

The Signed Linguistic Input of Mothers with Typical Hearing to Children who are Deaf or Hard of Hearing

Aleah S. Brock, PhD¹

¹University of West Georgia, Carrollton, GA

Abstract

This study investigated the distribution of ten facilitative language techniques (FLT) in the linguistic input of mothers with typical hearing who use sign language with their children who are deaf or hard of hearing (DHH). Four mothers with typical hearing and their children who are DHH under the age of three participated in six, ten-minute caregiver-child interaction sessions via Zoom. The recorded sessions were coded for mother FLT and child utterances. Results indicated that the mothers tended to use more initiative than responsive types of FLT, consistent with findings of previous studies that examined the input of mothers who were using spoken-only language with their children who are DHH. Additionally, the mothers tended to use combined signed and spoken input more frequently than signed language alone. These findings point to the need for focused intervention to increase the use of responsive and linguistically stimulating FLT by caregivers with typical hearing who use sign language. Findings also suggest that caregivers with typical hearing may need more ongoing support to learn to use American Sign Language (ASL) effectively with their children.

Keywords: deaf or hard of hearing, early intervention, caregivers, facilitative language techniques

Acronyms: ASL = American Sign Language; DHH = deaf or hard of hearing; FLT = facilitative language techniques

Correspondence concerning this article should be addressed to: Aleah S. Brock, PhD, University of West Georgia, 200 Education Annex, 1601 Maple Street, Carrollton, Georgia, 30118. <https://orcid.org/0000-0001-9744-7324>; Phone: 256-201-1314; Email: abrock@westga.edu

Caregivers are a child's earliest and most important communicative partners. Language is a social transaction, and language develops via social interactions (Tomasello, 1992; Vygotsky, 1978). Therefore, a child's caregivers have a large impact on the child's acquisition of language. Both the quantity and quality of adult language exposure and interaction impacts the child's language outcomes (Gilkerson et al., 2018; Hart & Risley, 1995; Hoff-Ginsberg, 1986; Rowe, 2008). Although children who are deaf or hard of hearing (DHH) with caregivers who are deaf usually acquire language similarly to their peers with typical hearing (Freel et al., 2011; Newport & Meier, 1985), children who are DHH with parents who are hearing are at risk for language delay due to a lack of exposure to accessible language in their environment. Caregiver/child interaction has been found to be impacted by hearing status mismatch. Caregivers with typical hearing with children who are DHH have been found to be less responsive and more directive, produce shorter utterances, and engage in less coordinated joint attention compared to dyads who share a hearing status, even in children with moderate hearing levels and amplification (Dirks & Rieffe, 2019; Fagan et al., 2014; Meadow-Orlans & Spencer,

1996; Spencer, 2000). This disruption in caregiver-child interaction could contribute to difficulties in language acquisition for children who are DHH.

Several studies have investigated the impact of caregiver hearing status and/or communication mode on caregiver-child interaction. For example, Meadow et al. (1981) reported differences in interaction styles among hearing mother/hearing child, deaf mother/deaf child, hearing mother/deaf child using spoken-only communication, and hearing mother/deaf child using combined signed and spoken communication. The dyads with matched hearing status (hearing/hearing and deaf/deaf) did not differ significantly in their interaction or conversational styles. Mothers with typical hearing who used spoken only communication with their children who were DHH interacted less and exhibited the least mature interaction styles compared with the three other groups. However, both hearing/deaf groups exhibited significantly more mother-initiated communication episodes compared to the groups with a hearing status match. It is important to note, however, that this study was conducted before universal newborn hearing screening was in place; consequently, children in this study were not identified with hearing loss

until the second year of life and may not have received the same type of family-centered early intervention that families benefit from in the present day.

Caregivers who are deaf and use sign language have been found to engage in more episodes of intersubjectivity, defined by Loots et al. (2003) as “an interaction state of shared involvement in a reciprocal exchange” (p. 405), compared to caregivers who are hearing with children who are DHH. However, caregivers with typical hearing who used combined signed and spoken language with their children who were DHH engaged in more episodes of intersubjectivity than caregivers with typical hearing using auditory/oral only communication (Loots et al., 2005). Further, parents who are deaf have been found to employ certain visual-tactile communication strategies—such as tapping the child to gain attention, signing on the child’s body, and using the child’s hands to form a sign—more often than parents who are hearing do with their children who are DHH. Not surprisingly, caregivers with typical hearing who use combined speech and sign practice more visual-tactile communication with their children who are DHH than caregivers with typical hearing who use auditory-oral only (Loots & Devisé, 2003). Results of these studies indicate that disruption in caregiver/child interaction caused by hearing status mismatch may be mitigated to some degree by the caregiver’s use of visual language.

Other research has examined the spoken language input of caregivers with typical hearing to their children who are DHH. DesJardin (2006) described the distribution of ten facilitative language techniques (FLT) used by hearing mothers of young children (ages 25–72 months) who were DHH. This study found that maternal use of techniques such as recast and open-ended questions, which facilitate conversational interaction, were positively associated with child language. On the other hand, maternal use of label and directive, techniques which do not encourage conversation, were negatively associated with child language. Other studies found similar results, with FLT termed as *higher-level* (those which are useful to facilitate language growth in children who are producing single word utterances) demonstrating positive associations with child language, and FLT termed as *lower-level* (those which are employed to facilitate language growth of children at the pre-linguistic level) demonstrating negative associations with child language (DesJardin et al., 2009; DesJardin & Eisenberg, 2007). Further, parents with typical hearing use more lower-level FLT with their children who are DHH compared to children who have typical hearing, and they may not intuitively adapt their input to their child’s needs in the same way as caregivers of children with typical hearing (DesJardin et al., 2014, 2017). Additional studies have demonstrated that hearing caregivers use more directive spoken language and provide less high-quality responsive input to their children who are DHH (Ambrose et al., 2015; Dirks et al., 2020; Su & Roberts, 2019).

Fewer studies have investigated the linguistic content of the signed input used by mothers to their children who are DHH. Fieldsteel et al. (2020) analyzed the signed linguistic input of mothers who are deaf to their children

who are deaf ranging in age from 21–39 months. The researchers found that verbs were used significantly more often than nouns, and that mothers were noted to use pointing for both linguistic (as pronouns) and attention getting purposes. Additionally, the mothers exhibited an average mean length of utterance (MLU) of 2.4, with most utterances consisting of 2–3 signs. This study was the first to report on the content and form of language used by signing mothers and provides valuable information about American Sign Language (ASL) input from native signers to their young children.

Recent research points to the benefit of caregivers with typical hearing using sign language with their children who are DHH. A study of young children who are DHH and have caregivers with typical hearing found that children who were exposed to ASL early (before the age of 6 months) had vocabulary comparable to children who are DHH with caregivers who are deaf and communicate with sign language. These findings indicate that caregivers with typical hearing have the potential to be good sign language models for their children, even if they are not yet fluent themselves (Caselli et al., 2021).

Another recent study found a positive association between American Sign Language (ASL) vocabulary and spoken English vocabulary in children ages five and younger who are DHH, even in families with caregivers who have typical hearing (Pontecorvo et al., 2023). These studies indicate that it could be advantageous for children who are DHH to have sign language exposure from their caregivers with typical hearing; however, there is a paucity of research exploring the signed linguistic input of caregivers with typical hearing. To date, studies investigating the content and quality of language input of mothers who have typical hearing to children who are DHH has focused almost exclusively on spoken language. The present study seeks to address this gap by exploring the distribution of FLT in the linguistic input of four mothers with typical hearing who sign. Further, the study explores the relationship of caregiver language modality (spoken vs. signed) with FLT use.

Methods

Participants

Following ethical approval from the supporting institution’s institutional review board, participants were recruited from two southeastern states’ statewide early intervention programs and via the social media platforms of the supporting institution. Families were eligible to participate in the study if they had a child between the ages of 9 and 36 months with an identified permanent childhood hearing loss and if they were using sign language with the child. The use of spoken English in addition to sign was acceptable, as long as the family reported active sign language use with the child as well. Families who completed the study in its entirety received \$20 in compensation for their time.

The study enrolled four participant dyads, all of which included mothers with typical hearing who used combined signed and spoken language with their children. All

mothers self-reported as hearing, rated themselves at “beginner” level ASL fluency, and were current or former participants in ASL lessons with a trainer who was deaf. Each child participant is identified by a pseudonym. Candice was a white female who was 21 months old at the time of enrollment in the study. Her mother reported that Candice has a moderately severe hearing loss in the right ear and a severe hearing loss in the left ear. She was fit with amplification at 6 months of age and currently uses a hearing aid in the right ear and a cochlear implant in the left ear. Both of her parents hold four-year college degrees. David was a Hispanic male who was 19 months old at the time of enrollment in the study. His mother reported that David has a severe hearing loss in the left ear and a profound hearing loss in the right ear. He was fit with amplification at 11 months and currently uses bilateral cochlear implants. Both of his parents hold two-year college degrees. Eve was a white female who was 24 months old at the time of enrollment in the study. Her mother reported that Eve has a mild hearing loss in the right ear and does not use amplification. Eve’s mother also reported that she has additional developmental delays. Her mother holds a master’s degree, and her father holds a four-year college degree. Kevin was a white male who was 35 months old at the time of enrollment in the study. His mother reported that he has a mild to moderate hearing loss in both ears and does not currently use amplification. Educational level was not reported for Kevin’s caregivers. Mothers of Candice, David, and Eve indicated that their child stayed at home full-time with them or their partner, while Kevin attended preschool daily.

Data Collection

Dyads participated in six 10-minute caregiver/child interaction sessions using Zoom. The mothers were instructed to gather a selection of their child’s preferred toys, books, and activities ahead of the session. During the session, they were instructed to play with their child as they normally would. The researcher’s camera and microphone were turned off during recording to minimize distractions to the dyad. Video data were coded using the Behavioral Observation Research Interactive Software (BORIS; Friard & Gamba, 2016), an open-source video coding software that allows for point-by-point behavioral coding of video data.

Coding

The videos were coded for mothers’ use of ten facilitative language techniques (FLT) adapted from those defined by Cruz et al. (2013) and DesJardin (2006). Cruz et al. (2013) and DesJardin (2006) stratified the FLT) as lower-level FLT) (linguistic mapping, comment, imitation, label, close-ended question, and directive) and higher-level FLT) (narration, open-ended question, expansion, and recast). In addition to the higher-level/lower-level categories, some FLT) may be viewed as *initiative*, meaning that they are employed by the caregiver to direct or initiate conversation in

the absence of a child utterance. Other FLT) may be viewed as *responsive*, meaning that they are employed in response to a child utterance. See Table 1 for descriptions of the FLT). Each mother FLT) was also coded as one of three modalities: spoken only, simultaneously spoken and signed, or signed only.

Table 1
Facilitative Language Techniques

Facilitative Language Technique (FLT)	Definition
Responsive	
Linguistic mapping (LM)	Coded when the caregiver interprets into words a child vocalization that is not recognizable as a word
Comment (CM)	Coded when the caregiver responds verbally to acknowledge a child utterance
Imitation (IM)	Coded when the caregiver repeats a child’s vocalization verbatim
Expansion (EP)	Coded when the caregiver repeats the child’s vocalization, adding one or more morphemes or words to provide a more grammatically complete model and/or add new information to the child’s vocalization
Recast (RC)	Coded when the caregiver repeats the child’s vocalization, adding one or more morphemes or words, and rephrasing it into a question
Initiative	
Label (LB)	Coded when the caregiver produces a verbal statement to name something
Directive (DIR)	Coded when the caregiver tells child to do or not to do something
Close-ended question (CEQ)	Coded when the caregiver asks the child a question that has a short, specific (usually one-word) response
Narration (NR)	Coded when the caregiver uses either parallel talk or self-talk, to describe what they or the child are doing or thinking
Open-ended question (OEQ)	Coded when the caregiver asks the child a question that does not have a specific, one-word answer

Child utterances were also coded as one of four different types of productions. *Word* was coded when the child produced an utterance that was recognizable by the coder as a true word; *babble* was coded when the child produced an utterance that was not recognizable as a word; *gesture* was coded when the child produced a non-verbal communicative movement such as a reach or show; and *reflexive* was coded when the child produced a non-linguistic vocalization such as a grunt, sigh, cry, or laugh. Each child utterance coded as word or babble was also coded as one of three modalities: spoken only, simultaneous spoken and signed, or signed only.

Utterances coded as gesture or reflexive were not coded for modality, because by definition, gestures could only be manual, and reflexives could only be spoken.

Results

Figure 1 represents the mothers' and children's utterances by modality (spoken, signed, or both simultaneously). All mothers produced more utterances than their children, and all children and three out of four mothers (David, Eve, and Kevin) used spoken language most frequently. Candice's mother used simultaneous signed and spoken language most frequently.

Figure 1
Facilitative Language Techniques

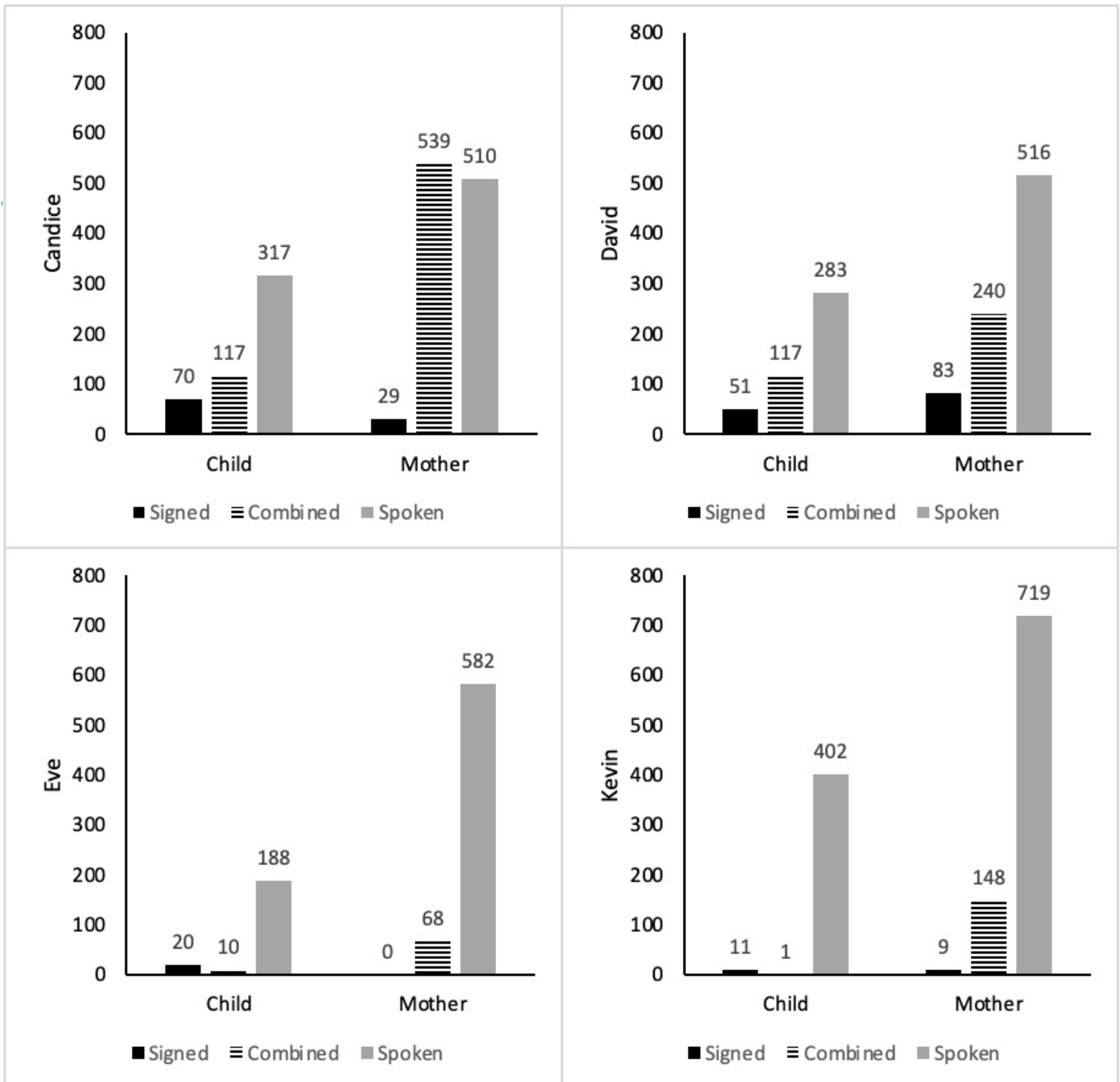
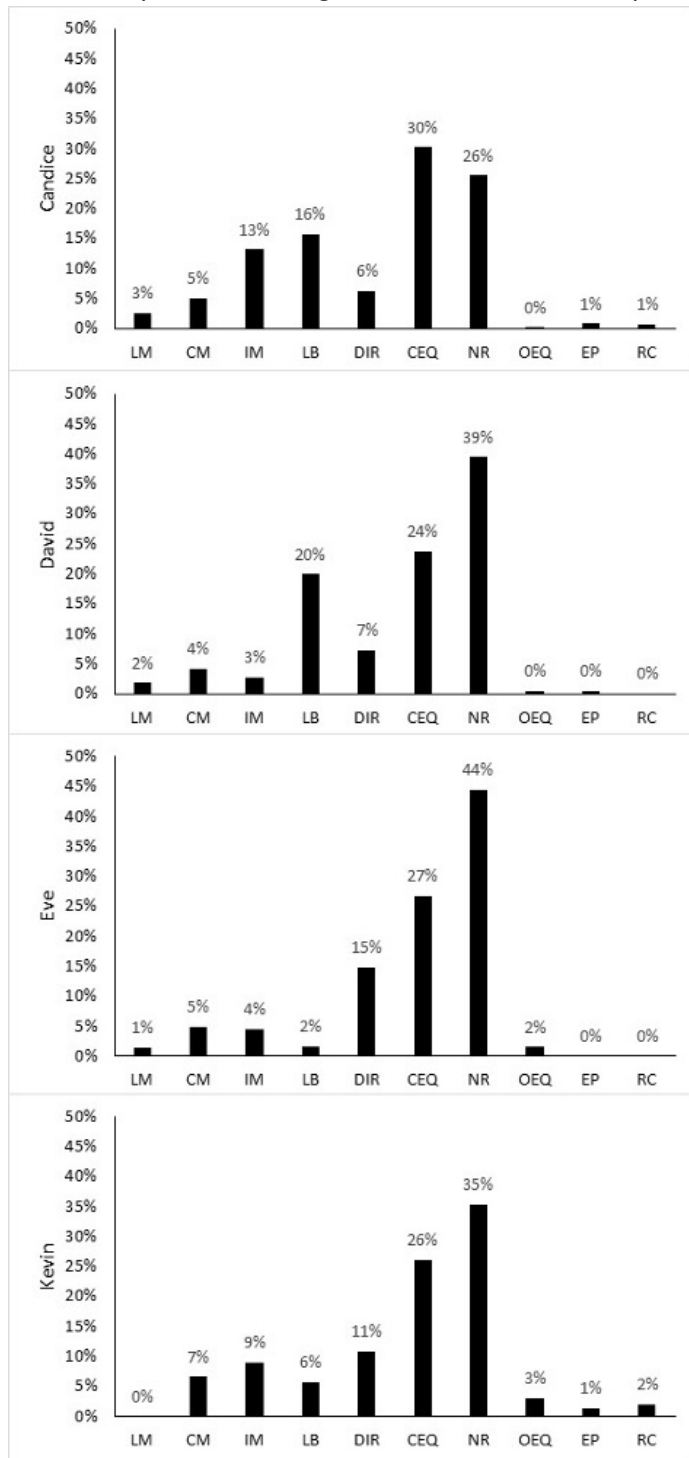


Figure 2 illustrates the overall distribution of FLT in the mothers' samples. In both Candice's and David's samples, the caregiver initiated FLT of close-ended question, narration, and label occur most frequently. In Eve's and Kevin's samples, the caregiver initiated FLT of close-ended question, narration, and directive occurred most frequently.

Figure 2
Overall Proportion of Caregiver FLT Across the Samples



Note. LM = linguistic mapping, CM = comment, IM = imitation, LB = label, DIR = directive, CEQ = close-ended question, NR = narration, OEQ = open-ended question, EP = expansion, RC = recast

Figure 3 illustrates the caregivers' FLT use by modality (spoken, signed, or both simultaneously). Candice's mother used spoken language only for most occurrences of narration, close-ended question, comment, and directive, and she used simultaneous spoken and signed language for most occurrences of label, imitation, linguistic mapping, expansion, and recast. David's mother used spoken language only for most occurrences of narration, directive, linguistic mapping, and imitation, and she used simultaneous sign and spoken language for most occurrences of close-ended question, label, comment, and expansion. Eve's caregiver used spoken language only for most occurrences of all FLT. Kevin's caregiver used spoken language only for most occurrences of all FLT except label, for which most occurrences were simultaneous sign and spoken language.

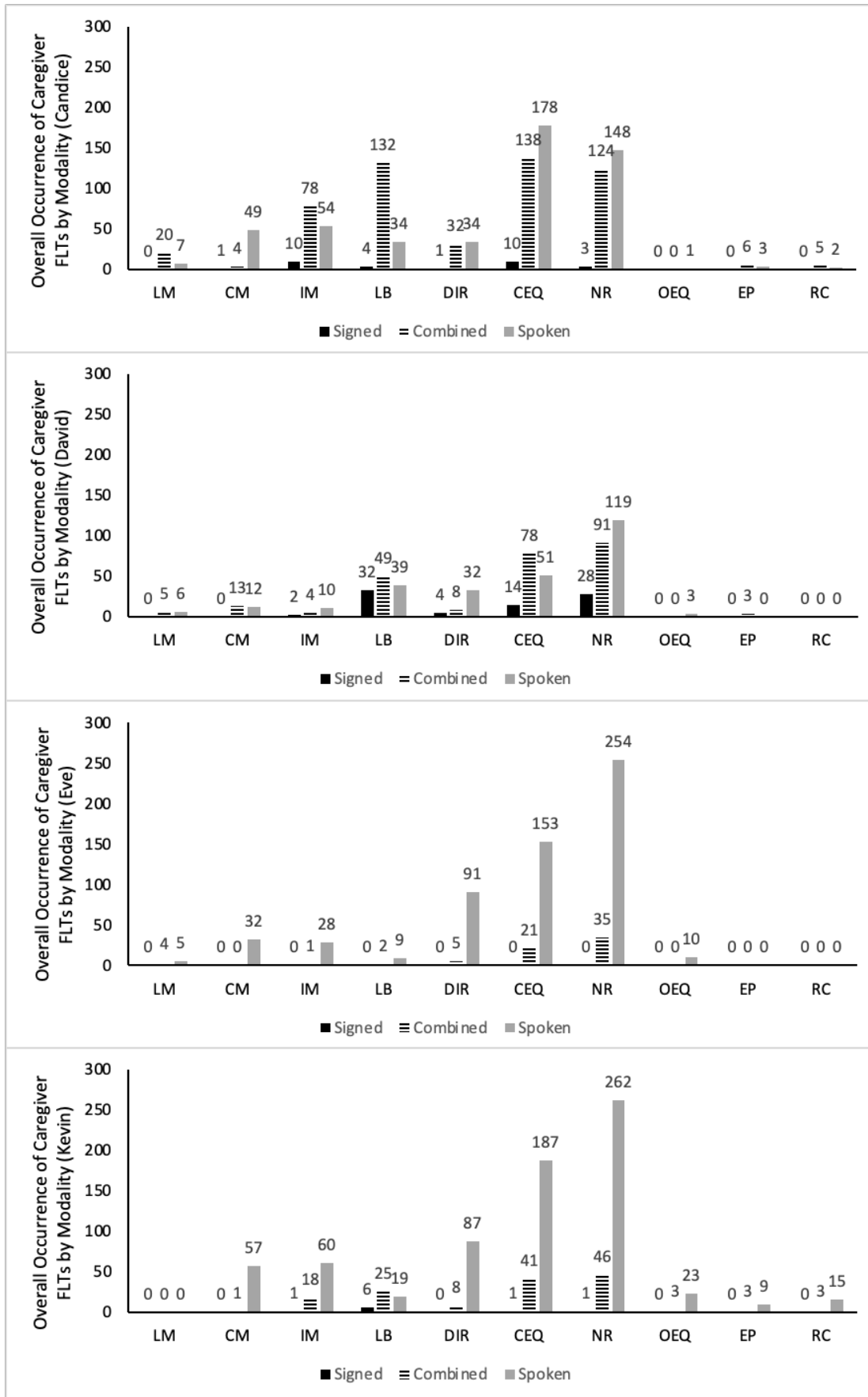
Figure 4 represents the mothers' responses and initiations to their children by modality (spoken only or signed). In this figure, signed only and simultaneous spoken/signed utterances were collapsed into one group representing signed utterance. This was due to the relatively low occurrence of signed only utterances (ranging from 0–10% of linguistic input) across all mothers' samples. All mothers produced initiative FLT much more frequently than responsive FLT, with initiative FLT accounting for 78–91% of the caregivers' samples. Candice's and David's mothers used signed and spoken-only language input at similar rates for both responses and initiations. In Candice's sample, 51% of her mother's responses were signed and 49% were spoken-only, while 53% of her mother's initiations were signed and 47% were spoken-only. In David's sample, 49% of his mother's responses were signed and 51% were spoken-only, while 52% of his mother's initiations were signed and 48% were spoken-only. Eve's and Kevin's caregivers used spoken-only input much more frequently than signed input for both responses and initiations. In Eve's sample, 7% of her mother's responses were signed and 93% were spoken-only, while 11% of her mother's initiations were signed and 89% were spoken-only. In Kevin's sample, 16% of his mother's responses were signed and 84% were spoken-only, while 18% of his mother's responses were signed and 82% were spoken-only.

Discussion

Most (three out of four) mothers used spoken-only language most frequently (Figure 1). All mothers used signs in conjunction with their spoken input more frequently than signed-only language. Candice and David also used combined sign/speech more often than signs alone. Eve and Kevin used predominantly spoken language, but produced signs alone more frequently than signs combined with spoken utterances. All mothers in this study were hearing, non-native signers who rated themselves as beginner level fluency. Each had received ASL support from a Deaf adult mentor to assist their ASL development. Although some instances of basic ASL sentences were noted, most of the mothers' signed utterances consisted of key words used for sign-supported speech. All children also used spoken-only language

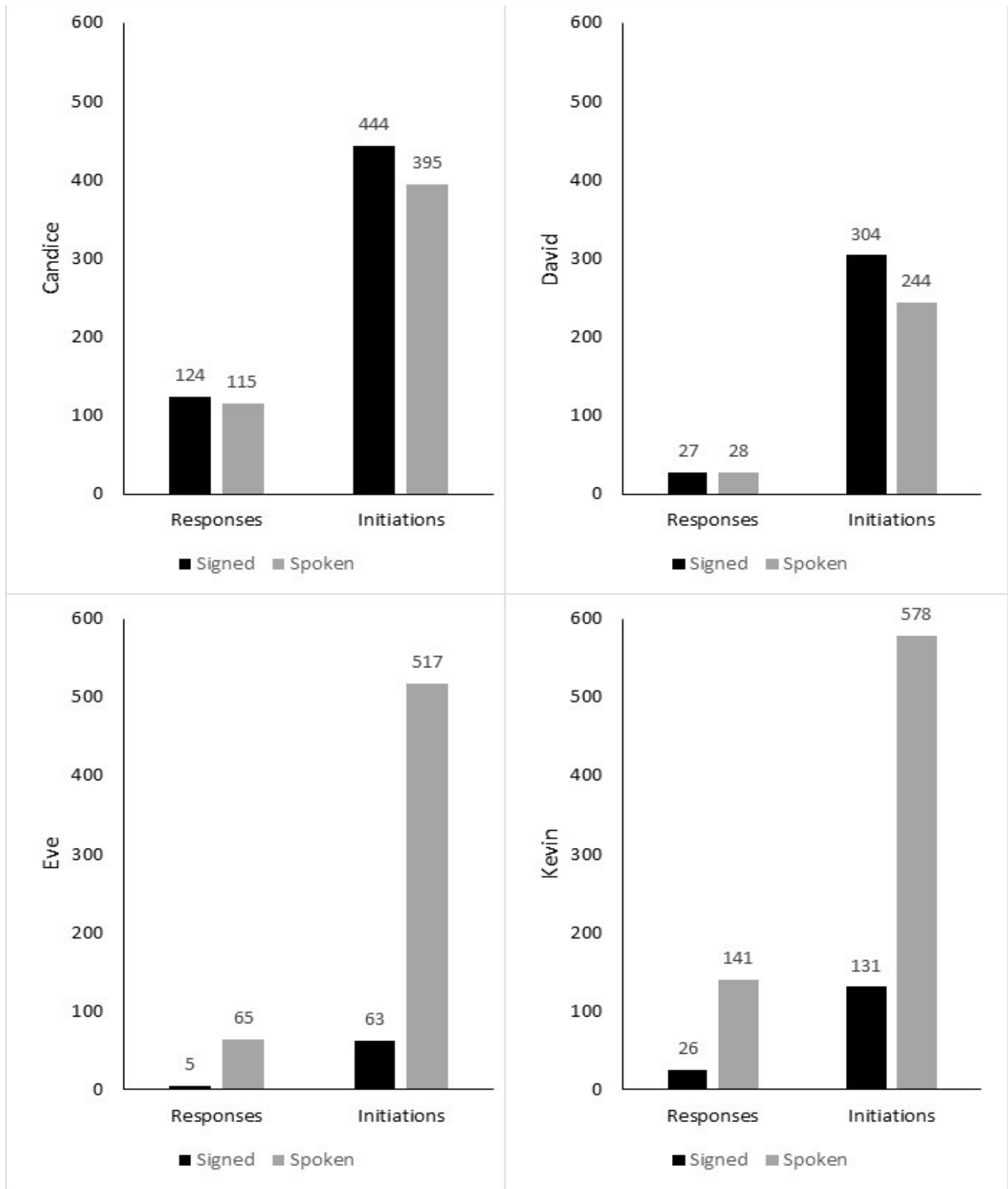
Figure 3

Proportion of Caregiver FLTs by Modality



Note. LM = linguistic mapping, CM = comment, IM = imitation, LB = label, DIR = directive, CEQ = close-ended question, NR = narration, OEQ = open-ended question, EP = expansion, RC = recast

Figure 4
Caregiver Responses and Initiations by Modality



most frequently, with spoken-only utterances comprising 63–97% of children’s samples. Eve and Kevin used sign infrequently, but when they did, tended to produce signed rather than combined sign/speech utterances. However, signed utterances made up only about 14% of Eve’s and about 3% of Kevin’s total utterances. Signed

utterances made up about 37% of both Candice’s and David’s samples, and both children produced combination signed/spoken utterances more frequently than sign-only utterances. It is unclear if the predominance of spoken only productions in both mothers’ and children’s samples is due to mothers mirroring the child’s most frequently used

modality, or vice versa; however, it is likely that there is a bidirectional influence of mother and child on each other's productions.

The overall distribution (including all productions, both signed and spoken) of FLT in the mothers' samples (Figure 2) indicates that the mothers tended to use initiative-type FLT such as narration, close-ended question, label, and directive the most frequently. This is consistent with findings from previous studies which show that parallel talk (narration), directive, and close-ended question were among the most frequently used FLT of hearing caregivers using spoken language with their children who are DHH (Cruz et al., 2013; DesJardin & Eisenberg, 2007). This indicates that these mothers with typical hearing who use sign-supported speech demonstrate patterns of linguistic input similar to mothers with typical hearing who use spoken language only with children who are DHH.

All mothers used spoken language only when employing narration and directive (Figure 3). Directive is an utterance telling the child to do or not to do something and narration is a one-sided production in which the parent describes what she or the child is doing without expectation for response. These two FLT are arguably two of the most controlling types, as they neither respond to nor invite child utterances. Even Candice's and David's mothers, who used signed input at a high frequency, were more likely to use spoken language for these more controlling utterance types. Techniques such as self- and parallel-talk are often taught as ways to increase children's exposure to language (Hearing First, n.d.). However, research indicates that children who are DHH benefit from caregiver linguistic input that is responsive and balanced in turns (Glanemann et al., 2013; Nicastrì et al., 2021; Roberts, 2019), and may be hindered in language development by caregiver input that is overly directive or intrusive (Ambrose et al., 2015; Vohr et al., 2010). Therefore, although initiative techniques may have value for children's language development, overuse of these strategies may be detrimental if they prevent caregivers from balancing turns and responding to their child. Three out of four mothers (Candice, David, and Kevin) used sign or sign supported speech most frequently when employing label, which is a single word or short utterance to provide a name or description for an item, person, or action. (Eve's mother used label at a level low frequency altogether.) This may be a function of the mothers' ASL fluency levels, as it is possible that mothers felt more comfortable signing this FLT, which is simpler in nature compared to a more complex utterance like narration.

Finally, all mothers used initiations much more frequently than responses in both spoken only and sign supported productions. These findings agree with findings from previous studies which indicate that mothers with typical hearing tend to initiate often, be more directive, and be less responsive in their interactions with their children who are DHH (Ambrose et al., 2015; Fagan et al., 2014; Meadow et al., 1981; Meadow-Orlans & Spencer, 1996; Su & Roberts, 2019). This extends extant literature by

demonstrating that mothers with typical hearing who use sign are similarly directive in their linguistic input, whether that input is signed, spoken, or both.

Limitations and Future Directions

The findings presented here represent an investigation of the distribution of FLT within samples of mothers with typical hearing who use sign with their children who are DHH and is the first to the author's knowledge to investigate these FLT in sign supported language samples. There are several limitations to be considered. First, the small sample size of this preliminary study precludes tests of statistical significance and limits generalizable conclusions from being drawn from the data. However, the data illustrate the feasibility of coding these FLT in signed samples and represent elements of mother-child signed interaction that may be expounded upon with a larger sample in future studies. Second, this study focused solely on FLT used by mothers to the exclusion of other elements of interaction previously discussed in the literature between signing mothers and children, such as signing on the child's body and visual attention getting strategies (e.g., Loots & Devisé, 2003; Waxman & Spencer, 1997). The omission of analysis of these behaviors in the present study may have overlooked some responsive actions which were not the focus of this study. Additionally, there are limitations related to the characteristics of the participants themselves. For example, it is unknown how long Kevin has been attending preschool or how he communicates while at school, and Eve was reported to have developmental disabilities which might impact her communication as well as her mother's responses to her. Each child's daily usage of their hearing technology and their audibility and access to spoken language is also unknown. It is unknown what other intervention services the families and children may have been receiving, aside from support from their Deaf Mentor, such as spoken language or sign language early intervention services. Further, caregivers did not indicate their desired long-term communication outcomes for their children and did not report their ratio of spoken to sign language use in the home.

Finally, all mothers who enrolled in this study were hearing, with limited ASL experience and fluency. The linguistic input of novice signing mothers is naturally different from that of mothers who are deaf or even mothers with typical hearing who are fluent signers. Therefore, this study can only speak to the linguistic input of this limited sample. Further, the mothers in this study exhibited limited ASL usage, tending instead toward signing key words and short phrases concurrently with their spoken utterances. As such, the study cannot make assumptions about the interactions of mothers who are deaf or have typical hearing who are providing more consistent ASL input to their children. Future studies should investigate the distribution of FLT in the linguistic input of mothers who are fluent in signing to their children who are DHH. Additionally, further investigations are planned to explore the effects of an intervention to increase the use of responsive FLT used by mothers who sign.

Clinical Implications

The findings of the present study have implications for clinical practice in early intervention for families of children who are DHH. The results indicate that, like hearing caregivers with typical hearing who use spoken language, caregivers with typical hearing who use signed language tend to be more controlling than responsive in their interactions with their children who are DHH. Intervention providers could provide education on language development and implement direct training of parents to use more responsive, linguistically stimulating techniques including linguistic mapping and expansion/recast, techniques which occurred at low frequency in each of the coded samples. Additionally, although each of these mothers reported participation in one-on-one ASL learning experiences with Deaf mentors, they all rated themselves as beginner level fluency. Most of the mothers' signed input was produced in the form of key words produced simultaneously with spoken language, rather than in ASL productions. This indicates a need for more support for caregivers with typical hearing to implement ASL with their children who are DHH.

Conclusions

To the author's knowledge, this study represents the first investigation of FLT types within a sample of mothers with typical hearing who sign to their children who are DHH. The findings indicate that the mothers, who rated themselves at a beginner level of ASL fluency and tended to use simultaneous sign and spoken productions, exhibited many similarities compared to previous studies of caregivers with typical hearing using spoken-only input. For example, the mothers in this study used predominantly initiative FLT types and most frequently employed narration, close-ended question, and directives in their input to their children. Results of this analysis suggest the need for focused intervention to increase use of responsive and linguistically stimulating FLT types within this population.

References

- Ambrose, S. E., Walker, E. A., Unflat-Berry, L. M., Oleson, J. J., & Moeller, M. P. (2015). Quantity and quality of caregivers' linguistic input to 18-month and 3-year-old children who are hard of hearing. *Ear and Hearing, 36*, 48S-59S. <https://doi.org/10.1097/AUD.000000000000209>
- Caselli, N., Pyers, J., & Lieberman, A. M. (2021). Deaf children of hearing parents have age-level vocabulary growth when exposed to American Sign Language by 6 months of age. *Journal of Pediatrics, 232*, 229-236. <https://doi.org/10.1016/j.jpeds.2021.01.029>
- Cruz, I., Quittner, A. L., Marker, C., & DesJardin, J. L. (2013). Identification of effective strategies to promote language in deaf children with cochlear implants. *Child Development, 84*, 543-559. <https://doi.org/10.1111/j.1467-8624.2012.01863.x>
- DesJardin, J. L. (2006). Family empowerment: Supporting language development in young children who are deaf or hard of hearing. *The Volta Review, 106*, 275-298.
- DesJardin, J. L., Ambrose, S. E., & Eisenberg, L. S. (2009). Literacy skills in children with cochlear implants: The importance of early oral language and joint storybook reading. *Journal of Deaf Studies and Deaf Education, 14*(1), 22-43. <https://doi.org/10.1093/deafed/enn011>
- DesJardin, J. L., Doll, E. R., Stika, C. J., Eisenberg, L. S., Johnson, K. J., Ganguly, D. H., Colson, B. G., & Henning, S. C. (2014). Parental support for language development during joint book reading for young children with hearing loss. *Communication Disorders Quarterly, 35*, 167-181. <https://doi.org/10.1177/1525740113518062>
- DesJardin, J. L., & Eisenberg, L. S. (2007). Maternal contributions: Supporting language development in young children with cochlear implants. *Ear and Hearing, 28*, 456-469. <https://doi.org/10.1097/AUD.0b013e31806dc1ab>
- DesJardin, J. L., Stika, C. J., Eisenberg, L. S., Johnson, K. C., Ganguly, D. M. H., Henning, S. C., & Colson, B. G. (2017). A longitudinal investigation of the home literacy environment and shared book reading in young children with hearing loss. *Ear and Hearing, 38*, 441-454. <https://doi.org/10.1097/AUD.0000000000000414>
- Dirks, E., & Rieffe, C. (2019). Are you there for me? Joint engagement and emotional availability in parent-child interactions for toddlers with moderate hearing loss. *Ear and Hearing, 40*(1), 18-26. <https://doi.org/10.1097/AUD.0000000000000596>
- Dirks, E., Stevens, A., Kok, S., Frijns, J., & Rieffe, C. (2020). Talk with me! Parental linguistic input to toddlers with moderate hearing loss. *Journal of Child Language, 47*, 186-204. <https://doi.org/10.1017/S0305000919000667>
- Fagan, M. K., Bergeson, T. R., & Morris, K. J. (2014). Synchrony, complexity and directiveness in mothers' interactions with infants pre- and post-cochlear implantation. *Infant Behavior and Development, 37*(3), 249-257. <https://doi.org/10.1016/j.infbeh.2014.04.001>
- Fieldsteel, Z., Bottoms, A., & Lieberman, A. M. (2020). Nouns and verbs in parent input in American Sign Language during interaction among deaf dyads. *Language Learning and Development, 35*, 351-363. <https://doi.org/10.1080/15475441.2020.1784737>
- Freel, B. L., Clark, M. D., Anderson, M. L., Gilbert, G. L., Musyoka, M. M., & Hauser, P. C. (2011). Deaf individuals' bilingual abilities: American Sign Language proficiency, reading skills, and family characteristics. *Psychology, 2*(01), 18-23. <https://doi.org/10.4236/psych.2011.21003>

- Friard, O., & Gamba, M. (2016). BORIS: A free, versatile open-source event-logging software for video/audio coding and live observations. *Methods in Ecology and Evolution*, 7(11), 1325–1330. <https://doi.org/10.1111/2041-210X.12584>
- Gilkerson, J., Richards, J. A., Warren, S. F., Oller, D. K., Russo, R., & Vohr, B. (2018). Language experience in the second year of life and language outcomes in late childhood. *Pediatrics*, 142(4), 1–11. <https://doi.org/10.1542/peds.2017-4276>
- Glanemann, R., Reichmuth, K., Matulat, P., & Zehnhoff-Dinnesen, A. (2013). Muenster Parental Programme empowers parents in communicating with their infant with hearing loss. *International Journal of Pediatric Otorhinolaryngology*, 77(12), 2023–2029. <https://doi.org/10.1016/j.ijporl.2013.10.001>
- Hart, B., & Risley, T. (1995). *Meaningful differences in the everyday experience of young American children*. Paul H. Brooks Publishing Co.
- Hoff-Ginsberg, E. (1986). Function and structure in maternal speech: Their relation to the child's development of syntax. *Developmental Psychology*, 22(2), 155–163. <https://doi.org/10.1037/0012-1649.22.2.155>
- Loots, G., & Devisé, I. (2003). The use of visual-tactile communication strategies by deaf and hearing fathers and mothers of deaf infants. *Journal of Deaf Studies and Deaf Education*, 8, 31–42. <https://academic.oup.com/jdsde/article/8/1/31/333254>
- Loots, G., Devisé, I., & Jacquet, W. (2005). The impact of visual communication on the intersubjective development of early parent-child interaction with 18- to 24-month-old deaf toddlers. *Journal of Deaf Studies and Deaf Education*, 10(4), 357–375. <https://doi.org/10.1093/deafed/eni036>
- Loots, G., Devisé, I., & Sermijn, J. (2003). The interaction between mothers and their visually impaired infants: An intersubjective developmental perspective. *Journal of Visual Impairment & Blindness*, 97, 403–417. <https://doi.org/10.1177/0145482X0309700703>
- Meadow, K. P., Greenberg, M. T., Erting, C., & Carmichael, H. (1981). Interactions of deaf mothers and deaf preschool children: Comparisons with three other groups of deaf and hearing dyads. *American Annals of the Deaf*, 126, 454–468.
- Meadow-Orlans, K. P., & Spencer, P. E. (1996). Maternal sensitivity and the visual attentiveness of children who are deaf. *Early Development and Parenting*, 5, 213–223.
- Newport, E. L., & Meier, R. P. (1985). The acquisition of American Sign Language. In D. I. Slobin (Ed.), *The Crosslinguistic study of language acquisition: Vol. 1. The data* (pp. 881–938). L. Erlbaum Associates.
- Nicastri, M., Giallini, I., Ruoppolo, G., Prosperini, L., de Vincentiis, M., Lauriello, M., Rea, M., Traisci, G., & Mancini, P. (2021). Parent training and communication empowerment of children with cochlear implant. *Journal of Early Intervention*, 43(2), 117–134. <https://doi.org/10.1177/1053815120922908>
- Hearing First. (n.d.). *Play-By-Play*. <https://www.hearingfirst.org/what-to-do/strategies-techniques/play-by-play>
- Pontecorvo, E., Higgins, M., Mora, J., Lieberman, A. M., Pyers, J., & Caselli, N. K. (2023). Learning a sign language does not hinder acquisition of a spoken language. *Journal of Speech, Language, and Hearing Research*, 66(4), 1291–1308. https://doi.org/10.1044/2022_JSLHR-22-00505
- Roberts, M. Y. (2019). Parent-implemented communication treatment for infants and toddlers with hearing loss: A randomized pilot trial. *Journal of Speech, Language, and Hearing Research*, 62, 143–152. https://doi.org/10.1044/2018_jslhr-l-18-0079
- Rowe, M. L. (2008). Child-directed speech: Relation to socioeconomic status, knowledge of child development and child vocabulary skill. *Journal of Child Language*, 35(1), 185–205. <https://doi.org/10.1017/S0305000907008343>
- Spencer, P. E. (2000). Looking without listening: Is audition a prerequisite for normal development of visual attention during infancy? *Journal of Deaf Studies and Deaf Education*, 5, 291–302.
- Su, P. L., & Roberts, M. Y. (2019). Quantity and quality of parental utterances and responses to children with hearing loss prior to cochlear implant. *Journal of Early Intervention*, 41(4), 366–387. <https://doi.org/10.1177/1053815119867286>
- Tomasello, M. (1992). The social bases of language acquisition. *Social Development*, 1(1), 67–87.
- Vohr, B., St. Pierre, L., Topol, D., Jodoin-Krauzyk, J., Bloome, J., & Tucker, R. (2010). Association of maternal communicative behavior with child vocabulary at 18–24 months for children with congenital hearing loss. *Early Human Development*, 86, 255–260. <https://doi.org/10.1016/j.earlhumdev.2010.04.002>
- Vygotsky, L. S. (1978). *Mind in Society*. Harvard University Press.
- Waxman, R. P., & Spencer, P. E. (1997). What mothers do to support infant visual attention: Sensitivities to age and hearing status. *Journal of Deaf Studies and Deaf Education*, 2, 104–114. <https://academic.oup.com/jdsde/article/2/2/104/358492>