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VISUAL LANGUAGE & VISUAL LEARNING RESEARCH BRIEF:



READING RESEARCH & DEAF CHILDREN

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Key Findings on Reading Research and Deaf Children:

LEARNING FROM RESEARCH

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- Early diagnosis and intervention support better reading outcomes.
- A strong language foundation (regardless of the language or modality) is important for reading success.
- Parental fluency in the language or communication mode of the child is critical.
- Parental involvement in the child's academic environment is important for academic success.
- In order to read, a child must develop word recognition, and there are multiple routes for relating print to meaning.
- In developing advanced reading skills, phonology appears to be important for some, but not all, deaf children.
- Phonological coding and awareness skills are a low-to-moderate predictor of reading achievement in deaf individuals.
- Deaf children with deaf parents tend to have an enriched language environment. In consequence, deaf children of deaf parents tend to read better, but given consistent and rich language access, deaf children from hearing parents can catch up.

“Why can’t Johnny read?”

This question has been asked, time and time again, about American children in general, but it is even more relevant when talking about deaf children, whose average reading level by age 18 has remained relatively stable at the third to fourth grade level for more than half a century.^{1,2,3,4,5,6,7} Most studies have shown that children with more residual hearing tend to have better reading and academic outcomes than those with less hearing, but that even a mild hearing loss affects reading outcomes.^{8,9} Nevertheless, despite these depressing statistics, many deaf people do become skilled readers, earning bachelors’ degrees and graduate degrees.

These conflicting outcomes suggest two questions. First, why do most deaf children struggle to learn to read and develop such limited literacy in English? Second, given this situation, how are other deaf children able to develop advanced reading skills? It is possible that answering these two questions will help us to understand how to bring the first group closer to the outcomes of the second. The goal of this brief is to summarize the research related to deaf readers and to identify key findings that impact the development of fluent reading skills in deaf children and particularly those findings that involve alternate pathways to reading success.

It is estimated that over 90 percent of deaf children are born to hearing parents and as few as four percent of deaf children have at least one deaf parent.¹⁰ Despite early exposure to hearing parents’ spoken English, intervention programs, and technology such as digital hearing aids and cochlear implants, the majority of deaf children continue to struggle to develop age-appropriate English skills, particularly in the area of complex grammar and syntax.^{11,12} Much of the research suggests that deaf children parallel hearing children in early literacy skills, but many do not make the transition to later stages of literacy development.

^{13,14}

Sound versus Print-based Word Recognition

Much of the research related to reading and deaf children (and adults) has focused on the child’s ability to recognize, or decode, individual words. Relating words to meaning is important, as it is difficult to understand what is being read if even 10 to 20 percent of the words in the text are not recognized. Research with hearing readers has suggested a dual route to single word decoding.¹⁵ The indirect phonological, or sound-based, route involves the relationship of the letters in the word to sounds (e.g., “sounding out” the word). This process is slower, but allows the child to recognize words they have never seen before in print (or don’t know well).

The direct lexical, or print-based, route depends on whole word recognition. It is fast and works with words that do not follow phonological rules (e.g., “yacht”), but the child must already know the word in its printed form for this route to work. The general assumption is that hearing children use the phonological route for unfamiliar words and the direct route for familiar words.¹⁶

Do Deaf Children Use Phonological, or Sound-based, Decoding?

Many researchers have focused on phonological awareness (PA) and decoding as a key component of reading even for deaf readers, and a number of reviews of the literature have concluded that adult deaf readers can and do use phonology to support decoding of print.^{17,18,19,20,21,22} Deaf and hard of hearing children have been found to access phonological awareness and decoding skills through speech-reading, Total Communication, reading, and kinesthetic feedback associated with fingerspelling and speech movements.^{21,23,24,25,26,27,28}

Studies of cochlear implant users have suggested that the child’s early English language skills predicted development of both PA and later reading skills.²⁹ This suggests that for at least some deaf children, spoken language skill drives both PA and later reading skills. However, research with

cochlear implant users has also indicated that even those who rely on their hearing are able to access English better with sign (or as the case may be, visual supports for speech).³⁰

The relative benefit of the different routes of access appears to depend on the child's intrinsic abilities and needs, the language or communication methods used with and by the child, the educational focus, and so forth. Nonetheless, all children need early exposure to a rich, accessible first language, and for deaf children--even those who have access to auditory input through cochlear implants or hearing aids--this, by necessity, includes visual access.

Reading Comprehension Versus Word Decoding

Another study found that although some oral deaf children who use cochlear implants develop adequate English skills, in which case single word skills were generally strong, many children still had weaknesses in the complex language forms.¹² Because they involve more advanced word formation, grammar, and syntax, these complex language skills are important for advanced reading.
¹²

Even researchers who support a phonemic decoding approach to reading acknowledge that deaf children of deaf parents fluent in American Sign Language (ASL) have an early and rich language environment; this environment provides a foundation for reading, with the consequence that deaf children from deaf families generally read better than deaf children of hearing and non-signing parents.¹⁷ They note that literacy depends on the individual's skills with the morphology, semantics, and syntax of their primary language, *even when the primary language happens to be in the visual modality, as is the case with ASL*.¹⁷ Indeed, deaf children of hearing parents who attend sign-based schools and who develop ASL skills comparable to those of the children with deaf parents also appear to develop comparable reading skills.³¹

Alternate Routes to Reading Success

The data suggest that that while some deaf individuals may rely on PA, others use an alternate route to reading success. The preferential use of one or the other route may be driven by the child's language and educational history. For example, in one study in which all of the groups had comparable reading skills, deaf adults raised orally or using Cued Speech demonstrated PA comparable to hearing peers, and their PA skills were associated with their level of reading comprehension.³² Despite having comparable reading skill, the deaf participants who were raised using ASL did not show the same association between PA and reading comprehension seen in the other groups.³² This suggests that the ASL-fluent group is using an alternate route to reading success.

A consistent finding in the research is that a strong first language (L1) foundation (regardless of the language used for L1) is critical to reading success. A strong positive correlation has been found between bilingual abilities (in American Sign Language and English) and morphological knowledge (in both languages); indeed, VL² researchers have found that higher levels of syntactic and semantic knowledge are important for the acquisition of reading ability.³³ In the bilingual approach to reading, parents and teachers use American Sign Language (ASL) as the L1, and then the teaching of English literacy is based upon complex linguistic knowledge accessed through the first language.^{8,34,35}

Other studies have indicated that many deaf children demonstrate use of approaches based on fingerspelling, sign, or print-based (orthographic) codes.^{33,36,37,38,39,40,41,42} For example, some children may not recognize a word in print until they fingerspell it for themselves, at which point they are able to recognize the word and associate it with meaning. Other children directly associate the printed word with signs, which they then relate to meaning, and can be seen to "read out loud" by signing the text. Still others use the lexical route and relate the printed word directly to meaning.

Review articles have discussed various alternate decoding routes and the potential benefits and limitations of each for deaf readers.^{20,43}

Furthermore, a recent meta-analysis of the literature on phonological coding and awareness—a study supported by VL²—discovered that half of the studies found statistically significant evidence for PA, but half did not.³⁴ However, this figure was complicated by the fact that some of the studies that found evidence of PA did not include a measure of reading but only rhyme judgments or some other measure of phonology or, alternately, the studies did not fully account for the possibility of orthographic overlap.³⁴ This meta-analysis also suggested that PA only accounts for 11% of the variance in reading proficiency in deaf participants. When the relationship with reading outcomes was investigated, the child's language skill (either ASL or English) was the best predictor of reading success.^{34,44}

Other Factors in Reading Success

Studies that have investigated the factors important for reading success beyond single word decoding have found a number of factors to be critical for advanced reading skill development in deaf individuals. Clearly, having a strong foundation in a first language is critical, and studies investigating factors that predict better reading skills have also found that children with earlier diagnoses and greater vocabulary tend to read better.^{9,45}

Two factors that are commonly ignored are parental involvement in education and the child's comfort in communicating with teachers and peers; both affect academic and reading outcomes in deaf children.⁹ Parental involvement in the child's education has been cited as important for hearing as well as deaf children, and in the deaf child's case it may also reflect parental fluency in the primary language of the child, a critical skill for providing the child with an ongoing and enriched language environment. In addition, children need to be able to communicate freely with teachers and peers to participate fully in the classroom. This engagement with teacher and peers will affect motivation and involvement in learning, both of which are critical to academic

attainment. In an accessible classroom environment, the child is then more likely to develop both language and academic skill.

Regardless of the primary language of the child, a strong knowledge of the vocabulary and the syntax and grammar of the language of print are both (independently) critical for reading success.^{20,28,46,47,48} Deaf readers must be able to perform basic reading processes such as single word decoding automatically (without needing to spend effort thinking about it) in order to have the cognitive resources available to perform more advanced reading processes.⁴⁹ In deaf adults, even for weaker readers, the amount of reading completed for personal reasons predicts text comprehension, and intrinsic motivation was the best predictor of the amount of reading done.⁵⁰ Thus, an interactive relationship exists between the amount of reading and reading comprehension. This reinforces the need to encourage reading regardless of the level of reading skills of the individual.

Ongoing Research on Reading

While a wide range of issues impact reading skills, two of the most important factors for reading competence appear to be a strong first language and consistent and ongoing practice reading. Other factors continue to be debated and studied.

VL² researchers are increasing our understanding of the processes involved in reading skill development through research such as the Early Education Longitudinal Study (EELS). The EELS study investigates parental, school, teacher, and child variables that affect early reading skill development. Over a three year period, EELS researchers are collecting data on the children's attention, language, memory, and reading and pre-reading skills, in addition to collecting and evaluating information about their family and school environment.

There remain many questions to be answered, and continued research is crucial to improving reading outcomes for deaf children.

Integration of Research in Education

VL² publishes research briefs as a resource for educators and parents. The goal is to inform the education community of research findings, to summarize relevant scholarship, and to present recommendations that educators and parents can use when addressing the multifaceted challenges of educating deaf and hard of hearing children.

Research briefs are available under Publications & Products at vl2.gallaudet.edu.

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