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ABSTRACT

A study examined the effects of the use of sign language in young hearing children's language development. The study tracked a class of 19 Maryland students from their first week of prekindergarten over the 2-year period that ended with the last week of their kindergarten year. Subjects received sign instruction during the prekindergarten year and none in the kindergarten year and were tested at the end of the kindergarten year. The testing instrument was the Peabody Picture Vocabulary Test (PPVT-R), which showed students receiving sign language instruction scored significantly higher than similar students in comparable classes not receiving such instruction. Results indicated that the gain subjects achieved during their sign-language-enhanced prekindergarten year continued throughout their kindergarten year, with test results confirming that there was no memory decay over time. Findings suggest that the addition of sign language in their prekindergarten curriculum made a significant increase in these students' vocabularies and was sustained in the absence of any further sign instruction in their kindergarten program. Further study of the effect of sign language instruction on hearing children's language development is needed concerning the specific reason additional linguistic modalities interact in such a positive way with language growth. (Contains 28 references.) (CR)

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Abstract

SEEING LANGUAGE: THE EFFECT OF SIGN LANGUAGE ON VOCABULARY DEVELOPMENT IN YOUNG HEARING CHILDREN

This research examines the effects over time of the use of sign language in young hearing children's language development. It tests and tracks a class from their first week of school as prekindergarten students over the two year period that ends with the last week of their kindergarten year. The results indicate that the statistically significant vocabulary gains made in their prekindergarten year sustain throughout their kindergarten year and remain with them. There is no memory decay over time. These findings strengthen the rationale for including sign language instruction in early childhood education.

SEEING LANGUAGE: THE EFFECT OF SIGN LANGUAGE ON VOCABULARY DEVELOPMENT IN YOUNG HEARING CHILDREN

A primary concern of educators is improving language development in children. Since language is essential to process information, to construct messages, and to provide a medium for communication exchanges, children with limited language capabilities are disadvantaged learners. Hirsch (1988) asserts knowing a lot of words means knowing a lot of things. Young learners' language competency is critical for facilitating communication and for academic success.

Using sign language to improve hearing children's language acquisition is a concept that was first introduced in the early nineteenth century. Thomas Hopkins Gallaudet, the famous pioneer of education for the deaf in the United States, advocated that hearing siblings of deaf children learn and use sign language. He believed this would serve two purposes. The deaf child in the family would have easy access to other children with whom they could communicate in sign language and the hearing children who learned and used the sign language would increase their vocabulary and language proficiency. Gallaudet was convinced that using sign language and fingerspelling with the manual alphabet would assist language acquisition in the hearing child.

In an 1853 issue of the American Annals of the Deaf and Dumb, Bartlett recounting Gallaudet's earlier assertion describes the principles on which he postulates Gallaudet based his convictions: "The more varied the form under which language is presented to the mind through the various senses, the more perfect will be the knowledge of it acquired, and the more permanently will it be retained" (33).

Apparently throughout the nineteenth century some families followed Gallaudet's recommendation. From anecdotal narrative (Groce, 1985) it seems teaching sign language to hearing children was successful for both purposes, improving the communication of the deaf child and improving the vocabulary and language capacity of the hearing child. During the ensuing years sign language went through a period of disuse and disfavor. It was not encouraged for deaf individuals and there are no reports of its use with normal hearing children. It was not until the late twentieth century, largely through the work of William Stokoe (1978) and later Kilma and Bellugi (1979), that the misperceptions about American Sign Language began to change and sign language came into its own, fully recognized as an independent language with all of the properties of any language.

Review of literature

A review of the relevant contemporary literature found there has been some minimal use of sign with educationally challenged hearing children. Sign was used as a communicative tool for

children with Down's syndrome (Weller & Mahoney, 1983), autism (Konstantareas, 1984) and communicative impairments (Musselwhite, 1986). These studies offer evidence using specific signs as gestural cues led to improved communicative competence in the children.

A small number of studies concern hearing children of deaf parents. Holmes and Holmes (1980), Prinz and Prinz (1981), Orlansky and Bonvillian (1985), and Griffith (1985) all report early acquisition and accelerated development of language when hearing children of deaf parents are simultaneously presented sign language and English. These findings were repeated in a recent study of 14 hearing children of deaf parents, who learned American Sign Language and English as preschoolers. The research results reported by Daniels (1993) show these bimodal bilingual youngsters achieved higher than average scores on the Peabody Picture Vocabulary Test and suggest knowing American Sign Language has a positive effect on a hearing child's acquisition of English.

Reports using sign language with hearing children without disabilities or without deaf parents or deaf siblings are rare. A limited number of studies suggest that sign language aids language development in normally developing mainstream hearing children. Ellison (1982) found that sign offered a positive contribution to expressive language development in hearing nursery school children. DeViveiros and McLaughlin (1982)

provide evidence of sign's enhancement of hearing kindergarten children's use of descriptive adverbs and adjectives.

More recently, Sacks (1990) wrote of a series of effective educational experiments using sign with hearing children in the United States. Sacks described one program by Wilson and Hoyer (1985) and another by Brown (1990), both conducted in Prince George's County, Maryland, a unique educational environment that welcomes innovative programs. In each of these interventions sign proved to increase the young learners' language abilities.

Daniels (1994) research study in the same Maryland county found the addition of sign to prekindergarten curriculum increased hearing children's receptive English vocabulary. Subjects for the study were from four preschool classes of the identical size in two schools in the same district in adjoining neighborhoods with analogous socioeconomic status. Each of the classes contained 19 students. Some moved during the course of the year, but with the addition of new students, the class size remained constant.

Two of the classes tested received sign instruction. The other two classes received traditional instruction and were taught no sign. In all other aspects, the curriculum for each of the four classes was identical.

In the prekindergarten classes using sign instruction, teachers begin the school year using sign language concurrently with spoken English. Initially, the teachers sign words and

phrases, not whole sentences. Signs are used to emphasize words and stressed for requests and commands. Children are taught to sign the alphabet as they learn the letters. For lessons and stories the signs are often introduced first.

The teacher communicates with the students using sign and spoken English simultaneously about half of the time, English alone about one quarter of the time and sign alone about one quarter of the time. When the students begin to acquire the sign, they spontaneously use the language, at first communicating in sign with their teacher. As the school days continue they use sign language with each other in their activity centers. They very quickly communicate easily in this non-native language.

To measure the effect of this sign language instruction relative to the usual preschool program the children were tested with the Peabody Picture Vocabulary Test during the first week of school in September 1992 and again at the end of the school year in late May 1993. The mean pretest score for the children receiving sign instruction was 79.03 (sd, 9.7), and the mean posttest score was 96.27 (sd, 11.61). The corresponding scores for the children not receiving sign instruction were 78.63 (sd, 14.48) and 85.11 (sd, 13.09).

The pretest scores for the signing and nonsigning classes were virtually identical. All of the preschool classes had the same level of competence with receptive English vocabulary prior to the sign language intervention. When the posttest scores are

examined, a dramatic change in the competence level is seen in the students who received sign language instruction. The addition of sign language instruction in their preschool curriculum made a striking 17.24 increase in the score that reflects these student's language abilities [as compared with a 6.48 increase with normal curriculum]. Thus the results of this study show a statistically significant improvement in receptive English vocabulary for students who received the sign language instruction.

In the present follow-up study the Maryland students who received the sign language instruction during their prekindergarten year are tested at the end of their kindergarten year to determine if they have maintained the vocabulary gains they achieved in their prekindergarten year. It was hypothesized that there would be no decay over time.

METHOD

Subjects

The participants in this United States study were 19 kindergarten students from Prince George's County, Maryland who had been part of the early childhood program cohort receiving sign instruction during their prekindergarten year. Eleven of the 30 students constituting the prekindergarten sign classes test results were no longer in the school system. The 19 remaining students adequately represent the original group. These 19 students' mean score on entering school was 77.84 (sd, 9.97) and their mean

score at the end of their prekindergarten year was 95.11 (sd, 10.57) showing a 17.27 increase in the score that measures their vocabulary. These statistics mirror the results of the numbers for the entire original group who had a pretest mean of 79.03 (sd, 9.7), a postest mean of 96.27 (sd, 11.61), and a 17.24 increase in the score measuring vocabulary.

Testing instrument

The instrument chosen for this study was the Peabody Picture Vocabulary Test (PPVT-R). This reliable, well respected testing device published by the American Guidance company has been in use since the 1960's in its original form. The 1981 revised version in use here is an individually administered, norm-referenced, wide range power test of hearing English vocabulary. It has been found to be neutral to tester influence. The test is designed for persons 2 years, 6 months through 40 years of age. The PPVT-R was standardized nationally using a carefully selected sample of 5,028 persons (4,200 children and adolescents and 828 adults). Raw scores are converted to age-referenced norms. These standard scores have a mean of 100 and a standard deviation of 15.

Procedures

The kindergarten students who had received sign instruction during their prekindergarten year were tested at the end of their kindergarten year. Their sign instruction was limited to prekindergarten. During their kindergarten year they received no

additional sign instruction nor was the sign they had been taught utilized. Their kindergarten teacher knew no sign and used none.

The testing procedure took place during a one week period in May of 1994. The Peabody Picture Vocabulary Test (PPVT-R, Form M) was administered to the 19 kindergarten students who took part in the 1992/1993 prekindergarten sign instruction intervention to determine the effect over time of the prekindergarten year of sign instruction on these student's English vocabulary acquisition. The participants were shown a series of test items (generally 35 to 45) arranged in order of increasing difficulty. Each item included four simple black and white illustrations arranged in a multiple choice format. The subject's task was to select the picture considered to best illustrate the meaning of an orally presented stimulus word.

RESULTS

The mean score earned by the 19 kindergarten students on the Peabody Picture Vocabulary Test was 94.32 (sd, 11.38). Their mean score at the end of their prekindergarten year had been 95.11 (sd, 10.57). The difference between these scores is not statistically significant.

These results show the 17 point gain in receptive English vocabulary they achieved during their sign language enhanced prekindergarten year continued throughout their kindergarten year. The test results confirm that there was no decay over time.

DISCUSSION

The addition of sign language instruction in their prekindergarten curriculum made a dramatic increase in these students' vocabulary. The improvement occurred during the time of the sign intervention and was maintained by the students throughout the kindergarten year that followed. Student's vocabulary growth sustained in the absence of any further sign instruction or use of sign language within their kindergarten program.

What accounts for the superior vocabulary growth exhibited by the students who were taught sign and why were they able to retain the gains they had made? A possible explanation for the larger vocabularies and facility with English the children in this study displayed is the theory of T. H. Gallaudet that sign's utilization of an additional sensory channel provides a richer language base for young learners. Gallaudet believed that language would be acquired more perfectly by hearing children through a combination of sign language and oral English and that knowledge gained in this manner would be retained longer.

There are a number of factors resting on a biological base which support a modality preference favoring sign production over oral speech in young children. A small window of optimum opportunity for children to acquire language during their preschool years exists. Moore (1970) asserts: "The specific ability to develop language appears to peak around the ages of

three to four, and tends to steadily decline thereafter (44). The Maryland preschool programs' use of sign language maximizes the opportunity presented during this early childhood period for accelerated language growth.

Current research by Bonvillian and Folven (1993) found both motor ability and visual perception contribute to the early acquisition of sign language in young children. At birth, the level of maturation in the brain of the motoric centers is ahead of the speech centers, this differential level is maintained during early development and continues in childhood. Basic motor control of the hands occurs before the voice and the visual cortex matures prior to the auditory cortex. These factors present a modality preference favoring sign language production with young children.

Piaget's writings (1955) support the premise that sign provides a more natural code for children's exchange of ideas: "gesture and mime... language in movement, ... is the real social language of the child" (77). If Piaget's proposition is correct and language in movement is native to the child, then sign, which is indeed language in movement, would provide a more natural code than English for language acquisition in children.
Piaget's position receives support from research advanced by Newport and Meir (1985; Meir, 1991) which found signs are more easily understood by young children than spoken words.

Sign language relies heavily on gesture and iconic expression.

Children who learn it as preschoolers are utilizing more gesture and mime in their language development than children who only learn spoken English. Furthermore, the manual alphabet associated with sign language provides an early convenient form of writing for young children, as they are able to fingerspell far sooner than they acquire the manual dexterity to write words with paper and pencil. Gallaudet maintained that fingerspelling familiarized children with the correct orthography at an early age.

Including sign language in the prekindergarten curriculum employs an additional sensory channel. The kinetic sense that is involved augments the usual oral aural sensory channels. Using sign language literally allows a child to feel language. The teachers in the Maryland program, who use sign with the children, report that the children develop an awareness of the configurations of letters and words. Sign teaches them location and position within space in a kinetic form. When the students sign they become active participants in learning language, and express a great deal of pleasure in creating visual symbols that represent letters and words.

This active association with symbols stimulates the students facility for play. The capacity to play is generally accepted as a cause as well as a correlate of cognition, social growth and language ability. During play a consolidation of skills occurs which are carried over to contexts beyond those in which they are

obtained. A lack of skill in language alters children's interactive experiences and decreases the degree to which they can learn from play. According to studies cited by Spencer and Deyo (1993), hearing children with language difficulties suffer from an underlying pervasive symbolic deficit. Such children, often labeled language delayed or language disordered, have accompanying delays in symbolic play despite otherwise normal cognitive functioning. Using sign language with hearing children appears to enhance their capacity for play by augmenting or increasing their understanding and use of symbols. Characteristically this advancement leads to a corresponding development and use of language. Spencer and Deyo's findings supply another rationale for the Maryland students' increased vocabulary and their more frequent animated interactive communication behaviors.

Although facial expressions obviously have important communicative function within spoken language communication, they are not regarded as elements in the linguistic structure. It is possible to communicate in a spoken language without any visual contact between the communicators. This is not true with a signed language. The communicators need to look at each other carefully to transmit and receive the message. In signed language facial expression and other nonmanual behaviors can have true linguistic structure; Loncke, Boyes-Braem, and Lebrun (1984), for example, found facial expressions in sign language

are components of lexical items as well as the grammar on both the morphological and the syntactic level.

This need to see all that is happening is an impetus for students to maintain eye contact during communication. Although they do not realize it in any sort of conscious way, they quickly recognize the need to focus and pay close attention to a communicator in order to receive the entire meaning. The teachers using sign with the students find the children's ability to focus is easily established from the beginning of the school year. The children look carefully at the teacher's hands eyes and facial expression, as well as listen to the voice, in this more abundant form of language presentation that Gallaudet advised.

When the students observe the teachers signing what they are expressing verbally, the students are presented with optimum cues. The signs represent the message visually and kinesthetically. Sign is received in a visuospatial manner by the right hemisphere of the brain and subsequently processed by the left hemisphere. The eyes are the receptors for sign, as the ears are the receptors for oral languages. The experience in these classes concurrently delivers the communication in visual, aural, and physical modes. The combination of signals creates the probability of a multiple imprint on the learner's memory. In tandem sign language and English offer a much stronger language foundation for young learners.

Gallaudet also believed that knowledge gained through the use of sign language would be retained over a longer period of time. Studies by Hoemann (1978) and Hoemann and Koenig (1990) show that languages are coded in separate memory stores. This is true even in the early stages of acquisition of a second language. Today, it is understood that a sign language such as American Sign Language is a distinct language with the same characteristics as any language. Accordingly the sign language the children learned would have been stored in a memory store separate from the store of their native English, and so provides two sources for search and recall, establishing a psycholinguistic rationale for Gallaudet's belief that sign would aid language retention.

The convictions that Gallaudet held so many years ago that sign language would improve the language abilities of hearing children and that the improvement would be maintained over time have been justified by this research. However, it is unclear exactly which element was responsible for the accelerated language growth or for the retention of language growth that these young subjects exhibited. Does the additional modality of sign stimulate the right hemisphere of the brain while the heard language is stimulating the left hemisphere? Does the kinetic aspect of sign language provide a more natural code for language development in children? Does the active association with symbols facilitate enhanced play behavior and its associated benefits? Do biological maturity levels support a sign

advantage? Do two separate language memory stores account for the sign students sustained accelerated scores on the PPVT-R? This research did not seek to nor does it not offer definitive answers to these questions. It could be one element or a combination of them or something unsuspected. However, the 1992/1993 investigation did clearly indicate that students in prekindergarten classes receiving sign language instruction test significantly higher on the PPVT-R than similar students in comparable classes not receiving sign language instruction. The results of this 1994 follow-up research study demonstrate that the vocabulary advancement made by these children as prekindergarten students was maintained throughout their kindergarten experience in the absence of any additional sign instruction. Furthermore, the latest student scores on the PPVT-R demonstrate there was no memory decay overtime, a powerful indicator of the value of sign language instruction for early childhood education.

Implications

What are the implications of these findings for teaching language in early childhood education? It seems abundantly clear that sign language instruction should constitute an integral part of more prekindergarten programs. Based on this research, children's language ability would increase and the gain achieved would be retained. The durability of the vocabulary enhancement is a strong argument to expend the effort and the associated

expense of implementing early childhood programs that include a sign language component.

There are additional implications arising from this study for children's communication competence. Students who have learned sign language express added pleasure in communicating. They are less reticent and more enthusiastic about participating in communication activities. They focus their attention and appear to be better listeners. It is very likely that improving these communication skills will carry over into other aspects of these children's educational endeavors.

An ancillary, far reaching, future, effect of this research is a possible contribution to communication with the deaf community. If many more people routinely learn sign language as a part of their education, they will have the ability to communicate with deaf persons. Improving communication between the deaf community and the hearing community could be a significant by-product of the application of these research findings.

Further study of the effect of sign language instruction on hearing children's language development is needed. For the present, this study's findings confirm and extend those of previous research that indicate that simultaneously presenting words in visual, kinesic and oral ways enhances a child's vocabulary development. Speculation persists concerning the specific reason additional linguistic modalities interact in such a positive way with language growth. The evidence gathered here

provides continued support for the hypothesis that hearing prekindergarten children who learn sign language improve their acquisition of English vocabulary to a statistically significant degree; and that the improvement these children attain remains with them throughout their kindergarten year.

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