

COMPARISON OF THE LANGUAGE ABILITIES OF DEAF CHILDREN AND YOUNG DEAF ADULTS

Lisa L. Boothe

Elaine Z. Lasky, Ph.D.

Patricia B. Kricos, Ph.D.

Several authors have pointed out that the numerous problems of hearing impaired and deaf individuals, including emotional and social behaviors, educational achievement, and vocational success, can be attributed almost entirely to communication problems as a result of the hearing handicap (Johnson, 1978; Sanders, 1971). The communication skills of hearing impaired individuals have been studied extensively using a wide variety of testing paradigms. These studies have indicated that: the semantic-vocabulary component is mildly to profoundly delayed (Russell, Quigley, and Power, 1976; Brenza, Kricos, and Lasky, in press); the syntactic component is not only mildly to profoundly delayed but may also contain deviant rule structures. These deviant structures, peculiar to the language of severely hearing impaired children, include constructions such as, object-subject deletion in relativized structures as in the utterance, "The dog chased the girl had on a red dress." (Russell, et al., 1976) or acceptance of "willn't" and "amn't" in negative constructions (Quigley, Montanelli, and Wilbur, 1974). Lack of mastery of certain syntactic structures such as complementation, (e.g., The dress *that I wore* was blue) relativization, (e.g., The boy who hit the girl went home) and passivization (e.g., The car was hit by the train) has been consistently reported (Quigley, Power, and Steinkamp, 1977).

Most of these studies of the language

competencies of hearing impaired individuals have dealt with subjects in the school setting from early school age through age 18. While it would appear logical that continued exposure to the academic environment and to specific language teaching activities should lead to the students' improvement in both comprehension and production, data do not consistently show this. Evidence from Brenza, et al. (in Press), Geers and Moog (1978), and Vernon (1969), suggests there is little improvement in specific language skills, reading and language arts through the school years. *There appears to be a need to analyze the types of errors consistently made as the student progresses so as to program for them. There is also a need to investigate the language skills of hearing impaired individuals after they leave school and determine if performance in language comprehension and production deteriorates, remains at the same level or improves?* Information of this sort should be of interest to educators of the hearing impaired, speech pathologists and audiologists, rehabilitation and vocational counselors, and other professionals who provide services to hearing impaired children and adults.

METHOD

This study was designed to assess comprehension and production of specific syntactic structures among hearing impaired persons by comparing one group whose ages extended beyond 18 with two younger, school

Ms. Boothe is an Audiologist with the S. C. Department of Mental Retardation; Dr. Lasky is with Cleveland (Ohio) State University; and Dr. Kricos is in the Department of Speech at the University of Florida.

COMPARISON OF THE LANGUAGE ABILITIES OF DEAF CHILDREN AND YOUNG DEAF ADULTS

age groups. The three syntactic structures of negation, wh-question formation, and passivization were selected because they represented varying degrees of difficulty for

the hearing impaired subjects as reported by Power and Quigley (1973), Quigley, Power, and Steinkamp (1977) and Quigley, Wilbur and Montanelli (1974) (See Table 1).

Table 1. Approximate percent correct comprehension of syntactic structures by deaf children as a function of age.

Structure	Age 10	Age 18	Gain
*Negation	57%	83%	26%
**Wh-question Formation	45%	80%	35%
***Passivization	25%	50%	25%

*Quigley, Power, and Steinkamp (1977)

**Quigley, Wilbur and Montanelli (1974)

***Power and Quigley (1973)

Materials. Comprehension and production of syntax were each assessed through a closed set multiple choice paradigm. Syntax comprehension skills were evaluated through a picture selection task in which the subject was required to read a sentence and then select the one picture from a set of four pictures that best illustrated the syntactic relations of the stimulus sentence. Production of syntax skills was assessed through a sentence completion task in which a stimulus picture, sentence frame, and single-word response options were provided. The subjects were required to select one of the single-word response alternatives to complete the sentence to correspond with the picture. Twenty-four items were used to assess comprehension skills; 24 assessed production skills. The items were evenly divided into the three syntactic categories.

The vocabulary used in the stimulus sentences was controlled to the level of reading comprehension typical of the eight year old hearing impaired child. A vocabulary list was reviewed and revised by three experienced teachers of the hearing impaired before the stimulus sentences were constructed. Research (Brenza, et al., in press) has demon-

strated that teachers of hearing impaired children are able to accurately predict the ability of their students to comprehend and produce various vocabulary items.

Subjects. Twenty-seven prelingually hearing impaired subjects between the ages of 8 and 30 years were evaluated. Nine subjects were in each of three age groups: 8-11 years, 17-19 years, and 22-30 years. The groups 8-11 years and 17-19 years were selected because they approximate the youngest and oldest groups evaluated by other researchers (Schmidt, 1968; Power and Quigley, 1973; Quigley, Power and Steinkamp, 1977; and others) and so facilitated comparisons of data collected. The 22-30 year old group was selected to represent a young adult population which had been away from a formal education setting for at least three years. Each of the subjects participating in this study had average pure tone thresholds of no better than 80 dBHTL (ANSI, 1969) at 500, 1000, and 2000 in the better ear and/or met city or state requirements for educational placement in classes for the deaf. None of the subjects had any known disabilities other than hearing. Each age group contained an approximate balance of subjects represent-

COMPARISON OF THE LANGUAGE ABILITIES OF DEAF CHILDREN AND YOUNG DEAF ADULTS

ing the following educational backgrounds: oral day school classes, total communication day school classes, and total communication residential school classes from the Ohio School for the Deaf.

RESULTS

Scores for each subject were obtained by determining the number of correct responses

for each task. Scores were compared across age groups and for the type of task, comprehension or production. Mean scores presented in Table 2 show that all subjects did better on the comprehension task than on the production task. *These comprehension scores were higher for each older age grouping.*

Table 2. Mean scores and 't' values for each age group comparing comprehension and production tasks.

AGE	COMPREHENSION	PRODUCTION	t	df	P
8-11	11.2	2.3	7.76	8	.011
17-19	14.1	1.4	14.95	8	.001
22-30	17.1	7.6	7.14	8	.001

A two dimensional analysis of variance with repeated measures on one dimension (BMDO8V, Dixon, 1971) indicated a significant difference between the processes of comprehension and production ($F = 105.7$, $df = 1, 23$, $p < .01$). A significant difference for age was also noted $F = 22.3$, $df = 2, 23$, $p < .01$). Comprehension and production scores for each age group were then compared using t-tests for related measures and for each age group, comprehension was found to be significantly better than production (see Table 2). Results of t-tests comparing each age group on a combined comprehension/production score indicated that there were no significant differences, at or beyond the .05 level, in syntactic ability between the 8-11 year old group and the 17-19 year old group. *There was a significant difference between the performance of the 8-11 group compared to the 22-30 group and, again, for the 17-19 year old group compared to the 22-30 year old group (critical difference = 5.14, gp 1 vs. gp 3 = 11.22; gp 2 vs. gp 3 = 9.22).*

Performance with the specific syntactic structures showed similar trends. Table 3 portrays the mean percent correct comprehension and production scores for each age

group for negative, wh-question, and for passivization constructions. *Comprehension scores were better than production scores of each age group and for each syntactic structure tested. Comprehension scores improved for each structure with each older age grouping. Except for production performance for the 17-19 year old group, production scores improved for each structure as age grouping increased.* Scores were better for negation than for wh-question, better for wh-question than for passivization. Separate analyses of variance were done to compare performance with the specific syntactic structures. Significant differences were found for age groups for the negatives ($F = 7.33$, $df = 2, 24$, $p < .01$), for wh-question ($F = 6.0$, $df = 2, 24$, $p < .01$) and for passivization ($F = 5.93$, $df = 2, 24$, $p < .01$). These gains were in comprehension of the syntactic structure. Further analyses demonstrated that there were no significant gains for production of any syntactic structure between the 8-11 year olds and the 17-19 year olds. The 22-30 year old group showed significant increases, beyond the .05 level, over scores achieved by the 8-11 year olds on negative, wh-question, and passivization ($t = 4.44$, $t = 3.22$, $t = 3.56$, respectively), and over

COMPARISON OF THE LANGUAGE ABILITIES OF DEAF CHILDREN AND YOUNG DEAF ADULTS

Table 3. Percentages of correct responses for each age group for comprehension and production of negatives, wh-questions and passives.

Age Group	NEGATIVES			WH-QUESTIONS			PASSIVES		
	Comp.	Prod.	Aver.	Comp.	Prod.	Aver.	Comp.	Prod.	Aver.
8-11	63%	17%	40%	42%	11%	26%	35%	1%	18%
17-19	81%	4%	42%	50%	12%	31%	46%	1%	23%
22-30	93%	43%	68%	60%	46%	53%	61%	19%	40%

respective scores achieved by the 17-19 year olds ($t=3.22$, $t=2.44$, $t=2.67$ respectively).

The following analyzes what strategies or rules appear to have been used in producing and comprehending the structures under assessment and how these strategies or rules varied as a function of age.

Negation. The 8-11 year old subjects produced negatives appropriately approximately 17% of the time. In most cases, they appeared to realize that some type of negation was required, but appeared to be uncertain of exactly how to produce the negative. As with the subjects described in Quigley, et al., (1974), these subjects most frequently negated sentences by placing "no" or "not" in the sentence resulting in constructions such as "The girl not swim." Children in the 8-11 year old group did not seem to be aware that they had to apply the rule of do-support or to include a modal or auxiliary verb. The 17-19 year old subjects performed even more poorly, achieving a group mean score of 4.22 correct production on negative constructions. These subjects also attempted to negate sentences by using "not" or "no", but they seemed to have learned that some type of helping verb is necessary so an auxiliary or a modal was generally included. Frequently, however, the auxiliary included was inappropriate or the verb form was inappropriate, e.g., "The boy doesn't playing." Subjects in the 17-19 year group also appeared to be learning rules for producing negative contractions and often overgeneralized them, producing "willn't" and "amn't". Although most of the errors were of these two types, inappropriate aux-

iliary or over generalizations, other errors included producing negatives as affirmative sentences, i.e., "The girl have an apple." and production of meaningless constructions.

The 22-30 year old subjects, with 432 correct negative constructions, showed a dramatic decrease in errors in which "no" or "not" was added while the auxiliary was omitted or was inappropriate. They also showed a decrease in errors of overgeneralization. The auxiliary was included more frequently and the contractions were more limited and more accurate. The types of errors that did occur, although fewer in number, were essentially the same as those listed for the 17-19 year olds.

Errors in the comprehension of negative constructions for all of the age groups resulted from ignoring the negative element of the sentence and, therefore, interpreting negative sentences as if they were affirmative. This type of error gradually decreased as the age of the groups increased. **Wh-question formation.** The 8-11 year old subjects and the 17-19 year old subjects achieved similar scores on the production of wh-question (11.22 correct versus 12.5% correct, respectively). The 8-11 year old subjects often did not use a wh-word when forming a wh-question. When they did, the errors were either use of the wrong wh-word or omission of an obligatory auxiliary verb, e.g., "What the boy hit?". The 17-19 year old group tended to make the same type of errors but in reverse proportion. Most of these subjects realized a wh-word was necessary but failed to use an appropriate auxiliary verb — the

COMPARISON OF THE LANGUAGE ABILITIES OF DEAF CHILDREN AND YOUNG DEAF ADULTS

auxiliary was frequently included but inaccurately. The oldest group, with 462 correct production, showed the same types of error but a reduction in their number.

Most errors in the comprehension of wh-questions made by the 8-11 year olds occurred because of confusion between "who" and "what". These subjects did not differentiate that "who" is used to refer to people while "what" refers objects or animals. This confusion had decreased for the age group of 17-19 years and had almost disappeared in the age group of 22-30 years. There appeared to be a decrease with age in errors with "where" questions but not with "when" questions. Confusion with comprehension of "when" persisted in all age groups. Research with hearing children indicates that the time duration concepts of "when" are more difficult and so complete use of "when" is acquired later than other wh-words.

Passivization. Many 8-11 year old subjects did not demonstrate a competency in producing passive constructions; they wrote passive sentences, such as, "The boy was hit by the ball as active ones, "The boy hit the ball". When these subjects did attempt to produce a passive, they used passive markers, such as, "by" or "was + by," but omitted the accompanying verb, e.g. "The apple by the girl", "The ball was by the girl." The 17-19 year old group still attempted to write passives as active sentences. When they attempted to use passives, markers were applied inappropriately as described for the younger group. The adult group showed a decrease in the tendency to produce passive constructions as active ones; however, they were still often unsure how to construct passives. This confusion resulted in the relatively low score for production of passives obtained by this age group. Most errors in production were of the type "was + verb" e.g., "The apple was eaten did the girl." Other types of errors were "was + by," e.g., "The dog was by the boy," or "was + verb," e.g., "The girl was hit the boy."

In the comprehension of passives, the 8-11 year old group tended to have the most

difficulty with reversible passives, such as, "The girl was pushed by the boy." They tended to interpret these as active sentences. Ability to handle reversible passives improved gradually with age. With non-reversible passives, e.g., "The car was washed by the boy", the 8-11 and the 17-19 year old groups had an equal number of errors. The 22-30 year old subjects showed improvement in interpreting these constructions. Agent-deleted passives, e.g., "The flowers were picked", were difficult for the 8-11 year olds and were more difficult for the 17-19 year olds; the 22-30 year old group was able to comprehend them with less difficulty. These data are consistent with previous reported results.

DISCUSSION

For each age group, results of comprehension testing were superior to production. Comprehension performance did improve for each of the older age groups studied. Comprehension scores for negative and passive constructions for the 8-11 year olds and 17-19 year olds were similar to the data presented in previous research (Quigley, et al., 1974; Quigley, et al., 1977; and Power & Quigley, 1973). Comprehension on the wh-question task showed similar trends but performance for the 17-19 year old group was poorer in this study.

Production of wh-question and passives did not show improvement from the 8-11 year group to the 17-19 year group and production of negatives showed a decrement. This is in agreement both with studies that have examined production skills specifically (Brenza, et al., in press; Geers and Moog, 1978) and with more generalized reports (Vernon, 1969). *The 22-30 year old subjects, however, showed a significant improvement over the 17-19 year olds on both comprehension and production of all three of the syntactic structures evaluated.*

Analyses of the strategies or rules used in producing and comprehending syntactic constructions suggests that in many instances 22-30 year old subjects are actually using different strategies than the younger

COMPARISON OF THE LANGUAGE ABILITIES OF DEAF CHILDREN AND YOUNG DEAF ADULTS

subjects when dealing with the constructions under consideration. They appear to have resolved some earlier confusions and do not appear to be making the same types of errors made by subjects in the two younger groups. It seems that *these subjects have made gains in linguistic skills after they have been away from a formal educational situation*. Although the reasons for this improvement are not readily apparent, possible explanations for the increases in language abilities *must consider that all of the adult subjects were involved in more frequent, more spontaneous, and often, more demanding communication interactions than those usually found in classrooms. They reported that lengthy communication exchanges were daily occurrences; these information exchanges often had critical, personal consequences*. These situations may have necessitated, encouraged, or motivated the acquisition of increased language ability. The adult subjects also seemed to have increased contact with the hearing community through vocational and social situations as well as through activities of daily living such as grocery shopping, etc.; this *increased exposure* to communication with the hearing community may have enhanced the language skills. Further, all of the adult subjects had learned sign language by the time of this study and were using it daily. Many had become fluent in sign language.

All of these possible explanations for the improvement in language ability are speculative. Each may or may not have contributed in varying amounts. Further study is certainly indicated to determine factors leading to the improvement, to continued error patterns, areas needing further help and more effective ways of supplying those needs. Conversely, *further study is needed to determine the reasons for the lack of improvement in language and reading skills between the 8-11 year age group and the 17-19 year old group which has been repeatedly demonstrated by researchers such as Geers and Moog (1978), Brenza et al. (in press) and Vernon (1969)*.

Although the hearing impaired subjects in this study were seen to be making gains in language skills even after high school graduation, they are still experiencing language difficulties. For example, although the subjects 22-30 years of age show a significant improvement over younger age groups in their ability to produce passive constructions, they are able to produce these sentences with only about 20% accuracy. The hearing impaired adults in this study demonstrated less than 50% accuracy in production of the constructions evaluated. All of the hearing impaired subjects assessed were able to comprehend more than they were able to produce, but comprehension of some constructions was still limited. The high school students were able to comprehend wh-questions with only 50% accuracy and passives with 46% accuracy. This should be a significant consideration when choosing and then reviewing reading materials for hearing impaired or deaf students and, especially, when giving instructions or phrasing questions.

It has been suggested that these errors made by deaf individuals take on increased significance when use of these syntactic structures in textbooks, newspapers and other reading materials is analyzed. Review of reading materials by previous investigators such as Russell, et al., (1976) and Brenza, et al. (in press) has led to their concern that hearing impaired individuals probably have great difficulty comprehending and therefore, obtaining important information from the material they read. Passive constructions are noted in school notebooks as well as in available fiction and non-fiction reading material, magazines, and newspapers. Certainly negation wh-question words are used and are critical constructions to comprehend to obtain the meaning from the message.

The findings in this and previous studies are particularly important for vocational and rehabilitation counselors who work with deaf individuals. It should be recognized that the language skills of young deaf adults may improve even after their formal schooling

COMPARISON OF THE LANGUAGE ABILITIES OF DEAF CHILDREN AND YOUNG DEAF ADULTS

has ended. Continued problems in producing and comprehending specific linguistic constructions must also, however, be recognized. "The flowers were picked." may seem

like a short simple sentence construction but this type of passive sentence may be very confusing to the deaf individual.

REFERENCES

- American National Standards Institute. *American National Standard Specifications For Audiometers*. ANSI S3.6-1969. New York: American National Standards Institute (1969).
- Brenza, B., Kricos, P., and Lasky, E., The performance of older hearing impaired children on a test of basic concepts. *J. Speech Hearing Res.*, (In Press).
- Dixon, W. J., Ed. *BMD: Biomedical Computer Programs*. Los Angeles: University of California Press (1971).
- Geers, A. E. and Moog, J. S., Syntactic maturity of spontaneous speech and elicited imitations of hearing-impaired children. *J. Speech Hearing Dis.*, 43, 380-391 (1978).
- Johnson, D. D., The adult deaf client and rehabilitation. In J. Alpiner (ed.), *Handbook of Adult Rehabilitative Audiology*. Baltimore: The Williams & Wilkins Co. (1978).
- Power, D. J. and Quigley, S. P., Deaf children's acquisition of the passive voice. *J. Speech Hearing Res.* 16, 5-11 (1973).
- Power, D. J. and Quigley, S. P., Testing deaf children's syntactic competence, Paper presented at the American Speech and Hearing Association Convention, Chicago, November (1971).
- Quigley, S. P., Montanelli, D. S., and Wilbur, R. B. *An Examination of Negation in the Written Language of Deaf Children*. Unpublished manuscript, Institute for Research on Exceptional Children, University of Illinois at Urbana-Champaign (1974).
- Quigley, S. P., Power, D. J., and Steinkamp, M. W., The language structure of deaf children. *Volta Review*, 79, 73-84 (1977).
- Quigley, S. P., Smith, N. L., and Wilbur, R. B., Comprehension of relativized sentences by deaf students. *J. Speech Hearing Res.*, 17, 325-341 (1974).
- Quigley, S. P., Wilbur, R. B., and Montanelli, P. S., Question formation in the language of deaf students. *J. Speech Hearing Res.*, 17, 700-713 (1974).
- Russell, W. K., Quigley, S. P., and Power, D. J. *Linguistics and Deaf Children*. Washington, D. C.: Alexander Graham Bell Association for the Deaf (1976).
- Sanders, D. A. *Aural Rehabilitation*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc. (1971).
- Schmitt, P., Deaf children's comprehension and production of sentence transformations and verb tenses. (Doctoral dissertation, University of Illinois, 1968). *Dissertation Abstracts*, 1970, 30, 36A (University Microfilms, No. 65-15381).
- Steinkamp, M. W. and Quigley, S. P., Assessing deaf children's written language. *Volta Review*, 79, 10-18 (1977).
- Tomblin, J. B., Effect of syntactic order on serial - recall performance of hearing-impaired and normal hearing subjects. *J. Speech Hearing Res.*, 20, 421-429 (1977).
- Vernon, M., Sociological and psychological factors associated with hearing loss. *J. Speech Hear. Dis.*, 12, 541-563 (1969).
- Wilcox, J. and Tobin, H., Linguistic performance of hard-of-hearing and normal children. *J. Speech Hearing Res.*, 17, 357-365 (1975).