

Petra M. Horn-Marsh, PhD, is an

associate professor with the ASL and Deaf Studies program at the University of Kansas. Previously, as a lead mentor of the Center for ASL/English Bilingual Education and Research housed at Gallaudet University, she provided national-level teacher in-service on methodologies and assessment tools for deaf children. She also served on the advisory committee to develop a statewide ASL and English Language Assessment Program for deaf and hard of hearing children ages 0-8.

Adele Ann

Eberwein, EdS, brings over 20 years of experience in the field of ASL and English bilingual education. Her diverse roles have included: adjunct instructor, bilingual language arts teacher, principal, K-12 mathematics teacher specialist, and elementary classroom teacher. As a lead mentor in Gallaudet's Center for ASL/English Bilingual Education and Research, Eberwein trained teachers from schools around the nation on methodologies and assessment tools for ASL/English instruction.

Early Exposure to ASL Yields Gifts to Children Learning to Read and Write

*By Petra M. Horn-Marsh, Adele Ann Eberwein, M. Diane Clark,
and Ashley Greene*

*Deaf children develop an early skill of gaze that allows them to connect
linguistic input to what is in their environment*

– Brooks, Singleton, & Meltzoff (2020)

Teaching deaf students how to read has been challenging and contentious. While a 2012 study (Easterbrooks & Beal-Alvarez, 2012) suggests that many deaf children can read at the same level as their hearing peers, an earlier frequently referenced study claims that the reading abilities of deaf students are typically at a third or fourth grade level (Marschark & Harris, 1996).

Unfortunately, teachers of deaf children can rely too heavily on strategies that were originally designed for hearing children. For instance, the National Reading Panel, which primarily focuses on hearing children and is often referenced in papers on deaf education (National Early Literacy Panel, 2008), suggests that there are five key skills that are highly predictive of children developing literacy:

1. Alphabetic knowledge
2. Phonological awareness
3. Rapid naming of letters or objects
4. Writing or writing one's own name
5. Phonological short-term memory

The National Reading Panel's assertion that phonological awareness is a strong

*Photos courtesy of Petra M. Horn-Marsh, Adele Ann Eberwein, M. Diane Clark,
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predictor of literacy has been used to support the argument that a lack of phonological awareness or limited access to English accounts for deaf children having lower reading levels than their hearing peers (Kyle & Harris, 2010). As a result, many studies have focused on developing spoken phonological awareness, and various systems were created and implemented in classrooms with the aim of improving deaf children's access to spoken phonology (e.g., Cued Speech [Cornett, 1967], Visual Phonics [Krupke, as cited in Montgomery, 2008], and the Foundations for Literacy reading program [Lederberg et al., 2014]).

Few in deaf education questioned this

Above: At the National ASL Round Table Conference in Salt Lake City, Utah, in 2019, Adele Ann Eberwein and Kester Horn-Marsh give an overview of the Signacy framework, highlighting Guided Viewing as one of the viewing elements.

assertion, even though the emphasis on spoken phonology was debated within the same report of the National Reading Panel that cited it as a critical precursor to reading (Garan, 2002). Further, a meta-analysis by Mayberry et al. (2011) found that spoken language phonology explained only 11 percent of the variance of reading proficiency in deaf readers, and other

M. Diane Clark, PhD, is a full professor and chair of the Department of Deaf Studies and Deaf Education at Lamar University. Prior to this, she was a tenured professor at Gallaudet University from 2002-2015 as well as a founding member of its National Science Foundation-funded Science of Learning Center on Visual Language and Visual Learning.

Ashley Greene, EdD, an assistant professor at Lamar University, worked in public school districts in Texas as a deaf education teacher with pre-kindergarten to high school students. She was part of a team that developed a Spoken Language Checklist that identifies and monitors developmental milestones for children, regardless of their hearing status, who use spoken English.

The authors welcome questions and comments about this article at dr.petra@ku.edu, aerberwein@lamar.edu, mclark22@lamar.edu, and agreene7@lamar.edu, respectively.

Right and far right: One ASL storyteller is shown using fingerspelling for “B-U-S,” “C-A-R,” and “T-R-U-C-K,” while the other is shown using fingerspelling for “B-A-G” and “S-T-A-T-I-O-N.” These videos, created by ASLCIA, provide kindergarten and first grade students, respectively, with an opportunity for fingerreading.

research showed that spoken phonology is not necessary for deaf students to become skilled readers (Costello et al., 2021; Emmorey & Lee, 2021).

Instead, successful deaf readers appear to rely on other attributes and strategies. One crucial attribute is early exposure to American Sign Language (ASL) (Caselli et al., 2021). Deaf children whose parents learned sign language before they were 6 months old had vocabulary skills that were appropriate for their age (Caselli et al., 2021). Additionally, ASL seemed to serve as a bridge to achieving English literacy and academic success (Hrastinski & Wilbur, 2016). This may be partly because early use of ASL enables deaf students to activate a variety of strategies to successfully develop reading skills. These include:

- **Sign language phonology**—Just as auditory phonology is based on the smallest components of spoken language, sign language phonology is based on the smallest components of a sign language (e.g., handshape, location, orientation, movement, non-manual markers) (Petitto et al., 2016; Stone et al., 2015). As is the case with English—or any language—ASL uses these meaningless phonological elements and combines them using the linguistic rules to create units of meaning (McQuarrie & Parrila, 2014). Deaf children who are provided with full access to ASL at an early age acquire an understanding of sign language phonology, which correlates strongly with English reading proficiency (Caselli et al., 2021). Petitto et al. (2016) suggest that deaf children



may develop this visual form of phonology through their sign language proficiency that also includes receptive fingerreading and expressive fingerspelling. Access to a sign language phonology for deaf children provides the statistical regularities necessary to establish the brain's language areas (Kuhl & Rivera-Gaxiola, 2008). This statistical regularity primes the brain to be able to identify and combine the smallest components of language (whether signed or spoken) and make meaning.

Sign language phonology develops as the child sees the repeated patterns of sign language and associates them with linguistic meaning and the linguistic areas of the brain become functional (Petitto, 2014). In the case of deaf children who use ASL, this association also leads to the child's development of fingerspelling, which also promotes phonological awareness (Crume, 2013; Holcomb et al., 2021). Given phonological awareness is implicit in a child's fingerspelled words, ASL has now bestowed on the child at least two of the pillars of literacy—understanding the combination of small meaningless parts to make meaningful units and understanding the relationship of the fingerspelled alphabet to the printed letters of the written text.

- **Skill of eye gaze**—Additionally, deaf children develop an early skill of eye gaze that allows them to connect linguistic input to what is in their environment (Brooks et al., 2020). This use of what researchers refer to as *knowing where to look or attention* provides another foundation for literacy development as the child learns to identify statistical regularities

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~ Petitto, 2014

in adult signing. Knowing where to look effectively allows the child to have access to ASL phonology.

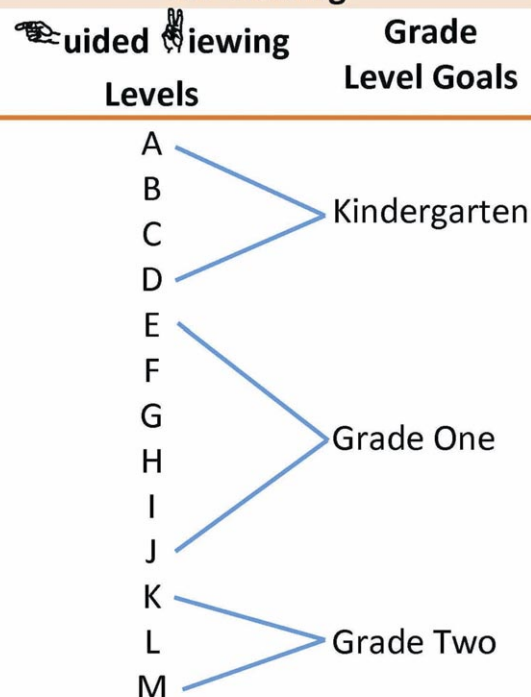
In the first six months of life, all infants begin to coordinate their eye gaze with adults. Then children and adults typically engage in joint attention (Lieberman et al., 2014). Brooks et al. (2020) note that gaze following is a critical way for children to input language, and this behavior develops earlier for Deaf children with Deaf parents than for hearing or deaf children with hearing parents. Brooks et al. posit that this difference in development occurs because Deaf parents actively and naturally engage their Deaf child's attention and know how to guide it.



Guided Viewing Framework



Instructional Level Expectations for Viewing



Deaf parents pause in their visual linguistic input, allowing their child to attend to the object in question before they engage with the child with information about the object (Lieberman et al., 2014).

Therefore, when Deaf children with Deaf parents arrive at school, they know how to manage attention and participate in turn taking in the classroom (Singleton & Crume, 2022). This ability contrasts with their deaf peers with hearing parents who seem highly distractible not only due to their diminished language but also due to their parents' lack of understanding of how to develop and train their attention. In fact, deaf children of hearing parents tend to show delays in the development of effective eye gaze (Cejas et al., 2014; Tasker et al., 2010). Consequently, teachers must first teach these students how to attend to the signer; they should not assume that watching the signer in

order to understand what is being said will occur automatically.

- **Skill in viewing**—Viewing ASL videotexts is one of the components of bilingual literacy instruction. In *viewing*, which promotes sign language phonological awareness to build deaf students' language and literacy skills, students watch videotexts of signers who use ASL signs, classifiers, visuospatial syntax and phonological structures, and fingerspelling. Fingerspelling in ASL has two forms: native signs, in which selected words are presented through fingerspelling their English equivalent; and non-native signs, in which a unit of fingerspelling has undergone a systematic change in meaning. Native and non-native fingerspelled signs may be viewed as part of the manual alphabetic correspondence between ASL and English as one of the components of reading and writing instruction (Crume, 2013). Students with

Above: Within the Guided Viewing Framework is a series of video viewing levels within each grade viewing level. The grade levels are continuous, and the viewing levels are intended not to be fixed within each grade level as students display a wide distribution of viewing skills.

exposure to phonological aspects through print and access to language through sounds may also use manual alphabetic principle, but it does not act as the best predictor of deaf children's reading fluency. A recent study by Costello et al. (2021) has further demonstrated that skilled deaf readers do not rely on sound-based phonological processing.

Importantly, teachers must first teach students how to view the signer in a videotext, how to understand the narrative, and how to discuss the narrative. Teachers must also teach students the story structure, finding explicit and implicit information in the narrative, making predictions

and inferences, and studying ASL signs, classifiers, visuospatial syntax and phonological structures, and fingerspelling. Holcomb et al. (2021) note, “The human brain segments the sequence of language, spoken or signed, into pieces of phonological units for the purpose of interpreting and connecting linguistic information to meaning. This process of segmentation during language acquisition occurs naturally in the brain if language input is early, accessible, and rich.” Through this process, deaf children develop metalinguistic awareness; that is, they learn to focus attention on ASL as a language and consciously reflect on the nature, structure, and functions of ASL.

- **Fingerspelling**—Fingerspelling is a component of ASL that functions as a bridge to literacy (Stone et al., 2015). Fingerspelling bears a twofold role in ASL: 1) It renders a word in its written form, letter by letter, in the manual alphabet (e.g., H-O-U-S-E, M-O-U-S-E); and 2) it allows the presentation of fingerspelling as lexicalized signs that have undergone a systematic change in form and meaning (e.g., #O-F-F, #B-R-E-A-D).

Deaf children can recognize fingerspelled words before they can read printed words (Morere & Roberts, 2012; Padden & Gunsauls, 2003). Padden (2006) notes that deaf children’s development of fingerspelling goes through two stages of acquisition, which she calls “learning to fingerspell twice.” The first stage involves native signers who learn fingerspelled items as whole units (e.g., #B-U-S, #O-F-F). In the second stage, deaf children learn to segment fingerspelled words into individual handshapes that can be linked to English spelling as children start to learn reading and writing (Padden, 1998). Emmorey and Lee (2021) note the deaf readers’

sensitivity to orthographic codes in reading. While both deaf and hearing readers make use of common neural pathways when reading (e.g., recruiting the left inferior frontal gyrus and the visual word form area), successful deaf readers demonstrate

greater engagement of the right hemisphere for processing visual word forms (Emmorey & Lee, 2021).

While some studies suggest that improving ASL fluency can lead to better English literacy skills (Freel et al., 2011), more research is needed on that issue. Skilled deaf ASL/English bilinguals have been found to achieve higher academic success, but less skilled deaf bilinguals do not have the same level of success (Hrastinski & Wilbur, 2016). The individuals identified as “higher skilled deaf bilinguals” typically had strong mastery of their first language (usually ASL) from a young age and then learned their second language later (Hrastinski & Wilbur, 2016). These findings support Mayberry and Lock’s 2003 study, which demonstrated that adults who acquire a second language later in life with near-native levels had acquired their first language early in life. The critical factor is not which language comes first or whether that language is signed or spoken but rather the level of access, exposure, and mastery that a child is able to achieve.

While teaching deaf children to read through systems that correlate visual systems (e.g., Cued Speech, Visual Phonics) has not been effective for many deaf children, early exposure to ASL seems to provide significant advantages. One of the main advantages involves training eye gaze and attention as well as the use of fingerspelling. These skills drive the development of deaf children’s phonological awareness in sign language. As these young deaf children embark on their literacy journey in the classroom, these pre-literacy skills enable them to more easily succeed in learning how to read and write.

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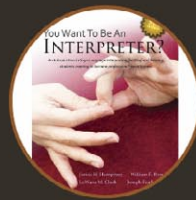
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