) Program for Hearing-Impaired Students, who returned a signed parental consent form. All deaf students were day students in a mainstreamed class for the hearing impaired and had no other handicapping conditions that complicated their deafness. Further, all the deaf students were judged by their teacher to be capable of reading and writing the experimental task material. The twenty deaf students consisted of 14 girls and 6 boys. Additional information regarding chronological ages, intelligence quotients, reading levels, and pure tone averages for

these students, is summarized in Table 1.

Insert Table 1 about here

Procedure

Hearing and deaf students were tested separately. The hearing students were tested in their regular classrooms, by their classroom teacher, and the deaf students were tested in the resource room by their teacher of the deaf; with both groups, experimental sessions were conducted as a part of the regular school day. All students were instructed in the manner most similar to their usual communication mode, i.e., hearing students were instructed orally, with their teacher using normal conversational hand and face movements, and the deaf students students were instructed manually, with their teacher using total communication. Additionally, both groups of students received (identical) written instructions.

Each student was handed a booklet containing a statement about the purpose of the study, written directions for the experimental task, a typed copy of the story, three pieces of lined, canary-colored paper ($8\frac{1}{2}$" x 11"), and three pieces of lined white paper ($8\frac{1}{2}$" x 11"). All students were informed that the same materials were being given to both deaf and hearing students. The entire

procedure took approximately 15 - 20 minutes for hearing students and approximately 25 minutes for the hearing-impaired students.

Materials

A simple children's story, "Lost in Alaska" (Potter, 1978), designed for teenage interest level and fourth grade reading level, was selected for this study. The story was first examined by the author and by a certified teacher of the deaf to rule out and eliminate any unusual or potentially misleading idioms, vocabulary, or sentence constructions. The resulting, adapted story was 377 words, 50 sentences, and 5 paragraphs in length. It had 47 distinct premises, which could be combined or used singly to yield at least 23 specific inferences from the text, and its readability was estimated at "high third grade," using the Harris-Jacobson Readability formula (Harris and Sipay, 1980). The story was retyped on plain white paper, using an IBM Letter Gothic typewriter element, to avoid giving clues about the story's reading level to the students. The story concerns a female airplane pilot whose instruments fail when she is caught in a thunderstorm, in Alaska, and she is forced to use her parachute and jump. Information affording a variety of inferences about the pilot's feelings, her safety, the changing weather, and her actions were intentionally integrated into the text of the story in such a way that these did not disrupt the logic or structure of the story.

Instructions

The students were told, "Read the following story carefully and try to remember what happens, because you will have to retell the story later, in your own words, without looking back at the story." The students were given an opportunity to read the story, and then were instructed, again,

> Now, rewrite the story in your own words, as best as you can remember it. The yellow sheets of paper should be used to write your rough draft. Rewrite the story so that someone who did not read it will know what the story is about. Write down all that you remember--it's OK to guess if you're not sure, but, please do not look back at the story! After you finish you rough draft, you may look it over, and fix any mistakes you can see.
>
> Then, copy over your rough copy onto the white paper, writing it as best as you can, for a final copy.
>
> If you have any questions, raise you hand and ask your teacher before you begin. If you have no questions, turn the page and start writing.

Reading this second set of directions usually resulted in a 1 - 2 minute delay for most students, before they began writing the story. The students were given unlimited time to write the story.

Results

Each recall protocol was individually scored by the author and by one additional trained judge who was unbiased and unfamiliar with the purpose of the study. Preliminary analyses revealed similar performance for boys and girls. For all subsequent analyses, the data were summarized across sex.

Propositional and Inferential Content

For semantic content, the dependent variables of major interest were the numbers of story premises and story inferences retained and written by the students. For this analysis, the premises in the recalled stories were compared with the premises in the original story, and the total number of premises accurately recalled by each student was determined. A premise was considered to be accurately recalled when there was a match in semantic content between the story and the recall protocol. There did not have to be verbatim recall or correct syntax for a premise to be credited; only the informational content had to be the same. When a student recalled a premise containing a major distortion, inaccuracy, or erroneous elaboration with respect to story content, it was not credited for this analysis. The interrater reliability coefficient (Scott, 1955) for number of story premises was r = .94.

The number of correct story inferences was also calculated for each student. Each recalled story was examined for the presence of

correct inferences, i.e., accurate (re)statements of information, generally from several input propositions, that were not explicitly stated in the story. For example, for the following story propositions, "her hand on the control was tense" and "her fingernails were white", several students correctly made the following inference: "She held the control so tight (sic) her fingernails were white." As with premises, story inferences that did not maintain the gist of the story were not counted in this analysis. The interrater reliability coefficient for number of story inferences was r = .91.

The means and standard deviations for the numbers of story premises and inferences recalled by each group of subjects were calculated. These are summarized in Table 2.

Insert Table 2 about here

A 2 (deaf vs. hearing) x 2 (premises vs.inferences) factorial analysis of variance, with repeated measures on the between subjects' factor of hearing status was performed on the numbers of premises and inferences correctly recalled. The ANOVA results indicated a significant main effect for hearingstatus, with the hearing students ($\underline{M}$ = 12.2) performing better than the deaf subjects ($\underline{M}$ = 9.15), $\underline{F}$ (1, 38) = 8.88, $\underline{p} < .005$. The main effect

of recall was also significant, with more premises (M = 15.7) than inferences (M = 5.65) being recalled by both populations, F (1, 38) = 117.28, p < .001. The one-way interaction between these two factors was not significant. Post hoc analyses with the Newman-Keuls' Multiple Range test for pair-wise comparisons were conducted. These revealed that both deaf and hearing students recalled significantly more premises than inferences (C_{deaf} = 4.80, p < .01; $C_{hearing}$ = 4.45, p < .010), that there were more premises recalled by the deaf subjects than there were inferences recalled by the hearing subjects (C = 4.45, p < .01), and that the hearing subjects recalled more premises than did the deaf subjects (C = 2.89, p < .05). Interestingly, there were no significant differences between the numbers of inferences correctly recalled by the deaf and hearing subjects. These means are displayed in the upper half of Table 2.

These dependent variables were then examined as percentages of the total numbers of premises and inferences presented within the story. This enabled the relative amounts of premise and inference information recalled by the students to be investigated. For each student, the number of premises correctly recalled was recalculated as a percentage of the number of unique premises in the story (N = 47), and the number of inferences correctly recalled was

recalculated as a percentage of the minimum number of unique inferences that could be drawn from these story premises ($\underline{N}$ = 23). The means and standard deviations for these percentages are summarized in Table 2.

A 2 (deaf vs. hearing) x 2 (premise vs. inference) factorial analysis of variance, with repeated measures, was performed, using percentages of premises and inferences correctly recalled as the dependent measures. The analyses were carried out using both raw percentages and the arc sin transformation of these percentages (Winer, 1971). Since the results were similar, the more conservative analysis on the raw percentages is reported.

Consistent with the previous analysis, the ANOVA results revealed significant main effects for hearing status ($\underline{M}_{deaf}$ = 24.40, $\underline{M}_{hearing}$ = 33.600, $\underline{F}$ (1,38) = 12.66, $\underline{p} < .001$), and recall ($\underline{M}_{premise}$ = 33.40, $\underline{M}_{inference}$ = 24.56), $\underline{F}$ (1, 38) = 15.98, $\underline{p} < .0005$. The interaction between hearing status and recall did not reach significance. Post hoc analyses, using the Newman-Keuls' Multiple Range Test, again indicated that both groups of subjects recalled significantly larger percentages of premises than inferences ($\underline{C}$ = 8.37, $\underline{p}<.05$, for deaf students, and $\underline{C}$ = 6.32, $\underline{p} < .05$, for hearing students). However, unlike the previous analysis, the hearing subjects recalled significantly larger percentages of both the premises ($\underline{C}$ = 7.60, $\underline{p}< .01$) and inferences

($C = 8.37$, $p < .01$) from the story than did the deaf subjects. These means are displayed in the lower half of Table 2.

Even though there was no significant difference between the absolute numbers of inferences recalled by deaf and hearing subjects, the hearing subjects recalled significantly larger percentages of the possible story inferences than the deaf subjects did. The hearing subjects thus included larger quantities of the available propositional and inferential content from the story in their written summaries than did the deaf subjects.

Reading Levels

To examine the interaction between the deaf students' reading proficiency and their semantic recall, several analyses were conducted. As a part of the school's routine end-of-year testing, the Stanford Achievement Test, Special Edition for the Hearing-Impaired (SAT-HI), was administered to all the deaf students in the school system. The students were tested within one month of this study. Grade equivalents and percentiles were obtained from the school and, for these analyses, the scores from the reading comprehension subtest of the SAT-HI were used as general measures of the deaf students' reading levels.

Since deaf high school students leave high school averaging fourth to fifth grade reading comprehension levels (e.g., Quigley & Kretschmer, 1982), deaf students with SAT-HI reading

comprehension scores at the fourth and fifth grade levels were categorized as "average" readers. Deaf students with SAT-HI reading comprehension grade equivalent scores below fourth grade levels were categorized as "poor" readers, and deaf students with SAT-HI reading comprehension grade equivalent scores at the sixth grade level or above were categorized as "good " readers. To be sure, these students would not be classified as good readers when compared with hearing students classified as good readers at the same age and grade levels. When compared with other deaf students, however, they are above the average. The distribution of reading comprehension scores on the SAT-HI is summarized in Table 3.

Insert Table 3 about here

Each student's written recall protocol was compared with the original story for information not specifically stated and not inferable from the semantic information given. Incorrect syntax and spelling was ignored unless meaning was affected; only the semantic content was considered. In both deaf and hearing students' recall protocols, the numbers of true premises (TPs), true inferences (TIs), false premises (FPs), and false inferences (FIs) were tallied. A false premise was defined as an incorrect statement of fact, i.e., false story propositional content. A

false inference was defined as an inaccurate or improbable inference drawn from the premise(s) given. These means were summarized across reading levels for the deaf students, and totalled for both deaf and hearing students (see Table 4).

Insert Table 4 about here

Differences between deaf and hearing students' recall in these four semantic areas were examined. The deaf students' scores were collapsed over reading levels and a 2 (deaf vs. hearing) x 4 (type of recall) ANOVA, with repeated measures, was performed on the numbers of premises and inferences accurately and inaccurately recalled, using the same recall criteria as in the previous analysis. There is a significant main effect for population ($\underline{M}_{deaf} = 5.82$, $\underline{M}_{hearing} = 6.99$), $\underline{F}$ (1, 38) = 4.36, $\underline{p} = .04$, indicating that the hearing and deaf students performed differently, a significant main effect for type of recall ($\underline{M}_{TP} = 15.7$, $\underline{M}_{TI} = 5.65$, $\underline{M}_{FP} = 2.09$, $\underline{M}_{FI} = 2.20$), $\underline{F}$ (3, 114) = 162.24, $\underline{p} < .001$, indicating differences among the four recall categories, and a significant one-way interaction ($\underline{F}$ (3, 114) = 5.05, $\underline{p} = .003$), indicating deaf and hearing students perform differently within certain recall categories.

In an effort to be as conservative as possible, a Scheffe's

post hoc test was conducted on the significant group x recall interaction. The analyses of these means reveal several significant differences of interest. (The means are displayed in Table 4.) Hearing students recalled significantly more TPs than deaf students ($S = 2.31$, $p < .025$), but there were no significant differences between the numbers of TIs, FPs, or FIs recalled by deaf and hearing students. This supports the earlier finding that hearing students recall a larger amount of premise information from text than deaf students, but both groups tend to draw similar numbers of inferences. Both deaf and hearing students recalled more TPs than TIs ($S = 3.48$, $p < .001$, for both populations) and more TPs than FPs ($S = 3.48$, $p < .001$, for both populations). Although the hearing students recalled significantly more TIs than FIs ($p < .001$), there were no significant differences among deaf students in this area. Deaf and hearing students draw a similar number of true inferences from text, but, in addition, the deaf students are significantly more likely to draw inaccurate inferences than the hearing students.

A 3 (reading level) x 4 (type of recall) factorial ANOVA, with repeated measures, was performed on the numbers of premises and inferences correctly and incorrectly recalled by the deaf students. The ANOVA shows a main effect for type of recall ($M_{TP} = 13.85$, $M_{TI} = 4.45$, $M_{FP} = 2.25$, $M_{FI} = 2.75$), $F(3, 51) = 72.54$,

$p < .001$, but no main effect for the deaf students' reading levels. The one-way interaction between reading level and type of recall is significant ($F(6, 51) = 3.91$, $p = .003$), indicating that the three reading groups exhibit different patterns of recall despite their similar overall levels of performance.

A Scheffe's post hoc test on the reading level x type of recall interaction reveals significant differences within the recall category of true premises. The means are listed in Table 4. The deaf good readers recalled significantly more TPs than either the deaf average readers($S = 5.74$, $p < .005$) or the deaf poor readers ($S = 6.70$, $p < .001$). There are no significant differences between the numbers of TPs recalled by the deaf average and poor readers. All the deaf readers performed similarly in the other three recall categories (i.e., false premises, true inferences, and false inferences), despite their differences in reading comprehension levels. Specifically, there are no differences between the mean numbers of TIs, FPs, or FIs among the deaf students.

The Scheffe's test on the interaction also revealed differences across categories. Good, average, and poor deaf readers recalled significantly more true premises than true inferences ($p < .001$, for all reading groups). Good, average, and poor readers recalled significantly more TPs ($M = 3.85$) than FPs (M

= 4.45), ($\underline{S}$ = 6.70, $\underline{p}$ < .001), and significantly more TPs than FPs ($\underline{S}$ = 6.70, $\underline{p}$ < .001). (See means in Table 4.) Interestingly, there are no significant differences between the numbers of true inferences and false inferences among deaf students in any of the three reading levels; all were equally likely to make correct as well as incorrect inferences.

Apparently, when deaf students have better reading comprehension skills, they can more accurately recall explicitly stated premise information from stories. However, the accuracy of their recall for implicitly given content does not seem to improve as their reading levels improve; all deaf students, regardless of reading ability, performed similarly in the accuracy of their inferences.

Discussion

The deaf and hearing students in this study recalled similar numbers of story inferences in their written narratives. This suggests that both hearing and deaf teenagers are able to comprehend, retain, and recall semantic story information that is implied. Clearly, deaf students have the abilities to integrate semantic information with their cognitive and linguistic knowledge, to draw inferences, and to use this information to derive correct conclusions in written narratives.

Both groups of students recalled significantly more premises

than inferences from the story. This suggests that for both hearing and deaf students, premise information, which is explicitly stated in prose, is easier to encode and recall than is inferred content.

As expected, the deaf students recalled significantly fewer numbers of premises than the hearing students. Furthermore, the deaf students also remembered and encoded significantly less of the available propositional and inferential information from the text than the hearing students did. In general, the deaf students recalled less story information when compared with hearing students of comparable age and intelligence, thus extending the findings from Graybeal's (1981) study on language-impaired children to the hearing-impaired.

Studies of short term memory in children have shown that there is improvement, with maturation, in children's memory representations for both premise and inferential information (Johnson & Smith, 1981; Paris & Lindauer, 1976; Paris & Upton, 1976; Small & Butterworth, 1981; Stein & Glenn, 1979). It is possible that the deaf students have less effective memory strategies for story recall; perhaps, their strategies are more like those of younger, hearing children. Although the deaf students' knowledge of story structure may help them to recognize and encode the most important story information, their strategies may not enable them to develop a systematic plan for retrieval of

other, less critical, semantic information to use in their written narratives. From this study, it appears that deaf students can derive and retain inferred information from text, but they are not able to retain the same quantity of premise or inferential information as hearing students.

When the deaf students' reading levels were examined, it was found that the good readers recalled significantly more TPs than either the average readers or the poor readers. In other words, the narratives from the deaf better readers are similar to those from the hearing students, with respect to the numbers of premises accurately recalled. However, there were no significant differences between the numbers of TIs, FPs, or FIs among the three groups of deaf readers. This suggests that while the memory for premise information from prose may improve with reading comprehension skills, the memory for inferred content does not show similar improvement.

Although the number of accurate inferences made by deaf and hearing students was not found to be significantly different, there was a difference in the nature of the inferences drawn by each group of students. Whereas the hearing subjects drew significantly more TIs than FIs from the story, there were no differences in the numbers of TIs and FIs drawn by the deaf students. Deaf students' inferences were as likely to be false as they were to be true.

Correct inferences require both accurate memory for the component premises and the ability to infer the implications from the premises, i.e., to integrate this material. This suggests that when processing discourse, deaf students are able to remember content that is central to a sentence or story. However, they are not able to remember implicit content, that may be perceived as peripheral to the plot, as accurately.

When the material is easy enough to process linguistically, both the deaf and hearing students seem to base their memory and written narratives of the material on their semantic representations of various ideas abstracted from the text. In so doing, the hearing subjects seem to retain much more of the additional specific premise information than the deaf subjects, and the hearing subjects use this information to draw accurate inferences. As the reading comprehension problems of deaf students may reflect a linguistic mismatch between their syntactic rule system and that of the printed text (Sarachan-Deily, 1982), the deaf students must develop constructive strategies to relate the semantic content of prose to their own psycholinguistic and world knowledge. Premise content that is unusual, new, or unrelated may be forgotten. Gormley (1981, 1982) found that familiarity with selection content facilitated text recall for deaf students. Presumably deaf as well as hearing readers can more easily

comprehend meaning when they have more background, "schemata", or "world knowledge" about the topic to help them interpret the text.

Johnston (1982) suggests looking at story-narratives as cohesive "texts", which demonstrate a child's understanding and expression of complex linguistic functions. The communication skills necessary to create and link individual sentences into unified, meaningful discourse are important for competent language usage, for all persons. But these are especially important for deaf students who depend upon cohesive writing to communicate with the hearing world when their speech or signing is not understood or when they are using telecommunication systems (TTYs and TDDs).

The writing problems of deaf students are frequently considered as larger "language" problems. Writing, as well as speaking, listening, and reading involves basic psycholinguistic processes, as well as certain complex linguistic functions. Deaf students' writing and speaking typically contains many errors in English structure, and much time is spent teaching and reteaching the rules of English structure to them. What is noteworthy is that deaf students can make correct semantic inferences and paraphrases, in many ways, similar to the hearing students. When deaf high school students forget exact sentences, they do not randomly guess at the content, rather, they base their paraphrase on semantic description, similar to the hearing subjects.

It seems efforts should be concentrated on these aspects of meaning when teaching language comprehension, reading, and writing skills. From their earliest years, deaf children should be encouraged to paraphrase what they hear, read, or lipread, and to relate it to their semantic base, i.e, what they know about the situational context. If students are encouraged to develop and use strategies based on their familiarity and experience, their comprehension of connected discourse should improve. When students are encouraged to evaluate what they hear and read in terms of their cognitive and linguistic knowledge of the situation, the syntactic rules may make more sense and become more critically salient for them.

This study demonstrates that deaf teenagers comprehend and process implied information from prose and are able to construct logical narratives. Written instructions, texts, and narratives should be viewed as communication acts requiring integrated communicative performance for implicit intentions, was well as explicit facts.

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Table 1

Summary of Descriptive Data for Deaf and Hearing Students

Measure	n	Summary Statistics Mean	S.D.	Range
Chronological Age				
Deaf	20	17.23	.76	15.8 - 19.1
Hearing	20	16.12	.51	15.3 - 17.4
Intelligence Quotient				
Deaf[a]	10	104.13	17.18	81 - 131
Hearing[b]	20	104.82	10.93	81 - 121
Reading Level (Grade Equivalent)				
Deaf[c]	20	5.36	1.40	3.3 - 7.6
Hearing[b]	20	10.53	1.99	6.6 - 12.9
Average Hearing Loss[d]	20	87.85	17.96	68 - 110+

[a]WISC-R. [b]California Achievement Test. [c]SAT-HI. [d] Deaf students' pure tone averages (better ear) at 250, 500, 1000, 2000 Hz.

Table 2

Means and Standard Deviations (S.D.) for Numbers and Percentages of Story Premises and Inferences Recalled by Deaf and Hearing Students

Group	Premises	Inferences
	Numbers	
Deaf (n = 20)		
Mean	13.85	4.45
S.D.	6.17	1.98
Hearing (n = 20)		
Mean	17.55	6.85
S.D.	5.51	2.00
	Percentages	
Deaf		
Mean	29.5%	19.3%
S.D.	13.1	8.7
Hearing		
Mean	37.3%	29.85%
S.D.	13.0	8.7

Note. Percentages are from the total story premises and inferences.

Table 3

Summary of Reading Comprehension Grade Equivalents (Stanford Achievement Test, Hearing-Impaired Edition), for Deaf Students

Category	n	Grade Equivalent Mean	S.D.	Range
"Good" Readers	7	6.9	.49	6.2 - 7.6
"Average" Readers	9	5.04	.56	4.5 - 5.8
"Poor" Readers	4	3.38	.10	3.3 - 3.5

Table 4

Mean Numbers of Correctly and Incorrectly Recalled Premises and Inferences for Deaf and Hearing Students

Group	Mean Recall			
	True Premises	True Inferences	False Premises	False Inferences
Deaf Students--Total[a]	13.85	4.45	2.25	2.75
"Good" Readers[b]	18.14	4.86	1.43	2.43
"Average" Readers[c]	12.22	4.22	2.33	3.00
"Poor" Readers[d]	10.00	4.25	3.50	2.75
Hearing Students--Total[a]	17.55	6.85	1.90	1.65

[a] $\underline{n} = 20$. [b] $\underline{n} = 7$. [c] $\underline{n} = 9$. [d] $\underline{n} = 4$.