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# **ASL Rhyme, Rhythm, and Phonological Awareness for Deaf Children**

*Leala Holcomb*

## **Abstract**

The author, who is of multigenerational Deaf heritage, provides a review of the literature on spoken and signed rhyme, rhythm, and phonological awareness used with young children. While a foundation of knowledge has been built with early language approaches in spoken language, little is known about parallel forms of these approaches in American Sign Language (ASL). ASL rhyme, rhythm, and phonological awareness have historically been absent from early childhood classrooms that serve Deaf children. The author explores why this is the case and draws upon historical events to provide answers. An autoethnographic account of the author's experience with early language approaches as a Deaf child, adult, and early childhood educator is shared. Some directions for future research include examining the effectiveness of ASL rhyme, rhythm, and phonological awareness in improving language and literacy outcomes.

**Keywords:** *rhyme, rhythm, phonological awareness, signed language, American Sign Language, ASL, bilingualism, deaf children, culturally and linguistically relevant pedagogy, culturally and linguistically responsive teaching, deaf pedagogy, early childhood education, deaf, hard of hearing, autoethnography*

## Introduction

Language development is an important part of early childhood education and paves the way to age-appropriate cognitive, linguistic, and socio-emotional development. Phonological awareness is one facet of a child's language journey that has been extensively studied among children who are able to naturally acquire a spoken language through sound and speech. There are myriad techniques geared towards enhancing and ensuring a child's phonological awareness—an example of which is rhyme and rhythm (songs, nursery rhymes, and poems). Rhyme and rhythm not only increase engagement with young children for various learning tasks, but its direct instruction has also shown to benefit phonological awareness development and can also be used as a way to monitor age-appropriate milestones in language growth. Children are exposed to rhyme and rhythm in their own homes: caregivers sing songs, read rhyming books and poems, and make up silly jingles to uplift their children through daily activities. These child rearing techniques serve as the foundation for what has become the accepted canon of early childhood education today—further expanded by evidence-based practices. This long standing linguistic and cultural practice among spoken language communities across the globe have become a mainstay in any early childhood classroom.

The same cannot be said, however, for the early childhood education of Deaf children. While research indicates that all children's brains respond to language stimuli regardless of whether the language input is sound-based or sight-based, Deaf education has not yet integrated American Sign Language (ASL) rhyme and rhythm or ASL phonological awareness into the classroom in the same way as their hearing counterparts. There is no national standardized curriculum in the United States *specifically* for signing Deaf children in early childhood education—the materials were developed by hearing non-signers. When educators of the Deaf are faced with phonological awareness-related activities in their English-based curriculums, they often skip them or try to make direct translations from spoken

English to a visual representation. Regardless of how the curriculum is adapted, culturally and linguistically responsive approaches using ASL rhyme and rhythm created by members of Deaf communities are not being regularly taught. Despite its absence in the classroom, ASL rhyme and rhythm do factor into the early childhood experiences of Deaf children raised in Deaf families. The cultural and linguistic practice that has existed in Deaf homes for generations is just beginning to be translated into actionable resources developed for ASL/English bilingual classrooms in the same way as it was developed for spoken-language classrooms (Crume, 2013; Czubek & Di Perri, 2015; Gietz, 2013; McQuarrie, Abbott, & Spady, 2012b; Snodden, 2011).

In this paper, I begin with the literature on the role of rhyme, rhythm, and phonological awareness for hearing children and then propose parallels in ASL. Next, I offer my own personal autoethnographic experiences as a Deaf child from a multigenerational Deaf family, as a student in an ASL/English bilingual Deaf school, as an early childhood educator, and finally as a researcher exploring the role of ASL rhyme and rhythm for young learners. While sound-based educational systems take for granted the importance of rhyme and rhythm in early childhood education, we are just beginning to make the connection to its importance in the context of visual learning through ASL.

### **Language Development in Early Childhood Education**

Toddlers are able to acquire any native language unconsciously and effortlessly during their first years. Successful language acquisition comes from abundant exposure to meaningful, natural, and enjoyable language input through the ears (speaking/hearing), eyes (signing/seeing), and/or hands (signing/tactile). With accessible language input, toddlers naturally absorb and store linguistic patterns, lexicon, and meaning in their brains (Chomsky, 1965). Joint engagement and imitation are among the first language skills toddlers acquire that lay the foundation for successful social interactions, vocabulary acquisition, and language play (Beuker, Rommelse, Donders, & Buitelaar,

2013). As toddlers partake in joint engagement which builds on eye gaze and attention skills (Lieberman, 2012), they begin to attend to language during interactions with adults. They are captivated by patterns in the environment and begin to imitate sounds or movements. Rhyme and rhythm are known to complement and support these initial stages of development in hearing toddlers (Adamson et al., 2019). Children with higher demonstrations of joint engagement and imitation have increased socio-emotional engagement and communication skills (Farrant, Maybery, & Fletcher, 2011). It is why certain early language approaches are used to spark children's affinity and engagement with language (Danielson, 2000; Mullen, 2017).

The importance of creating a language-rich environment where language input is plentiful, encouraging, and fun to foster successful language acquisition is highlighted in many early childhood programs. When we look at the prevalence of rhyme and rhythm in many—if not all—cultures, it becomes evident that this use of language is a fun and enjoyable experience for both children and adults alike. Hamm, Nettle, and Byrnside (1975) said, "There is no culture known to man, no single civilization of the past, that does not have its own body of music" (p. 71). Anecdotal evidence found in early childhood programs, children's television shows, and familial uses illustrate the ways hearing children are captivated with rhyme and rhythm. Music has been found to increase attention, engagement, imitation, and interaction in hearing children, especially those with disabilities (Gold, Voracek, & Wigram, 2004; Vaiouli, Grimmet, & Ruich, 2015). Given the high importance of activities that include rhyme, rhythm, and phonological awareness in early childhood education, many hearing children receive further specialized training in these areas in addition to the abundance of natural exposure and prior experience with rhyme and rhythm at home (Kuppen & Bourke, 2017; Lim & Chew, 2017; Patscheke, Degé, & Schwarzer, 2016). That is to say: that while rhyme and rhythm occur naturally throughout a hearing child's life, direct instruction and training in the subject is also beneficial and common.

Rhyme and rhythm can provide fun learning experiences when teaching young hearing children about transitions, rules, emotions, family names, animals, days of the week, colors, numbers, and the alphabet. When visiting any early childhood classroom setting, rhyme and rhythm are always heard throughout the day. We may find the teacher leading students in a good morning song to kick off their day in a routine fashion:

Good morning! Good morning! How are you?  
Good morning! Good morning! How are you?  
How are you on this special day?  
We are glad you came to play!  
Good morning! Good morning! How are you?

If we were to stay in the classroom, we would observe—throughout different parts of the day—myriad songs and casual ditties used for various purposes: to signal changes in activities, encourage student behavior, and create a sense of routine and familiarity. Another example of a song used as the class begins to clean up from their last activity and move to story time:

Clean up, clean up, that's what I say  
Clean up, clean up, put stuff away  
Story time, story time, come my way  
Story time, story time, that's what I say

Rhyme and rhythm actually go beyond simply encouraging children to keep their hands to themselves or helping motivate them to clean up the classroom. Research show significant relationships between the use of rhyme and rhythm in the classroom and a child's language and literacy development. There is a positive impact on reading (Baleghizadeh & Dargahi, 2010), engagement (Sandberg, Hansen, & Puckett, 2013), motivation (Lo & Li, 1998), language acquisition (Schön et al., 2008), vocabulary (Read, 2014), memory (Wallace, 1994), metalinguistics (Cazden, 1974), social-emotions (Bodden, 2010), and phonological awareness (Moritz et al., 2013). These hand-crafted or traditional songs exist in the classroom for the purpose of promoting positive language growth and learning.

This brings the question of whether rhyme and rhythm are used in similar ways through ASL and whether similar benefits extend to Deaf learners. While it is known that hearing children are regularly exposed to rhyme and rhythm, it would help to examine what rhyme and rhythm consist of and how they can be manifested in ASL.

### **How Rhythm is Formed**

Rhythm is a pattern created by sound or movement within the human body or even in nature. There is a repetitive consistency within the framework of meter consisting of beats produced through musical instruments and/or syllables in language (Cooper & Meyer, 1960). With spoken language-based songs, rhythm often exists in stressed and unstressed syllables (Bispham, 2006). For example, the constant switch between stressed and unstressed syllables can be heard in this cadence: “Humpty Dumpty sat on a wall, Humpty Dumpty had a great fall.” While most are familiar with this feature of spoken languages, linguists agree that syllables do exist in signed language with the sonority, or pulses, of the segments in signs (Mathur & Rathmann, 2014; Tyrone et al., 2010; Valli & Lucas, 2000). Movement of signs is considered the primary method of producing syllables, which can be unstressed and stressed through holds and/or manipulating the speed and tempo of signing. Furthermore, body and head movements can be moved in sync with the signs to demonstrate consistent visual beats and patterns (Perlmutter, 1993). These movements can be complemented with musical instruments, like a drum, or be entirely independent from such influence. While the word ‘rhythm’ typically brings to mind features of sounds and listening, upon further examination it appears that rhythm transcends sound and listening and is an experience that can be shared visually and tactically. Rhythm can exist as an experience or expression separate from language itself (either spoken or signed). The existence of rhyme—on the other hand—is intertwined with the linguistic structures of the language.

## **How Rhyme is Formed**

A rhyme is formed when phonemes in a language are manipulated in such a way as to create repetition. A phoneme is a linguistic concept to describe the smallest units of language that do not—by themselves—have any meaning. Phonemes are specific sounds in a spoken language or visual parameters in a signed language that are used to build words (Odden, 2005; Mathur & Rathmann, 2014; Stokoe, Casterline, & Croneberg, 1965; Tyrone et al., 2010). In spoken English, there are forty-four phonemes that can be combined in innumerable ways to create words. An example of this is the word ‘hen,’ which has three different phonemes: /h/, /e/, and /n/. The combination of these three phonemes produces the one-syllabic spoken word ‘hen’. In ASL, there are five visual parameters that take part in a signed word: handshape, location, movement, palm orientation, and non-manual marker. Selections of over fifty handshapes along with numerous locations, movements, palm orientations, and non-manual markers are combined to create words. For example, when the X-handshape with palm orientation facing the body is embedded in the up and down movement on the chin, the word ‘red’ is produced (Brentari, Fenlon, & Cormier, 2018; Valli & Lucas, 2000). All languages have phonemes, and when they are compared, contrasted, and examined, this is a part of linguistics called phonology.

With spoken language phonology, rhyme can be analyzed by identifying similar sounds used repeatedly in different words (Maclean, Bryant, & Bradley, 1987). With signed language phonology, rhyme is analyzed and identified within the similarity and repetition of visual parameters, such as handshape or location (Valli, 1990). There are multiple ways to achieve repetition with sound in spoken languages. Two such methods are alliteration and end rhyme (Dowker, 1989). Alliteration is the repetition of the same kind of sound produced at the beginning of words. Here are two popular examples of alliteration in nursery rhyme, which can become tongue twisters:



Peter Piper picked a peck of pickled peppers  
She sells seashells by the seashore

An *end rhyme* is the repetition of the same phonetic sound at the end of words. These lines in the Humpty Dumpty song have an *end rhyme*:

Humpty Dumpty sat on a wall  
Humpty Dumpty had a great fall

While this information is not new in hearing literature, analyses of the ways that rhymes can be formed in ASL are comparatively recent. Valli (1990) was one of the first scholars to analyze aspects of rhyme in ASL, affirming that the foundational linguistic principles of spoken languages also apply to signed languages. Paralleling the example of *alliteration* above: in ASL, the three words 'BLACK', 'MOUSE', and 'BORED' all share one common phoneme among them: the *1-handshape* (a fist made with the index finger outstretched as if indicating the numeral "one" with a gesture). When someone signs these three words one after another (BLACK MOUSE BORED), a visual rhyme is created using the *1-handshape* phoneme, which arguably could be considered as equivalent to the sound rhyme of "*puh*"-sound found in "Peter Piper picked a peck of pickled peppers."

Rhyming in ASL is not limited merely to the handshape parameter or phoneme—it can also be utilized with other phonemic parameters such as the location, movement, palm orientation, or non-manual markers. An example of the *location phoneme* can be seen in these signed words: "COW - DEER - HORSE - RABBIT - DONKEY." All five of these words share the same phoneme in the form of the location on the forehead, which can become a rhyme if incorporated into repeated patterns of sentences. Rhyme is also found in signs that share the same *movement phoneme*, such as the up-and-down movement found in these signed words: "HAT - SCHOOL - CHAIR - WORK."

ASL is just like any other languages, spoken or not, when it comes to the foundation of linguistics that support the creation

of rhyme and rhythm. For hearing children, rhyme and rhythm not only play a critical role in fostering robust language acquisition in toddlers, but also support phonological awareness. The ways rhyme and rhythm complement phonological awareness are explored next, and then connections will be made to similar interventions in ASL.

### **Rhyme, Rhythm, and Phonological Awareness**

Combining both activities—rhyme and rhythm and phonological awareness—can support language and literacy outcomes in hearing children (Bryant, MacLean & Bradley, 1990; Goswami, 2001; Moritz et al., 2013). Because phonological awareness is linked to stronger language and literacy skills, early childhood educators take advantage of the fun that rhyme and rhythm offer while bringing attention to the structures of sound. As hearing children become more aware of language, they are armed with tools necessary to tackle the complex skills involved in learning to read.

### **Spoken Phonological Awareness and Hearing Children**

Phonological awareness in English is the knowledge and understanding of how sound works in the spoken language (Torgesen & Mathes, 1998). Hearing children are able to build knowledge of how words are formed separate from their meaning (Pullen & Justice, 2003). This construct has been operationalized and categorized into a hierarchy based on difficulty by Adams (1990). In the beginning stages, hearing children are able to notice words that share similar sounds. In the latter stages, they are able to break words down into individual sounds, rearrange them, and add new sounds to produce a new word. Once children gain the ability to understand and manipulate sounds in words, they begin applying decoding skills by matching sounds with written letters. The process of decoding letters and blending them into words is an effective approach in learning to read for hearing children (National Early Literacy Panel, 2008). Phonological awareness is a skill that most hearing children naturally acquire through daily social interactions if

they are in a language-rich environment. With ample evidence that rhyme, rhythm, and phonological awareness exposure—starting at birth—contributes to language and literacy development, many early childhood programs implement empirically-based phonological awareness activities (Adams, Foorman, Lundberg, & Beeler, 1998; Bolduc & Lefebvre, 2012; Flett & Conderman, 2002; Williams & Rask, 2003). The activities in these programs include manipulatives that associate letter sounds with phonemes, games focused on long and short sounds, and tasks of blending and segmenting words. Musical instruments, rhythmic activities, listening to songs, clapping to the syllables, singing nursery rhymes, and rhyming pictures are often the highlights of the curricula (Danielson, 2000).

While most children do not need direct instruction in phonological awareness and would be able to achieve the tasks with or without prompts, some children struggle to develop phonological awareness without meaningful intervention and practice. It is a great concern among teachers and interventionists if hearing preschoolers are unable to sing nursery rhymes, count syllables in words, and notice sound repetitions in words as they provide foundational emergent literacy skills (Mann & Foy, 2003). Hearing children with challenges in these skills may have struggles that spill over in other areas of language and literacy. In these cases, teachers develop a systematic plan to address gaps in these students' phonological awareness skills (French & Feng, 1992). Once hearing children develops a strong foundation in phonological awareness along with other prominent language and emergent literacy skills by kindergarten, they begin their literacy pathway (Yop & Yop, 2002).

### **ASL Rhyme, Rhythm, and Phonological Awareness and Deaf Children**

While there is significantly more spoken language-based research on this subject (as is often the case), there is similar evidence that ASL phonological awareness also exists along a continuum of difficulty (Di Perri, 2004) and informs the sequence of tasks in interventions. In Di

Perri's dissertation, the foundations of spoken phonological awareness was utilized to develop parallel ASL phonological awareness activities for Deaf learners. Di Perri collected data on Deaf children's performance in ASL phonological awareness tasks such as: phoneme identification, categorization, differentiation, blending, segmentation, and substitution. Twenty-nine Deaf children between four and eight years old were assessed, and levels of difficulty in the phonological tasks were identified based on their age and performance. The results showed that Deaf children were able to do phonological awareness tasks very well without prior instruction and that there was a strong correlation between scores on the ASL phonological tasks and overall results on English tests (TERA and PIAT-R). Di Perri (2004) said this finding was something that should be "extrapolated on in the classroom by using an instructional approach that uses this vantage point ... which effects the beginning instruction of literacy in the early years for deaf children" (p.164). Although the number of participants in her study is too small to make generalizations, when we consider the body of evidence that ASL shares the foundational linguistic features and attributes of any spoken language, it makes sense for the difficulty of phonological awareness tasks in ASL to parallel spoken English. Typically developing Deaf children can produce similar results in phonological awareness as typically developing hearing children, but through a different language, one that is fully accessible through the eyes.

New studies reveal that the linguistic benefits of rhyme, rhythm, and phonological awareness known to exist for hearing children also extend to Deaf children through ASL. Snodden (2011) interviewed hearing parents engaging in the ASL Parent-Child Mother Goose Program with their Deaf toddlers and noted that parents saw immediate changes in their babies' behavior when exposed to ASL rhyme and rhythm. The babies demonstrated arm and hand movements, changes in facial expressions, laughing, and hand babbling that mirrored hearing babies' responses to sound-based rhyme and rhythm. Crume (2013) found that teachers of the Deaf in an ASL/English

bilingual early childhood program were beginning to experiment with ASL phonological awareness activities in the classroom through rhythmic handshape stories. A teacher shared in an interview that sign rhythm activities were the most beneficial for students with limited language because they were more engaged and motivated to imitate signed words. In another study, it was discovered that Deaf children had higher English vocabulary scores after viewing ASL-English bilingual stories incorporating handshape rhymes (e.g. the leaves fall from the tree) than ASL stories without rhymes (e.g. the girl goes to school) or ASL stories utilizing English word families (e.g. I let my pet get wet) (Gietz, Andrews, & Clark, 2020). McQuarrie and Abbott (2013) suggested that ASL phonology has some kind of influence, possibly an important one, on English literacy development. They looked at ASL phonological awareness skills using their ASL Phonological Awareness Test (currently undergoing the norming process), reading comprehension test scores, and word recognition, and found significant correlations between these three skill areas. In a similar vein, Corina, Hafer, and Welch (2014) looked at ASL phonological awareness to see if there was a correlation with English phonological awareness. Participants with a higher level of ASL phonological awareness had stronger English phonological awareness. Additionally, native signers significantly outperformed late signers. These findings yield information on the untapped potential of ASL rhyme, rhythm, and phonological awareness in supporting language and literacy outcomes in young Deaf learners.

With evidence that has demonstrated the importance of phonological awareness for young children—and how rhyme and rhythm are essential tools in its application—the inquiry can now be shifted to the early childhood education classrooms across the country with Deaf children in mind. Specifically asking: why would it be that rhyme and rhythm are such an integral part of hearing classrooms and not—as we will see—in Deaf education classrooms? The first thought someone from outside the Deaf community may have, when approaching this question is to wonder whether rhyme

and rhythm have any place naturally among Deaf people and their community and culture. It seems self-evident that spoken language communities all share a rich history of rhyme and rhythm, but what of Deaf people?

### **ASL Rhyme and Rhythm in the Deaf Community**

In spite of the fact that ASL rhyme and rhythm have not been commonly used in schools with young Deaf children, it is commonly used within the Deaf communities as evidenced both by published autoethnographic accounts, which I will add to shortly, and by historical artifacts capturing the playful use of the language among Deaf adults. Such linguistic and cultural artifacts from the Deaf communities can be used to identify linguistic features critical in ASL rhyme and rhythm. For example, a Deaf filmmaker, Charles Krauel, filmed one of the earliest uses of ASL rhyme and rhythm in the 1920s. In this one-of-a-kind black and white footage, one can see Deaf people at a football game clapping, swaying their bodies, and signing in a 1-2, 1-2-3 rhythmic percussion:

BOAT - BOAT – BOAT, BOAT, BOAT

DRINK - DRINK – DRINK, DRINK, DRINK

ENJOY - ENJOY – ENJOY, ENJOY, ENJOY (Supalla, 1994)

In this video, rhythm in ASL can be observed through the repetition of same body movements supplementing the signs produced by the signers. However, there are no identifiable rhymes in the handshape of these signs ‘BOAT,’ ‘DRINK,’ and ‘ENJOY’ as they do not share any similar phonological features. The Fight Song is another long-standing ASL song—and likely the most well-known among Gallaudet University students and alumni. As with the example from the 1920s above, the Fight Song also uses the 1-2, 1-2-3 percussion pattern usually accompanied by loud drumbeats. Bahan (2006), who is himself Deaf, described watching original ASL percussion songs being recited by Deaf people at different events such as the Deaf Way II conference in 2002 and local churches. He observed how these

songs incorporated the 1-2, 1-2-3 cadence with some variations. Bahan (2006) said, "Percussion signing may not be as widespread as it used to be in the early part of the twentieth century, but it is far from gone, and it may be riveting in situations that involve the need for sense of unity among a group" (p. 36). These historical documents of original ASL rhyme and rhythm being used by Deaf people demonstrate the cultural value of this practice in the Deaf community. Ranging from Deaf laypeople in casual gatherings to Deaf professional performers travelling around the nation, renditions of ASL stories, poetry, rhyme, and rhythm are commonly seen. Bahan (2006) elaborates, "The cadence of songs usually springs from the way signs are formed (e.g., phonology/morphology) and is visually pleasing.... Although it is difficult to prove, percussion signing may have originated in the DEAF WORLD rather than being modified from the oral medium" (p. 34). More recently, online resources created by Deaf educators and community members are proliferating to expand on ASL literacy and ASL literature (Byrne, 2013; Snoddon, 2011). The ASL Parent-Child Mother Goose Program in Canada and Hands Land in United States developed original, Deaf-centric ASL rhyme and rhythm for young signing audiences (Hands Land, 2014; Ontario Cultural Society for the Deaf, 2008). The Deaf community's rich 'oral' history and tradition of ASL storytelling, poetry, and rhyme and rhythm remain largely anecdotal. It is in my hope that this paper expands on the knowledge of how Deaf adults use ASL rhyme and rhythm with Deaf children to enrich early language experiences, which I will go in depth next.

### **My Autoethnography**

I am Deaf and come from a multigenerational Deaf family—from my nieces and nephews all the way to my great-grandparents there is an unbroken lineage of Deaf relatives. As a child, my Deaf parents would sing songs to me and my Deaf siblings. There was a song for every occasion: bedtime, bath time, ice cream time, holiday jingles, and other special moments. Some songs were spontaneous while

others were traditional marking an event. Some were meant to be funny, others touching, or instructional. Every night, my parents would sing to me using the closed B handshape rhyme in the first two lines:

GOOD NIGHT – GOOD NIGHT  
[swaying the body right to left]  
SWEET – SWEET  
[shaking the head quickly in a rhythmic motion]  
LEALA  
[pausing at the end]  
I  
[signing big and slowly]  
LOVE  
[shaking the head quickly in a rhythmic motion]  
YOU  
[twirling the finger slowly until it touches and tickles  
my tummy]

Rhyme and rhythm were a part of my upbringing—albeit in a way that may appear from the outside to be quite different from a typical hearing child. However, based on what we know from the literature review, the underlying linguistic foundations of my childhood were similar to any other hearing child. It is worth emphasizing that my upbringing was not unique among Deaf children with Deaf parents (although that, in and of itself, is unique among the majority of Deaf children who are born to hearing parents). From my own observations and reflections on my own life, combined with personal conversations and findings uncovered during workshops across the country on this topic, I can state that rhyme and rhythm are a naturally occurring feature of the signing Deaf community.

These childhood rhyme and rhythm are still part of me today, and I share them with my children, nieces, and nephews. Because the current generation of Deaf people, of which I am a part, have greater linguistic knowledge of ASL than our parents and grandparents did,



we have more tools at our disposal to experiment with language play through ASL. My sibling and I create songs for our children that are intentionally designed to help them understand the world around them, increase parent-child bond, regulate social-emotions, and make language acquisition fun and engaging. For example, we developed this ASL rhyme and rhythm using the 2-3 percussion pattern to help minimize a two-year-old child's separation anxiety when some family members left for work or school.

DAD - DAD - WORK, WORK, WORK  
 MOM - MOM - TAKE CARE, TAKE CARE, TAKE CARE  
 BROTHER - BROTHER - SCHOOL, SCHOOL, SCHOOL  
 YOU - YOU - PLAY, PLAY, PLAY  
 BABY - BABY - GROW, GROW, GROW  
 FAMILY!

Rhymes can be found in the location of signing, which occurred when both hands touched in these signed words - 'work,' 'take care,' 'school,' and 'grow.' Another example is this bonding activity that required collaborative signing to create song and meaning. The child and I would put together our hands using specific handshapes to complete words:

[The child begins with a 1-handshape]  
 SPECIAL – YOU  
 [I use my own F-handshape to pinch and raise theirs]  
 [My turn to start with the 1-handshape]  
 SPECIAL — YOU  
 [The child uses their own F-handshape to pinch and  
 raise mine]  
 SPECIAL - FAMILY!  
 [Both signed words use the F-handshape]

Rhymes can be found in the recurring use of F-handshape across different signed words. While changing diapers, we would sing a song to help pass time and make the experience less distressing for the child:

DIAPERS - DIAPERS - STINK, STINK, STINK  
 DIAPERS - DIAPERS - CHANGE, CHANGE, CHANGE  
 DIAPERS - DIAPERS - CLEAN, CLEAN, CLEAN

While there are no rhymes in this song, rhythms can be found in the stressed and unstressed holds of the signed words. We also played language games where the child picked an animal, and we would spontaneously create rhymes off that signed word. If the child said, "LION," we would use the claw-handshape throughout the song:

LION - LION - HUNGRY, HUNGRY, HUNGRY  
 [claw-handshape]  
 LION - LION - SEARCH, SEARCH, SEARCH  
 [claw-handshape]  
 LION - LION - RUN, RUN, RUN  
 [claw-handshape]  
 LION - LION - CHOMP, CHOMP, CHOMP  
 [pretending to bite the child's arm]

We promoted number concepts by singing following the ordinal pattern of one, two, three, four, and five and using the same handshape and movement in each string:

ONE - MOUSE - RUN, RUN, RUN  
 [1-handshape]  
 TWO - RACCOONS - RUN, RUN, RUN  
 [2-handshape]  
 THREE - ROOSTERS - RUN, RUN, RUN  
 [3-handshape]  
 FOUR - ZEBRAS - RUN, RUN, RUN  
 [4-handshape]  
 FIVE - DEERS - RUN, RUN, RUN  
 [5-handshape]

Any chance we get to have fun with ASL, we would spontaneously produce rhyme and rhythm in the train station, at a restaurant, during a car ride, or at home. I often find the children bobbing their head to a rhythm and signing ASL rhyme and rhythm to themselves.

It was not—in fact—until I began working myself as an early childhood educator in a classroom with other teachers of the Deaf that I began to realize how utterly *excluded* rhyme and rhythm were from the ASL/English bilingual classroom. It seemed only natural to me that the same organic transition of language play with rhyme and rhythm that had occurred from *hearing* families to the *hearing* classroom should have also manifested itself in the Deaf classroom. But it had not. Why were the natural language tools used among Deaf families not being incorporated into Deaf education in the same way they had been with hearing classrooms? What might happen to the phonological awareness skills and general literacy abilities of Deaf children if we began to incorporate them?

These questions, among others, were raised as I began teaching in an early childhood classroom, and they were what sparked my journey into what would eventually be my experimental research into how incorporating ASL rhyme, rhythm and phonological awareness in Deaf education could impact the language experiences of young Deaf children. Before going into how I set about investigating answers to these questions, it is important that we understand the history of Deaf education in the United States, why ASL rhyme and rhythm are conspicuously absent in early childhood classrooms, and my current position in education as a Deaf person impacted by the history.

### **A Brief History of Deaf Education**

The initial approach to Deaf education in the nineteenth century—which, it could be argued, was largely *of, for, and by* Deaf people themselves through the formation of signing Deaf schools—was disrupted in 1880 at the Second International Congress on Education of the Deaf (ICED), commonly known as the *Milan conference* (Gannon, 2011). A resolution was passed which abandoned the preferred educational and language modality of Deaf people in the USA (signed language) with one preferred by the hearing majority at the international conference (spoken language). This conference had marked a turning

point in the United States, where Deaf education would no longer be something that came from Deaf people and their own community but, instead, instruction and method would be designed for them by hearing non-signers. As a consequence, the use of ASL in schools began to dissipate and eventually vanish altogether as students were eventually forbidden from using it (Holcomb, personal communication; O'Connell & Deegan, 2014). As ASL was extricated from Deaf education, so too were the very Deaf people who had served as teachers, administrators, and role models to the Deaf student body. Hearing professionals took their place and had complete institutional authority over Deaf people's lives. The link between the common practices of Deaf families and Deaf members of the Deaf community and the educational system was broken.

In 1960s, new linguistic research asserted that ASL was a fully formed and valid language (Stokoe, Casterline, & Croneberg, 1965). This factor, among others, launched a slow beginning to a new era in Deaf education: one that saw the emergence of signed language being reintroduced to the classroom in various forms. Eventually, as time went on, more Deaf people returned to the fold of Deaf education—a place where they had previously been exiled. A handful of programs began to shift toward a fuller inclusion of ASL in the classroom with the emergence of the ASL-English bilingual movement in the 1990s led by Deaf educators and their allies (Humphries, 2013).

As bilingualism in Deaf education in the 1990s began to expand, I personally entered the early childhood education system at the California School for Deaf in Fremont as a toddler. It was again at this same program, twenty years later, that I worked as an educator and began to explore whether ASL rhyme and rhythm may further enhance Deaf children's language experiences. This is the historical context in which I began to observe the very fact that even in a prominent bilingual and progressive ASL-English bilingual Deaf school, there was only basic and emerging reference to ASL rhyme or rhythm in the curriculum in the early-2010s. This school, like many

others, was and is still grappling with the consequence of the Milan conference and the takeover of Deaf education by hearing professionals, which is something that has taken, and probably will take, generations of Deaf people to undo. As we have seen, rhyme and rhythm naturally occur in both hearing and Deaf families; however, rhyme and rhythm have only made its way in earnest into hearing classrooms. This exclusion was something I had hoped to address with the Deaf epistemology (way of knowing) that I had inherited through my Deaf parents, grandparents, and great-grandparents (Hauser et al., 2010; Holcomb, 2010). My first step was to investigate current practices as they relate to rhyme and rhythm in ASL/English bilingual early childhood classrooms.

### **English to ASL: Lost in Translation**

Standard ASL or bilingual curriculum is sporadic and novel in Deaf education (Czubek & Di Perri, 2015). Teachers of the Deaf typically follow standardized English-based curriculums for their classroom instructional activities. Since English-based songs and rhyming activities are heavily incorporated in these curricula, teachers either attempt to sign English-based songs word for word or just skip them altogether. The problem with signing songs in English is that the linguistic and cognitive benefit of exposing Deaf children to rhyme and rhythm is often lost in translation (Andrews & Baker, 2019; Mather & Winston, 1998). The phonemes of English do not rhyme with the phonemes of ASL and vice versa. For example, if a teacher translated the English song into ASL and signed word-for-word—or even if they translated it into ASL syntax—“She sells seashells down by the seashore,” no ASL rhyme could be found in any of the signs for these words. Furthermore, the “s” emphasis on sound is often lost on the Deaf child, making the entire utterance meaningless. Inversely, if a teacher translated an ASL song that is rich in rhymes into English and spoke, “BLACK MOUSE BORED,” no English rhyme could be found in any of these spoken words, and the linguistic benefit of this phonological play in ASL would be lost

on a non-signer. This shows how the linguistic allure of both ASL and English rhyme can easily get lost in translation, robbing it of its intended impact on the child's linguistic development. Rhyme and rhythm, or phonological play, are inherently language specific. A different approach to rhyme and rhythm that is centered on Deaf ways of learning is necessitated.

As rhyme and rhythm originated in families before its adoption in education, I drew upon my Deaf family's cultural practices by exploring ASL phonology and how it could manifest in ASL rhyme and rhythm. I started simply by creating original ASL rhyme and rhythm for my classroom, using different phonemic patterns found in ASL phonology to sing about transitions, numbers, colors, animals, and seasons. When students arrived in my classroom, I sang a call to response song using the 1-handshape and B-handshape along with the repeated circular movement found in these signed words – 'happy' and 'here'. I swung my body right to left following the beat of the drum.

HELLO! – HELLO!

I – HAPPY - I – HERE

I – HAPPY - YOU – HERE

[pointing to a student]

[that student takes a turn to sing the same lines above]

HELLO! HELLO!

I – HAPPY - I – HERE

I – HAPPY - YOU – HERE

[pointing to another student]

[that student takes a turn to sing the same lines above]

This is an example of how ASL rhyme and rhythm can promote positive transitions in the early childhood classroom. Then, I would introduce a new unit by signing a song that aligned with the themes and vocabulary found in the lesson. Here is such example of an ASL song using 1-handshape and X-handshape that was developed to supplement the insects unit:



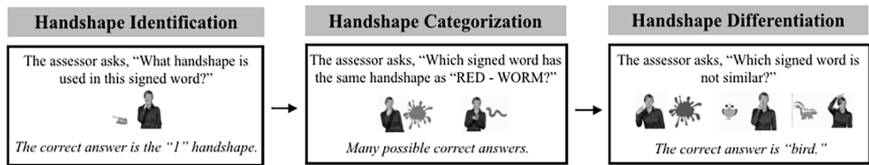
**Figure 1.** *Handshape Rhymes*

The light in my students' eyes, especially those who experienced language deprivation (not fluent in any language due to spoken language being inaccessible to them and having minimal exposure to signed language), is unforgettable. My students imitated a lot more, became more engaged in language activities, and was overall in a better mood. Although they were visibly engaged to ASL rhyme and rhythm and enjoyed imitating, I noticed they did not quite capture or appreciate the phonemic features of the rhyming signed words. Wanting to increase their phonological awareness, I started to supplement the ASL rhyme and rhythm with ASL phonological awareness activities.

### **ASL Phonological Awareness Intervention**

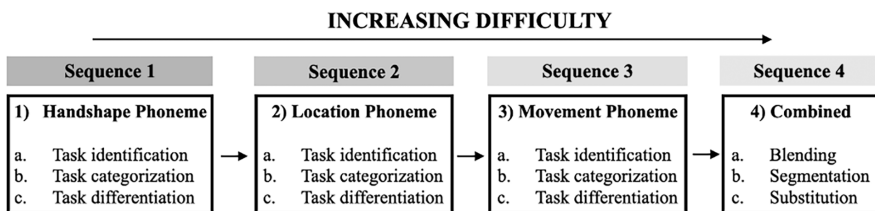
I provided a daily fifteen-minute direct instruction in ASL phonological awareness, following the sequence of difficulty in tasks. The lessons were similar to what was commonly found in spoken phonological awareness programs. With handshape identification, I would sign 'MOUSE' with the 1-handshape and then ask what handshape was used in this signed word. If the child were able to provide the correct answer, which is the '1' handshape, then they are ready to move onto the next task - handshape categorization. I would ask which signed word has the same handshape as 'RED' and 'WORM' with the X-handshape. The child would respond with examples like 'SUMMER', 'CRY', or any other signed words that use the 'X' handshape. Handshape differentiation is the last task in the sequence of handshape awareness. I would ask the child to tell me which signed word has a different handshape: 'PURPLE,' 'BIRD,' AND

‘SKUNK’. The correct answer in this case would be bird because it does not share the same ‘K’ handshape as purple and skunk.



**Figure 2.** Examples of ASL Phonological Awareness Task Handshape Sequence

I would repeat the procedure with other types of ASL phonemes such as location, movement, and non-manual markers. For example, I would expose my students to ASL rhyme and rhythm that stress the specific ASL phoneme and then engage them in phonological awareness activities on that phoneme such as identification, categorization, and differentiation. Once my students become aware of the role of different phonemes in rhyming activities, I would start challenging them with more complex tasks that involve two or more phonemes such as blending, segmenting, and substituting.



**Figure 3.** Sequence of Signed Phonological Awareness Skills (Di Perri, 2004)

After receiving favorable feedback from teachers, students, and families about this practice, I sought to expand this knowledge outside of a single school program and make it available to other schools across the country. As part of this effort, a new company was created in 2015 called Hands Land, which I along with two other Deaf founders took part. The primary goal of Hands Land was to bring Deaf people together to lean on our Deaf epistemologies and



heritage language to develop original ASL rhyme and rhythm for young signers (Moses, Golos, & Holcomb, 2019). Between 2018-2020, we released thirty ASL rhyme and rhythm videos on Amazon and provided professional development to Deaf schools and programs. The reviews people left on Amazon portray the great gap in Deaf children's language experiences that needed to be filled, especially for hearing families and educators.

Review #1: It can be difficult or time-consuming to try and find a way to incorporate ASL rhythm and rhyme into a classroom and finally a resource that is fun for kids! This is parallel to nursery rhymes and silly songs in English which help language acquisition and encourage children to play with language.

Review #2: We bought all of the videos for our Deaf son, and at three months old, he is already fascinated with the videos- analyzing all of the possible movements, and we love the ASL rhythms!

Review #3: As a hearing parent my ASL skills aren't strong enough to come up with these kind of rhymes myself. It's helping my son's language development and I like the repetition and practice. It's so very clearly signed and my son loves it.

Review #4: I've been using it with a young elementary child (with delayed language) and it's been amazing to see this student come out of their shell and copy what is being said! Great for so many skills!

Review #5: This builds language and phonemic awareness in ASL. This is a critical piece of language development that many Deaf/Hard of Hearing Children miss.

Creating new resources is an enormous undertaking; finding evidence of the impact these resources is another. I was especially interested in producing empirical knowledge of the effects of ASL rhyme and rhythm on language acquisition and emergent literacy. It was important to me that my research was done "with" or even "by" rather than "on" Deaf individuals, leveraging the cultural capital and funds of knowledge of the Deaf community (Singleton, Jones, & Hanumantha, 2017)

## **Experimental Studies**

For my dissertation, I ran two experimental studies using the single subject design to examine the effects of ASL rhyme and rhythm on Deaf children's engagement behavior and accuracy in recitation. My participants were Deaf preschoolers between three and six years old in an ASL/English bilingual program. I showed them non-rhyming ASL stanzas and rhyming ASL stanzas and examined their engagement during viewing and words recited in the correct order after viewing. I found that Deaf children, including those with language delays, spontaneously imitated the rhyming ASL stanzas far more than the non-rhyming ASL stanzas, which has significant implications as imitation is an integral part of the stepping blocks of language acquisition as discussed earlier in this paper. As predicted, all Deaf children in my study, regardless of their language backgrounds, were oblivious to the existence of rhymes in rhyming ASL stanzas. This became apparent during the task of recitation as each child did not remark on how different signed words shared the same rhyming handshape nor did they rely on handshape rhymes as clues of what words should come next while reciting. The apparent lack of phonological awareness in this group of Deaf children differed from what was typical for hearing children of similar ages.

After providing this pair of 20-minute handshape rhyme awareness instruction, Deaf children with age-appropriate language skills quickly acquired rhyme awareness, as demonstrated by their ability to recite the whole rhyming ASL stanzas verbatim on their first or second try, often relying on handshape rhymes as clues of what words should come next. This finding is powerful when thinking about the natural and abundant experiences of rhyme, rhythm, and phonological awareness that hearing children have, leading them to succeed in rhyme awareness, language and literacy. It does not take much exposure (only two 20-minute lessons) to see a dramatic change in the way some Deaf children recite ASL rhyme and rhythm. Their initial lack of awareness corresponds with the

current literature regarding daily barriers and limitations among many young Deaf children in accessing ASL rhyme, rhythm, and phonological awareness in early childhood education.

Considering that rhyme and rhythm are so heavily integrated in hearing children's early experiences (both in the classroom and at home), it is worth remembering that those children are still *taught*—through direct instruction—about the existence of rhymes in language. Due to the novelty of embracing Deaf cultural ways of promoting language development in early childhood education, many Deaf children, even in ASL/English bilingual schools, have not been socialized or taught in the same way as hearing children. However, the tides are changing with new research showing the benefits of early exposure to ASL (Cheng et al., 2019; Clark et al., 2020; Davidson, Lillo-Martin, & Chen Pichler, 2013; Ferjan Ramirez et al., 2013; Friedmann & Rusou, 2015; Hall, 2017; Marshall et al., 2015; Penicaud et al., 2013; Petitto et al., 2016; Wilkinson & Morford, 2020). Professionals, educators, and families are increasingly enthusiastic to capitalize on the linguistic capitals found in the Deaf community. It is a prime time to fully investigate the role of ASL rhyme, rhythm, and phonological awareness in young learners' language and literacy development.

### **Future Directions on ASL Rhyme, Rhythm, and Phonological Awareness**

Many questions continue to remain that I anticipate pursuing. How do Deaf parents use ASL rhyme and rhythm and engage in language play with their children at home? How does this practice benefit parent-child relationship? What kind of coaching support hearing non-signing parents need to provide this practice for their Deaf children at home? What kinds of ASL rhyme and rhythm are the most alluring to Deaf children? Which phonemes (e.g. handshape, location, movement, palm orientation, and non-manual markers) are the most salient in supporting language acquisition at specific ages? What are the milestones of rhyme awareness during Deaf

children's first few years? What is the significance of rhyme awareness in supporting language development? How are teachers of the Deaf currently promoting ASL phonological awareness in early childhood classrooms? Which instructional approaches are the most effective in increasing ASL phonological awareness? Do ASL rhyme, rhythm, and phonological awareness have parallel types of influence in the areas of attention, engagement, imitation, memory, metalinguistic awareness, language play, vocabulary, literacy, and social-emotions? Do Deaf children of varying ages receiving ASL rhyme, rhythm, and phonological awareness interventions have stronger language, emergent literacy, and/or literacy skills? Do ASL rhyme, rhythm, and phonological awareness build metalinguistic awareness that supports the process of learning English? How do Deaf children use their linguistic knowledge in ASL to learn English? What about those who experience language deprivation? Can ASL rhyme and rhythm increase receptive and expressive language in young and older Deaf students with extremely limited language? Indeed, we are at a fascinating juncture of language and literacy research when it comes to ASL rhyme, rhythm, and phonological awareness.

## **Conclusion**

Deaf epistemologies, or ways of knowing, have not been embraced by most people who make decisions related to Deaf education. Paulo Freire presents a critical theory in education that the oppressed cannot be liberated if they rely on the pedagogy of their oppressors. Only the oppressed have the power to liberate themselves because only they can truly understand the need for liberation. Once the oppressed gain knowledge of the course of history, they can translate this knowledge into action by developing their own educational practices to sustain their language, culture and values, and ultimately end oppression (Freire, 1972).

Critical Deaf pedagogy provides Deaf educators and researchers opportunities to scrutinize history and detect how the system has

hindered Deaf children from accessing certain cultural and linguistic practices. Indeed, Deaf children are at risk for language and literacy delays, not necessarily because they do not hear but rather because people surrounding them are often unable to provide them with appropriate and early access to language. A body of research has been built to affirm the significance of exposing hearing children to spoken rhyme, rhythm, and phonological awareness for successful language and literacy outcomes. Yet, despite these same tools being used in Deaf families and communities, parallel forms of ASL rhyme, rhythm, and phonological awareness are relatively new to most Deaf education programs. Deaf people like myself aim to start inching towards liberation by setting up small educational projects to bring culturally and linguistically responsive practices that can liberate the oppressed, and eventually, change society for better. When Deaf people have ownership of Deaf pedagogy and the research process, the spirit of inquiry and discovery can be used as part of the emancipatory effort to inform social policy and practice that bring equity to Deaf children's early language experiences.

## References

- Adams, M. J., Foorman, B. R., Lundberg, I., & Beeler, T. (1998). *Phonemic awareness in young children: A classroom curriculum*. Baltimore, MD: Brookes Publishing.
- Adams, M. J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: The MIT Press.
- Adamson, L. B., Bakeman, R., Suma, K., & Robins, D. L. (2019). Sharing sounds: The development of auditory joint engagement during early parent-child interaction. *Developmental Psychology*, 55(12), 2491-2504. doi:<http://dx.doi.org.proxy.lib.utk.edu/90/10.1037/dev0000822>
- Andrews, J. F., & Baker, S. (2019). ASL nursery rhymes: Exploring a support for early language and emergent literacy skills for signing deaf children. *Sign Language Studies*, 20(1), 5-40.
- Baleghizadeh, S., & Dargahi, Z. (2010). The effects of nursery rhymes on EFL children's reading ability. *New England Reading Association Journal*, 46(1), 71.

- Bispham, J. (2006). Rhythm in music: What is it? Who has it? And why?. *Music Perception*, 24(2), 125-134.
- Bodden, V. (2010). *Poetry basics: Nursery rhymes*. Mankato, MN: Creative Education.
- Bolduc, J. E., & Lefebvre, P. A. E. (2012). Using nursery rhymes to foster phonological and musical processing skills in kindergarteners. *Creative Education*, 3(4), 495-502.
- Brentari, D., Fenlon, J., & Cormier, K. (2018). Sign language phonology. Oxford Research Encyclopedias. DOI: 10.1093/acrefore/9780199384655.013.117.
- Bryant, P., Maclean, M., & Bradley, L. (1990). Rhyme, language, and children's reading. *Applied Psycholinguistics*, 11(3), 237-252. <https://doi.org/10.1017/S0142716400008870>.
- Burling, R. (1966). The metrics of children's verse: A cross-linguistic study. *American Anthropologist*, 68(6), 1418-1441. Retrieved from JSTOR.
- Byrne, A. P. J. (2013). *American Sign Language (ASL) literacy and ASL literature: A critical appraisal*. Unpublished Doctoral Dissertation. York University.
- Cazden, C. B. (1974). Play and metalinguistic awareness: One dimension of language experience. *The Urban Review*, 7(1), 28-39. <https://doi.org/10.1007/BF02223202>.
- Cheng, Q., Roth, A., Halgren, E., & Mayberry, R. (2019). Effects of early language deprivation on brain connectivity: Language pathways in deaf native and late first-language learners of American Sign Language. *Frontiers in Human Neuroscience*, 13.
- Chomsky, N. (1965). *Aspects of the theory of syntax* (50th ed.). Cambridge, MA: The MIT Press. JSTOR.
- Clark, D. M., Cue, K. R., Delgado, N. J., Greene-Woods, A. N., & Wolsey, J. A. (2020). Early intervention protocols: Proposing a default bimodal bilingual approach for deaf children. *Maternal and Child Health Journal*.
- Cooper, G., & Meyer, L. B. (1960). *The rhythmic structure of music*. Chicago, IL: University of Chicago Press.
- Corina, D. P., Hafer, S., & Welch, K. (2014). Phonological awareness for american sign language. *Journal of Deaf Studies and Deaf Education*, 19(4), 530-545.
- Crume, P. K. (2013). Teachers' perceptions of promoting sign language phonological awareness in an ASL/English bilingual program. *The Journal of Deaf Studies and Deaf Education*, 18(4), 464-488. <https://doi.org/10.1093/deafed/ent023>.
- Czubek, T., & Di Perri, K. (2015). Bilingual grammar curriculum: ASL and English.
- Danielson, E. (2000). *The importance of nursery rhymes*. Retrieved from <https://eric.ed.gov/?id=ED442117>.
- Davidson, K., Lillo-Martin, D., & Chen Pichler, D. (2013). Spoken English language development among native signing children with cochlear implants. *Journal of Deaf Studies and Deaf Education*.

- Di Perri, K. (2004). *ASL phonemic awareness in deaf children: Implications for instruction*. Unpublished Doctoral Dissertation, Boston University.
- Dowker, A. (1989). Rhyme and alliteration in poems elicited from young children. *Journal of Child Language*, 16(1), 181–202. <https://doi.org/10.1017/S0305000900013507>.
- Farrant, B. M., Maybery, M. T., & Fletcher, J. (2011). Socio-emotional engagement, joint attention, imitation, and conversation skill: Analysis in typical development and specific language impairment. *First language*, 31(1), 23–46.
- Ferjan Ramirez, N., Leonard, M. K., Torres, C., Hatrak, M., Halgren, E. & Mayberry, R. I. (2013). Neural language processing in adolescent first-language learners. *Cerebral Cortex*.
- Flett, A., & Conderman, G. (2002). Promote phonemic awareness. *Intervention in School and Clinic*, 37(4), 242–245. <https://doi.org/10.1177/105345120203700409>.
- Friedmann, N., & Rusou, D. (2015). Critical period for first language: the crucial role of language input during the first year of life. *Current Opinion in Neurobiology* 35, 27–34.
- Freire, P. (1972). *Pedagogy of the oppressed*. New York, NY: Penguin Books.
- French, V. L., & Feng, J. (1992). Phoneme awareness training with at-risk kindergarten children: A case study. Retrieved October 5, 2017, from ERIC database. (ERIC Document Reproduction Service No. ED361120).
- Gannon, J. (2011). *Deaf Heritage: A Narrative History of Deaf America*. Washington, DC: Gallaudet University Press.
- Gietz, M. R. (2013). *ASL handshape stories, word recognition and signing deaf readers: An exploratory study*. ProQuest LLC. 789 East Eisenhower Parkway, PO Box 1346, Ann Arbor, MI 48106.
- Gietz, M. R., Andrews, J. F., & Clark, M. D. (2020). ASL stories with handshape rhyme: An exploratory intervention to support english vocabulary with signing deaf readers. *Archives of Psychology*, 4(2).
- Gold, C., Voracek, M., & Wigram, T. (2004). Effects of music therapy for children and adolescents with psychopathology: a meta-analysis. *Journal of Child Psychology and Psychiatry*, 45(6), 1054–1063.
- Goswami, U. (2001). Early phonological development and the acquisition of literacy. *Handbook of Early Literacy Research*, 1, 111–125.
- Hall, W. (2017). What you don't know can hurt you: The risk of language deprivation by impairing sign language development in deaf children. *Maternal and Child Health Journal*, 21(5), 961–965.
- Hamm, C., Nettl, B., & Byrnside, R. L. (1975). *Contemporary music and music cultures*. Englewood Cliffs, NJ: Prentice-Hall.

- Hauser, P. C., O'Hearn, A., McKee, M., Steider, A., & Thew, D. (2010). Deaf epistemology: Deafhood and deafness. *American Annals of the Deaf*, 154(5), 486-492.
- Holcomb, L., McMillan, J. and Higgins, M. (2018). *Hands Land. Educational videos that use ASL rhymes and rhythms*. <https://www.amazon.com/Hands-Land/dp/B07FYWRP9Y>.
- Holcomb, T. K. (2010). Deaf epistemology: The deaf way of knowing. *American Annals of the Deaf*, 154(5), 471-478; discussion 493-496.
- Humphries, T. (2013). Schooling in american sign language: A paradigm shift from a deficit model to a bilingual model in deaf education. *Berkeley Review of Education*, 4(1). <https://doi.org/10.5070/B84110031>.
- Kuppen, S. E. A., & Bourke, E. (2017). Rhythmic rhymes for boosting phonological awareness in socially disadvantaged children. *Mind, Brain, and Education*, 11(4), 181-189. <https://doi.org/10.1111/mbe.12148>.
- Lim, C. T., & Chew, F. P. (2017). Using poems to increase phonological awareness among children. *Issues and Trends in Interdisciplinary Behavior and Social Science*, 22-23. <https://doi.org/10.1201/9781315148700-5>.
- Lieberman, A. (2012). *Eye gaze and visual engagement*. Visual Language and Visual Learning Science of Learning Center. (Research Brief No. 5). Washington, DC: Gallaudet University.
- Lo, R. S. M., & Li, H. C. F. (1998). Songs enhance learner involvement: Materials development. *Forum*, 36(3).
- Maclean, M., Bryant, P., & Bradley, L. (1987). Rhymes, nursery rhymes, and reading in early childhood. *Merrill-Palmer Quarterly*, 33(3), 255-281.
- Mann, V. A., & Foy, J. G. (2003). Phonological awareness, speech development, and letter knowledge in preschool children. *Annals of Dyslexia*, 149-173.
- Marshall, C., Jones, A., Denmark, T., Mason, K., Atkinson, J., Botting, N., & Morgan, G. (2015). Deaf children's non-verbal working memory is impacted by their language experience. *Frontiers in Psychology*, 6(527).
- Mather, S., & Winston, E. A. (1998). Spatial mapping and involvement in ASL storytelling. In C. Lucas (Ed.), *Pinky Extension and Eye Gaze: Language Use in Deaf Communities* (pp. 183-210). Washington, DC: Gallaudet University Press.
- Mathur, G., & Rathmann, C. (2014). The structure of sign languages. *The Oxford handbook of language production*, 379.
- McQuarrie, L., Abbott, M., & Spady, S. (2012b). *American sign language phonological awareness test*. Poster presented at the 10th Annual Hawaii International Conference on Education, Honolulu, Hawaii.



- Moritz, C., Yampolsky, S., Papadelis, G., Thomson, J., & Wolf, M. (2013). Links between early rhythm skills, musical training, and phonological awareness. *Reading and Writing*, 26(5), 739–769. <https://doi.org/10.1007/s11145-012-9389-0>.
- Moses, A., Golos, D., and Holcomb, L. (2018). Creating and using educational media with a cultural perspective of deaf people. *Language Arts*. 96(1). 67.
- Mullen, G. (2017). More than words: Using nursery rhymes and songs to support domains of child development. *Journal of Childhood Studies*, 42(2), 42–53. <https://doi.org/10.18357/jcs.v42i2.17841>.
- National Early Literacy Panel. (2008). *Developing early literacy: Report of the national early literacy panel*. Washington, DC: National Institute for Literacy.
- Odden, D. (2005). *Introducing phonology*. Cambridge, UK: Cambridge University Press.
- O'Connell, N. P., & Deegan, J. (2014). “Behind the teacher’s back”: An ethnographic study of deaf people’s schooling experiences in the republic of ireland. *Irish Educational Studies*, 33(3), 229–247. <https://doi.org/10.1080/03323315.2014.940683>.
- Ontario Cultural Society for the Deaf. (2008). *The ASL parent-child mother goose program: ASL rhymes, rhythms and stories*. Mississauga, Ontario: Ontario Cultural Society for the Deaf. <https://ocsdeaf.org/>
- Patscheke, H., Degé, F., & Schwarzer, G. (2016). The effects of training in music and phonological skills on phonological awareness in 4- to 6-year-old children of immigrant families. *Frontiers in Psychology*, 7. <https://doi.org/10.3389/fpsyg.2016.01647>
- Pénicaud, S., Klein, D., Zatorre, R. J., Chen, J., Witcher, P., Hyde, K., & Mayberry, R. (2013). Structural brain changes linked to delayed first language acquisition in congenitally deaf individuals. *NeuroImage*, 66, 42-49.
- Perlmutter, D. M. (1993). Sonority and syllable structure in american sign language. In G. R. Coulter (Ed.), *Phoentics and Phonology: Current Issues in ASL Phonology* (Vol. 3, pp. 227–261). <https://doi.org/10.1016/B978-0-12-193270-1.50016-9>
- Pullen, P. C., & Justice, L. M. (2003). Enhancing phonological awareness, print awareness, and oral language skills in preschool children. *Intervention in School and Clinic*, 39(2), 87-98.
- Read, K. (2014). Clues cue the smooze: Rhyme, pausing, and prediction help children learn new words from storybooks. *Frontiers in Psychology*, 5, 149. <https://doi.org/10.3389/fpsyg.2014.00149>
- Sandberg, H., Hansen, C., & Puckett, K. (2013). Increasing engagement through music and movement. *Academic Exchange Quarterly*, 17(4).
- Schön, D., Boyer, M., Moreno, S., Besson, M., Peretz, I., & Kolinsky, R. (2008). Songs as an aid for language acquisition. *Cognition*, 106(2), 975–983. <https://doi.org/10.1016/j.cognition.2007.03.005>

- Singleton, J., Jones, G., & Hanumantha, S. (2017). Deaf community involvement in the research process: An examination of barriers and strategies in research in deaf education. In S. W. Cawthon & C. L. Garberoglio (Eds.), *Research in Deaf Education: Contexts, Challenges, and Considerations* (pp. 75–92). New York, NY: Oxford University Press.
- Snodden, K. (2011). Action research with a family ASL literacy program. *Writing and Pedagogy*, 3(1), 265-288.
- Stokoe, W. C., Casterline, D., & Croneberg, C. (1965). *A dictionary of american sign language on linguistic principles*. Linstok Press: Silver Spring, MD.
- Supalla, T. (1994). *Charles krauel: A profile of a deaf filmmaker*. Dawn Sign Press.
- Torgesen, J. K., & Mathes, P. G. (1998). *What every teacher should know about phonological awareness*. Tallahassee, FL: Florida Department of Education.
- Tyrone, M. E., Nam, H., Saltzman, E., Mathur, G., & Goldstein, L. (2010). Prosody and movement in American Sign Language: A task-dynamics approach. In *Speech Prosody 2010-Fifth International Conference*.
- Vaiouli, P., Grimmet, K., & Ruich, L. J. (2015). “Bill is now singing”: Joint engagement and the emergence of social communication of three young children with autism. *Autism*, 19(1), 73-83.
- Valli, C., & Lucas, C. (2000). *Linguistics of american sign language: An introduction*. Washington DC: Gallaudet University Press.
- Valli, C. (1990). Sign language research 1987: Papers from the fourth international symposium on sign language research. In *The nature of the line in ASL poetry* (pp. 171–182). Hamburg: Signum Verlag.
- Wallace, W. T. (1994). Memory for music: Effect of melody on recall of text. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 20(6), 1471–1485. <https://doi.org/10.1037/0278-7393.20.6.1471>.
- Wilkinson, E., & Morford, J. P. (2020). How bilingualism contributes to healthy development in deaf children: A public health perspective. *Maternal and Child Health Journal*.
- Williams, M., & Rask, H. (2003). Literacy through play: how families with able children support their literacy development. *Early Child Development and Care*, 173(5), 527–533. <https://doi.org/10.1080/0300443032000088276>.
- Yopp, H., & Yopp, R. (2000). Supporting phonemic awareness development in the classroom. *The Reading Teacher*, 54, 130-143.