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Parental Support for Language Development During Joint Book Reading for Young Children With Hearing Loss

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Abstract

Parent and child joint book reading (JBR) characteristics and parent facilitative language techniques (FLT) were investigated in two groups of parents and their young children; children with normal hearing (NH; $n = 60$) and children with hearing loss (HL; $n = 45$). Parent–child dyads were videotaped during JBR interactions, and parent and child behaviors were coded for specific JBR behaviors using a scale developed for this study. Children’s oral language skills were assessed using the *Preschool Language Scale–4* (PLS-4). Parents of children with HL scored higher on two of the four subscales of JBR: Literacy Strategies and Teacher Techniques. Parents of children with NH utilized higher level FLT with their children who had higher language skills. Higher level FLT were positively related to children’s oral language abilities. Implications are discussed for professionals who work with families of very young children with HL.

Keywords

birth to 3 years; age; language; assessment; deaf/hard of hearing; exceptionalities

Reading storybooks to very young children is a daily practice in many families today. Indeed, current research and early childhood organizations highlight the importance of reading storybooks to very young children (National Association of Education for Young Children [NAEYC], 2012; National Early Literacy Panel, 2009). Infants and toddlers with normal hearing (NH), whose parents read to them often, encourage child engagement (e.g., close proximity to parent) and active participation (e.g., offers spontaneous ideas about the

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pictures), and who use particular facilitative language techniques (FLT), such as open-ended questions, tend to enter kindergarten more prepared for learning in the areas of language, social-emotional, and general cognitive development than children who do not have those early joint book reading (JBR) experiences (Bus, van Ijzendoorn, & Pellegrini, 1995; Colombo, 2007; Senechal & LeFevre, 2001; Sonnenschein & Munsterman, 2002; Trivette, Dunst, & Gorman, 2010). Due to the overwhelming data that support early JBR as a predictive factor in children's oral language development, several programmatic efforts and parental training of specific JBR behaviors have been implemented across the country for families of young children with NH (Dickinson, Griffith, Golinkoff, & Hirsh-Pasek, 2012; Mendelsohn, Dreyer, Brockmeyer, Berkule-Silberman, & Morrow, 2011) and, more specifically, for children with NH who have language challenges (Roberts & Kaiser, 2011). Much less is known about families and their very young children with hearing loss (HL). From limited research in the field, parents of young children with HL may be challenged while reading storybooks with their children due to the auditory and language delays of their children (Swanwick & Watson, 2007; Zaidman-Zait & Dromi, 2007). Thus, global programs and instructional procedures that highlight JBR for children with NH may not fully and appropriately support families and their very young children with HL who participate in early intervention programs. This study investigates (a) frequency of book reading and (b) parent and child engagement and FLT during JBR in two groups of young children with and without HL.

JBR and Children With NH

JBR has been operationalized in various ways. One such way is the amount that a parent reads to a young child. Frequency of parent-child book reading in the infant and toddler years predicts early language and later emergent literacy skills in the preschool years (Colombo, 2007; Karrass & Braungart-Rieker, 2007; Raikes et al., 2006). In one of the first longitudinal studies of parent-child book reading in children less than 3 years of age, Raikes and colleagues (2006) investigated frequency of book reading in a fairly large population of low-income culturally and linguistically diverse families ($N = 2,581$). A pattern of mothers reading aloud to their children daily in the early years predicted children's oral language and cognition at age 3 years (Raikes et al., 2006). Similar findings were evident in the Karrass and Braungart-Rieker (2007) study investigating children with NH at 4, 8, 12, and 16 months of age over the course of 1 year. Findings revealed that parents' perceptions of shared book reading behaviors at 8 months of age were positively linked to later expressive language skills at 12 and 16 months of age (Karrass & Braungart-Rieker, 2007). Overall, reading regularly to very young children with NH indisputably predicts higher vocabulary and expressive language skills in young children (Colombo, 2007).

The nature of parent-child book reading also supports young children's oral language development. In a meta-analysis of 21 studies, Trivette and colleagues (2010) analyzed the effects of a number of JBR adult and child characteristics on oral language skills in young children (12-42 months old), which included 1,275 toddlers with NH. Parental JBR behaviors such as relating the story to personal experiences, providing positive feedback to a child during storybook interactions, and utilizing higher level FLT (i.e., open-ended questions), all encouraged children's participation during shared reading activities. In

addition, children's active participation and engagement were the most effective predictive characteristics on early oral expressive language skills for toddlers (Trivette et al., 2010).

Furthermore, in populations of children with NH who display language delays, specific techniques used by parents during JBR may support children's language learning (see Table 1). One particular intervention, *dialogic reading*, incorporates many specific adult behaviors into target child communication attempts to support language development in the context of JBR (Whitehurst, Falco, Lonigan, & Fischel, 1988). Higher level FLT's such as expansions (i.e., extending a child's utterance) and open-ended questions (i.e., asking why and how questions) seem to elicit more words from children who are at the early word phrase level of language development (Mol, Bus, DeJong, & Smeets, 2008; Whitehurst et al., 1988), while lower level FLT's such as linguistic mapping (i.e., putting child's unintelligible utterance into words) and imitation (i.e., repeating the child's utterance verbatim) may enhance language skills in younger populations of children at the prelinguistic stage of development (Girolametto et al., 2002; Yoder, McCathren, Warren, & Watson, 2001). Evidence-based research in *dialogic reading* techniques has shown dramatic improvements in oral language development for children who are at risk for language delays (Bus, 2001; Institute of Education Sciences, 2010).

Children With HL

Today, many more children are receiving newborn hearing screening before leaving the hospital than only a decade ago (Kennedy, McCann, & Campbell, 2006). Early detection of HL and prompt early intervention can drastically influence language outcomes for young children identified with HL (Fitzpatrick, Durieux-Smith, Eriks-Brophy, Olds, & Gaines, 2007; Yoshinaga-Itano, 2003). Young children who are identified at birth, receive appropriate amplification by 3 months, and are enrolled in an early intervention program by 6 months of age have the potential to reach typically developing language milestones (Yoshinaga-Itano, Sedley, & Coulter, 1998) and school readiness skills (Harrington, DesJardin & Shea, 2010) during the toddler and preschool years. There is a considerable variability in language skills, however, for young populations of children with HL who have received a newborn hearing screening (Fitzpatrick et al., 2007; Geers, Moog, Biedenstein, Brenner, & Hayes, 2009; Wake, Poulakis, Hughes, Carey-Sargeant, & Rickards, 2005). Home literacy experiences and specific JBR behaviors may partially account for individual differences in oral language skills for young children with HL.

JBR and Children With HL

Recent research utilizing both parental report and videotaped analyses during parent-child interactions provides us with some limited applications in terms of JBR and young children with HL (Cruz, Quittner, Marker, & DesJardin, 2013; DesJardin & Eisenberg, 2007; Fung, Chow, & McBride-Chang, 2005; Zaidman-Zait & Dromi, 2007). Most of the cited research has been conducted on preschool to early childhood populations of children who have severe to profound HL, and two investigations included children who utilize cochlear implants. Very limited research exists in young populations of children with mild to severe HL who utilize hearing aids.

Using a parent questionnaire, Zaidman-Zait and Dromi (2007) explored JBR interactions in young toddlers with and without HL in Israeli families who all spoke Hebrew (HL mean age = 16.4 months, NH mean age = 13.4 months). All of the children with HL were classified as being in the severe to profound range of HL except for two children, and all of the children wore hearing aids. Utilizing a parental observation questionnaire, which measured the frequency of parent–child storybook reading and child linguistic production, toddlers with HL demonstrated lower spontaneous use of words and reduced involvement in JBR with their parents compared to toddlers with NH. Reduction in hearing may impede the coordination between adult, child, and object in toddlers with HL due to a need to alternate gaze between parent and book to receive the linguistic information from the parent (Zaidman-Zait & Dromi, 2007).

Specific parental techniques during JBR may also influence children’s oral language skills. DesJardin and Eisenberg (2007) investigated FLTs during JBR interactions in a group of mothers and their young children who utilized a cochlear implant ($M = 4.8$ years old). Findings suggest that mothers’ use of two higher level FLT—recast and open-ended questions—was positively related to children’s oral language skills. Conversely, mothers’ use of lower level FLTs, such as linguistic mapping, labeling, and directives, was negatively associated with children’s oral language abilities. Similar results were found in younger populations of children with cochlear implants (Cruz et al., 2013). For a young child with HL, who may need explicit language techniques, providing lower linguistic techniques when the child is at a higher language level could possibly hinder the child’s language development (DesJardin & Eisenberg, 2007).

To our knowledge, this is the first investigation to explore the differences in parental and child aspects of JBR and children’s oral language skills between children with mild to severe HL who utilize hearing aids and children with NH. Having a better understanding of the precise JBR mechanisms (i.e., frequency of JBR, parent and child JBR behaviors, parent FLT) that may contribute to stronger oral language skills can better guide professionals in early intervention, as they support families and their very young children with HL.

Purpose of the Study

The overall goal of this study was to investigate home literacy experiences (i.e., frequency of JBR, parent and child JBR behaviors, and parental FLT) in two groups of parents and their young children (children with NH and children with HL). Comparing groups of parents of children with and without HL might provide information regarding how HL may impact home literacy practices and how parent JBR behaviors may relate to young children’s oral language skills. More specifically, the purpose of this study was to address the following research questions:

Research Question 1: Are there differences between groups of parents of young children with HL and parents of children with NH in terms of JBR frequency, specific adult and child behaviors, and FLT during JBR?

Research Question 2: Within each group, are there significant relationships between JBR frequency, specific parent and child behaviors, FLT's during JBR, and children's oral language skills?

Method

Participants

Participants in this study are a subgroup of parents and their young children from a large multi-site longitudinal investigation of families and their children with bilateral mild to severe HL (Stika et al., 2013). The full research project was conducted to investigate multi-dimensional aspects of child development (i.e., language, social-emotional skills, and adaptive behaviors) and family variables (e.g., family income, perceived parental stress) related to the whole child. This is one of the first investigations to explore various child and family factors with a very young population of children with HL who utilize hearing aids. In the current study, we focus on parental contributions during JBR and children's oral language skills.

Parents—Sixty culturally diverse parents (57 mothers and 3 fathers) and their children with NH (M age = 18.6 months) and 45 culturally diverse parents (44 mothers and 1 father) and their children with HL (M age = 25.8 months) participated in this study. Four mothers in the HL group and three mothers in the NH group were identified with bilateral or unilateral sensory neural HL (ranging from moderate to severe). All of the mothers with HL utilize hearing aids and use spoken language as their primary mode of communication. As shown in Table 2, no significant differences emerged between groups in terms of parent demographic variables (e.g., age, race, ethnicity, income, parent education level); however, a larger proportion of parents of the children with NH held postgraduate educational degrees than did the parents of children with HL (25.0% vs. 8.9%; $p = .04$). In both the groups, the parents averaged 34 years of age and primarily spoke English as their first language (see Table 2). No significant correlations emerged between parent demographics and outcome variables.

Children—As shown in Table 3, both groups of children equated on gender (HL = 22 males and 23 females; NH = 30 males and 30 females). The groups also did not differ in terms of race (HL = 36 or 80.0% Caucasian; NH = 48 or 80.0% Caucasian) or ethnicity (HL = 33 Non-Hispanic or Latino; NH = 49 Non-Hispanic or Latino). However, the groups of children did significantly differ in terms of age, with children with NH being significantly younger than children with HL. No children with known secondary disabilities were enrolled in the study.

Children with HL—Of 45 children with HL, 84.4% were identified through newborn hearing screening procedures. Although the majority of the children with HL were identified early, the average age of identification and amplification (fitted with bilateral digital hearing aids) for the group was approximately 6 months and 10 months, respectively. A four-frequency pure-tone average (PTA-4) was established using 500, 1000, 2000, and 4000 Hz. Children with HL presented with bilateral mild to severe HL (see Table 3).

All of the children with HL were enrolled in a family-centered public or private intervention program for at least 3 months; 75.6% of parents indicated that they had an Individual Family Service Plan, 15.6% indicated that their child had an Individual Education Plan, and 4.4% of parents indicated that they did not know. Depending on their age, the children received home visits (81.0%) and/or participated in a private or public infant-toddler program for children with HL (26.2%) at least once a week. Children's average length of participation in early intervention at the time of testing was 6.89 months ($SD = 2.33$). Twenty-six parents (57.8%) indicated that their children received speech-language therapy on a weekly basis, but children varied with respect to the number of private or public school speech-language therapy sessions that they received each week. Although mode of communication was not a variable under investigation, all of the children primarily used auditory-oral methods of communication. Two parents in the HL group and two parents in the NH group also used baby sign language to support their children's oral language skills during the videotaped interactions.

Procedures and Measures

Recruitment—Recruitment and testing of parents and children were conducted at two large medical centers in two different regions in the United States. Both sites received Institutional Review Board Approval for this study. Families and their children with HL from birth to age 18 years are seen at these sites for a range of comprehensive services for children with HL that include diagnostics and ongoing audiological care and/or related speech and language services. Parents and their children with HL were recruited from the clinical population (e.g., computer generated lists, clinician referrals). Children with NH were siblings of the children with HL being seen at the two sites, children of professionals working at one of the research sites, or recruited from outside one of the sites through advertisements. Of 64 families of children with NH and 48 families of children with HL contacted for the larger investigation (Stika et al., 2013), four parent-child dyads with NH and three parent-child dyads with HL were not videotaped due to time constraints of the family, and therefore not included in this study.

JBR interactions—Parents and their children were videotaped during a storybook interaction. The videotape interactions were conducted in a comfortable, quiet playroom at each research site. Interactions were videotaped using a remote-controlled camera (Sony EVID70p) mounted on a shelf in the playroom approximately 2 1/2 feet from the floor. Parents wore a wireless microphone (G2 Sennheiser 100 series) and were seated near the child on either a carpeted or soft foam tiled floor. A condenser microphone (Beyerdynamic 5-inch gooseneck) centrally mounted on the ceiling of the room was also used to ensure optimal acoustic information for the recordings. The output of each camera was captured (Osprey 450e capture board), mixed (video and audio), and digitized (Telestream Episode software). The digitized video/audio files were transferred via a secure cloud-based website from the research site to the first author.

The younger children (ages 12–24 months) and their parents were provided with three picture books (*Where's Spot?* Hill, 1980; *What Shall We Do With the Boo Hoo Baby*, Cowell & Godon, 2000; and *That's Not My Puppy: Its Coat Is Too Hairy*, Watt, 2009). The

older children (ages 25–48 months) were provided with two wordless picture books (*Umbrella*, Franson, 2007, and *A Boy, a Dog, and a Frog*, Mayer, 2003). Parents were instructed to “read with your child as you would normally do at home when you have free time” and could choose either book to begin and then continue with the other book(s) when they finished with the first book. The younger children’s books were selected intentionally to engage children’s developmental interests (Pierroutsakos & DeLoache, 2003). For the older children, wordless picture books were selected to encourage parent linguistic input and children’s narrative language as the children were learning to use more language, rather than relying on printed words alone. Similar wordless picture books have been used in several other parent–child interaction studies with young children with NH (Weizman & Snow, 2001) and children with HL (DesJardin & Eisenberg, 2007).

Preschool Language Scale–4 (PLS-4)—After the book reading session, the children were orally administered the PLS-4 (Zimmerman, Steiner, & Pond, 2002) by certified speech-language pathologists who have extensive experience testing children with HL. The PLS-4 is a standardized individually administered test of receptive and expressive oral language skills, appropriate for infants and young children aged birth to 6 years 11 months. It is comprised of two subscales, Auditory Comprehension (AC) and Expressive Communication (EC), that use pictures and toys as stimuli to target communication skills in the areas such as attention, play, gesture, vocal development, vocabulary, and social communication. The PLS-4 is commonly used with children with NH and children with HL (Ching et al., 2010; Fitzpatrick et al., 2007; Geers et al., 2009). For this study, children’s AC and EC language standard scores (SSs) were used in all analyses.

Demographic information and parental perception of JBR—Demographic information was obtained by the parent or significant caregiver (e.g., father or grandmother) for both parent and child by completion of a parent booklet (i.e., questionnaire). Questionnaires were completed at parent convenience and brought to their child’s scheduled testing appointment. Parental variables included factors such as age, ethnicity, primary language spoken in the home, level of education, and household income level. Child variables included factors such as age, gender, age at identification, age at amplification, and age of enrollment in early intervention. Auditory information such as PTA-4 and degree of HL was obtained by a licensed pediatric audiologist as part of the global test battery. Within the parent questionnaire, parents or caregivers completed three questions on a Likert-type scale (1–5) pertaining to their perceptions of JBR in their home (i.e., “To what extent does your child seem to enjoy looking at storybooks with you?” and “How many minutes per day do you read to your child?”). A total mean score was used in the data analyses.

Data Preparation

All parent and child speech, vocalizations, and baby signs produced were transcribed verbatim by the second author and research assistants using the Codes for the Human Analysis of Transcripts (CHAT) transcription system (CLAN program; MacWhinney, 2000). The transcriptions were analyzed in two ways: (a) Parent and child JBR behaviors were coded using the *Responsive Adult–Child Engagement During JBR Scale* (RACED-

JBR; DesJardin, 2011; see the appendix) and (b) Parents' FLT's were coded using the *Codes for FLT's* (DesJardin & Eisenberg, 2007).

The RACED-JBR scale was designed specifically for this study to measure parent and child behaviors that have been shown to predict language development in populations of young children with NH. This is a more in-depth adaptation of the *Adult-Child Interactive Reading Inventory* (DeBruin-Parecki, 2008), which was geared for preschool-aged children, to better target more specific behaviors that may relate to language skills in a much younger population of children. The RACED-JBR scale consists of the following five sections: (a) adult and child *engagement* (six adult behaviors and five child behaviors), (b) adult *literacy strategies* (four adult behaviors), (c) adult *teacher techniques* (five adult behaviors), (d) adult and child *interactive reading* (five adult behaviors and seven child behaviors), and (e) child *guided reading* (five child behaviors; see the appendix). The first and second author rated each adult and child item on a Likert-type scale ranging from 0 (*no evidence*) to a 3 (*most of the time*) or 80% of the JBR interaction. Cronbach's coefficients for each subscale suggested high internal consistency (range = 0.88–0.91 for adult behaviors, 0.90–0.96 for child behaviors). A total mean score for each parent and child subscale and a total score were calculated and used in the analyses.

Every parental utterance (linguistic phrase or sentence) was coded for one of the specific FLT's (see Table 1). Total and proportional scores of each FLT were calculated and used in the analyses, so that less talkative, yet very responsive parents were not penalized. Accordingly, proportional data were calculated by dividing the total number of occurrence for each language technique by the overall number for parents' linguistic attempts.

To establish inter-rater reliability of transcription and coding of both JBR behaviors and FLT's, a second research assistant transcribed in full 20% of the randomly selected videotaped data. This included 12 parent-child NH dyads and 8 parent-child HL dyads. The calculation of word-by-word correspondence yielded a high reliability between transcribers, ranging from 90% to 93% agreement for parents and children's intelligible verbal utterances. Inter-rater reliability for coding of JBR behaviors and FLT's consisted of the same 20% samples. Adult JBR behaviors ranged from 86% to 91% agreement, whereas child behaviors ranged from 82% to 97%. Agreement for FLT's ranged from 90% to 92% agreement.

Results

Preliminary Analyses

A cross-sectional research design was used at this first time point of a longitudinal investigation. Preliminary analyses suggest that there were no significant differences between length of storybook interaction between groups (HL = mean length 6.54 min; NH = mean length 6.31 min). However, significant differences were evident between groups in terms of child age (NH = 18.6 months; HL = 25.8 months; $F = 10.94, p < .001$; see Table 3). After controlling for between-group differences in child age, SSs remained significantly different for PLS-4 AC ($F = 10.66, p < .001, \eta^2 = .095$) and PLS-4 EC ($F = 7.54, p < .01, \eta^2 = .069$). AC and EC subscale SSs were positive and significantly related ($0.80, p < .001$ for

HL group; $0.73, p < .001$ for NH). The AC subscale had a stronger positive relationship with outcome variables and was chosen as the control in all subsequent analyses.

Between-Group Analyses

Parental perceptions of JBR frequency—A two-group (HL vs. NH) MANCOVA, which employed children's AC SSs as covariates, was performed using three items from the home literacy questionnaire. No significant differences emerged between groups in terms of the minutes indicated reading to their children per day (1 = *no time* to 5 = *30 min per day*; HL = 3.16, NH = 2.90), ease of reading to their children at home (1 = *very difficult* to 5 = *very easy*; HL = 2.00, NH = 1.90), and the extent to which child enjoys JBR (1 = *not at all* to 5 = *extremely*; HL = 3.62, NH = 3.74). For parents of children with HL ($N = 37$), 62.2% stated that they read 11 min per day compared to 43.4% of parents of children with NH ($n = 42$) and 60% indicated easy-to-somewhat easy when asked about reading to their children, whereas 51.7% parents of children with NH indicated the same. When asked about how much the child enjoys reading storybooks with parent, 55.5% of parents of children with HL indicated “quite a bit to extremely so” and 45.0% indicated the same in the NH group.

JBR behaviors—A two-group (HL vs. NH) MANCOVA, which employed children's PLS-4 AC SS as covariates, was performed using parent and child JBR subscales as the dependent variables (see Table 4). Statistically significant differences emerged between parent groups for JBR behaviors in terms of *literacy strategies* ($F = 11.34; p < .001, \eta^2 = .10$) and *teacher techniques* ($F = 4.79, p < .05, \eta^2 = .05$), with parents of children with HL scoring higher than parents of children with NH. Due to the use of a multivariate design, η^2 was utilized to measure effect size (Pedersen, 2003). As cited by Pedersen (2003) equivalent eta squared values for Cohen's d (Cohen, 1988) effect sizes of small, medium, and large are .01, .06, and .14, respectively (Stevens, 2002). Therefore, a medium to large effect size was evident for *literacy strategies* and a medium effect size was evident for *teacher techniques*.

Further univariate analyses revealed significant differences in *literacy strategies* in terms of pointing and labeling pictures/objects in the book (B1; HL = 2.55, NH = 1.96, $F = 17.65, p < .000, \eta^2 = .15$) and pointing to words/letters while reading (B3; HL = 1.15, NH = .81, $F = 4.25, p < .05, \eta^2 = .04$). In terms of *teacher techniques*, parents of children with HL were significantly higher in elaborating on child ideas (C2; HL = 1.02, NH = .65, $F = 6.78, p < .01, \eta^2 = .07$), soliciting predictions (C4; HL = 1.00, NH = .68, $F = 6.03, p < .06, \eta^2 = .06$), and reviewing beginning, middle, and end of book (C5; HL = .33, NH = .08, $F = 7.49, p < .07, \eta^2 = .07$). No significant differences emerged for any of the items related to parental *engagement* or *interactive reading*. Similarly, no significant differences emerged in terms of child JBR behaviors. At this young stage of development, both groups of children were similar in terms of child *engagement*, *interactive reading*, and *guided reading* during JBR with their parents.

Parental FLTs—A two-group (HL and NH) MANCOVA, which employed children's AC SSs as covariates, was performed using total and proportional scores for higher level and lower level FLT. As shown in Table 5, no significant differences emerged between the

groups of parents in terms of higher level FLT. However, significant differences emerged between groups for total parent utterances ($F = 9.72, p = .01, \eta^2 = .09$) and total lower level FLT. ($F = 8.53; p = .01, \eta^2 = .09$), with parents of children with HL higher in both. More specifically, follow-up univariate analyses revealed significant differences between groups of parents in terms of labeling ($F = 13.33, p = .001, \eta^2 = .12$), commenting ($F = 5.66, p < .05, \eta^2 = .06$), and use of linguistic mapping ($F = 5.17, p < .05, \eta^2 = .05$).

Analyses Within Language Groups

Independent-sample t tests were conducted to explore further mean differences in parental JBR behaviors and FLT. for groups of children in terms of language scores. As shown in Table 6, within each group, children were divided by the PLS-4 AC subscale SS (SS ≥ 90 or below average and SS < 90 , average range or above).

For the NH group, significant differences between higher and lower language groups emerged for all of the JBR sub-scales except for *interactive reading*. Parents of children with NH who had lower PLS-4 AC SS were significantly higher in *engagement* ($F = 5.63, p = .05, \eta^2 = .04$). However, parents of children with NH who had higher AC SS utilized more *literacy strategies* ($F = 6.29, p = .05, \eta^2 = .05$) and *teacher techniques* ($F = 4.47, p = .05, \eta^2 = .05$) than parents of children with NH who had lower language SSs. Significant differences also emerged between language groups for higher level FLT. Parents of children with higher AC SSs utilized more higher level FLT. ($F = 3.04, p = .05, \eta^2 = .02$) with their children compared to children with lower AC SS.

Within-group differences based on children's AC SS were also seen for parents of children with HL. Parents of children with lower AC SS utilized more *literacy strategies* ($F = 4.21, p = .05$) and more lower level FLT. ($F = 14.56, p = .0001, \eta^2 = .13$). No significant differences emerged between language groups for JBR in terms of *engagement*, *teacher techniques*, or *interactive reading* or for higher level FLT. for parents and their children with HL. In fact, of 20 parents in the higher level language group (>90 SS; range = 94–121), 15 parents (75%) utilized lower level FLT. (e.g., closed-ended questions) rather than the more expected, higher level FLT. (e.g., open-ended questions).

Correlation Analysis

A series of Pearson's product-moment correlations suggest significant positive relationships among (a) frequency of home JBR experiences, (b) all parental JBR subscales, (c) parents' use of higher level FLT., and children's oral language skills for children with NH, ranging from 0.32, $p = .05$ to 0.76, $p = .01$. Only two positive associations emerged for children with HL: (a) frequency of home JBR experiences ($AC = 0.39, p = .05$) and (2) higher level FLT. ($AC = 0.49, p = .01$ and $EC = 0.47, p = .01$).

However, analyzing individual items within between-group subscales (*literacy strategies* and *teacher techniques*) revealed significant correlations with subscale items and the PLS-4 EC SS for children with HL. In terms of *literacy strategies*, posing and soliciting questions about the book's content ($0.30, p < .05$), pointing to letters and words in the book ($0.37, p < .05$), and referring to characters and setting ($0.44, p < .01$) were positively related to

children's EC SS. Similarly, in terms of *teacher techniques*, soliciting predictions about the story (0.34, $p < .05$) was positively related to children's EC SS for the group of children with HL.

Discussion

Current research and early childhood programs highlight the importance of reading storybooks to very young children. The incorporation and practice of specific adult and child JBR behaviors during the infant and toddler years has been shown to promote academic and social success for children with NH as they enter kindergarten (Marulis & Neuman, 2010). To date, this is the first study to investigate frequency and JBR behaviors in parents and their young children with HL who utilize hearing aids. The main goal of this study was to examine two factors of JBR in two groups of parents and their young children (NH and HL).

Our first research question explored the differences between groups of parents and their children with and without HL in terms of JBR frequency, adult and child JBR behaviors, and parent FLTs used during JBR. No significant differences emerged between groups in terms of any of the items pertaining to parental perceptions of frequency of JBR at home (i.e., number of minutes per day). Furthermore, similar to prior research in families of children with NH (Colombo, 2007; Karrass & Braungart-Rieker, 2007; Raikes et al., 2006), frequency of JBR was positively related to children's expressive language skills for both groups of children.

In terms of parent and child JBR behaviors and parents' FLTs during storybook interactions, significant differences emerged after controlling for children's receptive language skills. Parents of children with HL presented more *literacy strategies* (e.g., pointing to and labeling pictures and letters within a storybook) and *teacher techniques* (e.g., elaborating on child ideas) than parents of children with NH. Similar to a recent meta-analysis of parent behaviors during JBR in NH populations (Trivette et al., 2010), it could be the case that parents of children with HL, knowing their children may be at risk for developing language delays, were intentionally utilizing more direct strategies—which were directly taught by early interventionists—to support their children's active participation and oral language skills. Unlike investigations comparing toddlers with severe to profound HL to their NH peers (Zaidman-Zait & Dromi, 2007), the children in this study with mild to severe HL, did not significantly differ in terms of child behaviors during JBR (i.e., engagement).

Language group (<90 and >90 AC SSs) analyses revealed significant differences between groups of parents and their children. For children with NH who had higher language skills, their parents provided to their children more *literacy strategies* and *teacher techniques*, and higher level FLTs, compared to parents of children who had lower language skills. However, for children with HL who had lower language skills, their parents provided more intentional *literacy strategies* and lower level FLTs than children with higher language skills. Although the parents of children with HL were employing more literacy strategies and lower level FLTs with their children with lower language skills, a shift to greater use of higher level FLTs was not seen for those children with higher language skills. For the group of children with higher language skills (>90 SS, range = 94–121), 75% of the parents

continued using lower level (e.g., closed-ended questions) rather than higher level (e.g., open-ended questions) FLT. The use of lower linguistic techniques when the child is at a higher language level may not foster ongoing language growth as effectively as using higher level FLT (Cruz et al., 2013; DesJardin & Eisenberg, 2007). Thus, parents of young children with HL may need guidance for a transition from lower to higher FLT.

Our second research question investigated relationships within each group in terms of parent JBR behaviors and FLT and children's oral language skills. Similar to prior research findings on children with NH (Trivette et al., 2010), all of the parental JBR behaviors (e.g., engagement, literacy strategies) and higher level FLT were positively related to receptive and expressive language skills for the children with NH. However, this was not the case for the group of parents and their children with HL. Similar to preschool children (DesJardin & Eisenberg, 2007) and infants and toddlers (Cruz et al., 2013) with cochlear implants, frequency of JBR and higher level FLT were positive and significantly related to children's expressive language skills. Further analyses of each item within JBR subscales, *literacy strategies* and *teacher techniques*, revealed specific JBR parental behaviors that also supported children's expressive language skills. In terms of *literacy strategies*, parental behaviors such as posing and soliciting questions about the book's content and pointing to letters and words in the book were positively related to children's EC SS. Similarly, in terms of *teacher techniques*, soliciting predictions about the story was positively related to children's EC SS. This finding highlights the importance of reading on a daily basis and providing a combination of higher level FLT (e.g., open-ended questions) with specific teacher techniques during JBR for very young children with mild to severe HL who utilize hearing aids.

Limitations

This study represented cross-sectional findings from the first assessment point of a 4-year longitudinal investigation. Thus, predictive or causal relationships cannot be inferred. It could be the case that these factors (e.g., parents' JBR behaviors) as well as other variables not explored at this first assessment (e.g., children's type of early intervention) may have an influence on later oral language skills in this young population of children with mild to severe HL. Such future analyses are expected to provide a broader understanding of the underlying mechanisms that explain outcomes and guide early intervention efforts. In addition, although this is a fairly large sample of parents and children, the majority is categorized as being Caucasian English speakers. Culturally and linguistically diverse parents and children enrolled in future studies are expected to provide information that is representative of the population at large (McNaughton, 2006). Despite these limitations, findings from this study highlight the importance of JBR in a very young population of children with HL.

Implications for Early Intervention

National and international awareness is growing about the importance of reading storybooks to very young children (Trivette et al., 2010). Although families of young children with HL have greater opportunities than ever before to receive and derive benefit from early intervention, variability in language skills remains evident even among children who receive

these interventions (Fitzpatrick et al., 2007). The results of the present study shed light on goals for professionals in early intervention as they guide and support parents and caregivers of young children with HL.

JBR is one way that early childhood professionals can promote language skills for young children with HL. Strategies embedded into storybook interactions may need to be intentionally taught and supported, while parents and caregivers are reading with their young children (DesJardin & Ambrose, 2010). Specific strategies during JBR such as asking open-ended questions and vocabulary teaching are important techniques that cultivate an interest in reading and support new language and reading comprehension for young children with HL (DesJardin, Ambrose, & Eisenberg, 2009; Fung et al., 2005). Higher level FLTs, especially for those children at a higher language level (> 90 SS), also support these skills.

Storybook reading experiences must be established early for young children with HL. One way to support families is through a coaching model. The role of the early interventionist in a coaching model is to provide multiple formats (e.g., demonstrations, videos, side-by-side coaching) as well as opportunities for parents or caregivers to learn the important strategies and techniques during JBR (DesJardin, 2009). Providing targeted training and practice with constructive and specific verbal feedback (e.g., use of videotaped training) are essential components of early intervention, as parents and caregivers learn the strategies that promote language learning (Friedman, Woods, & Salisbury, 2012; Hanft, Rush, & Shelden, 2004). Building a parent's sense of knowledge and competence while modeling appropriate language techniques (i.e., FLTs) specifically tailored to a child's language level also facilitates language acquisition in young children with HL (DesJardin, 2006). Infants and toddlers with HL, assisted by appropriately fitted hearing aids that enable speech to be audible, will benefit from multiple opportunities of JBR interactions with caregivers that embed intentional strategies and FLTs to support their language development.

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Appendix. The Responsive Adult–Child Engagement During JBR (RACED-JBR) Scale

PARENT/CAREGIVER BEHAVIORS		CHILD BEHAVIORS	
A. Engagement		A. Engagement	
1. Sustains interest and attention through nonverbal behaviors (e.g., eye contact, facial expressions, laughing, touch).		Seeks and maintains physical proximity.	
2. Provides positive verbal feedback (e.g., “Good job!” “You did it!” “You’re right!”).		Visually attentive (e.g., looking at the book or the parent).	
3. Utilizes emotional language and intonation for child (e.g., “There’s Spot—Hi Spot!”).		Listens to the story (e.g., is quiet when adult is speaking) and sustains interest/engagement.	
4. Makes continued efforts to engage child in story/interaction if initial attempt does not work.		Appears “settled” for the interaction (e.g., does not wander around the room).	
5. Attempts to promote and maintain close proximity to child (e.g., child on lap, child close by, parent attempts to move toward the child).		Holds the book and/or turns the pages on own (e.g., treats book nicely, turns pages carefully).	
6. Monitors child’s comprehension by looking at child’s behaviors (e.g., facial expressions, child movements) and modifying interaction accordingly (e.g., repeating words, re-engaging child as needed).			
B. Literacy Strategies		B. Interactive Reading	
1. Points to/labels pictures/objects in the book.		Responds (verbally or nonverbally) to questions about the book.	
2. Poses and solicits questions about the book’s content (e.g., to enhance text or expand topic).		Attempts to relate the book’s content to personal experiences or previous books.	
3. Points to words/letters/sentences while reading.		Offers spontaneous ideas about the story or related topics.	

PARENT/CAREGIVER BEHAVIORS		CHILD BEHAVIORS	
4. Refers to characters or setting.		Poses questions about the story and related topics.	
		Refers to characters or setting.	
		Recalls information from earlier in the story.	
		Makes predictions about what will happen next.	
C. Teacher Techniques		C. Guided Reading	
1. Relates content of book to prior experience (e.g., "Look, there's a doggie just like our dog, Otis").		Points to words while parent is reading.	
2. Elaborates on child ideas.		Points to/comments on pictures and labels objects and/or identifies words.	
3. Defines new vocabulary.		Repeats words/phases with or after the adult speaks them (e.g., imitations).	
4. Solicits predictions.		Displays positive nonverbal feedback/reactions (e.g., laughing, smiling).	
5. Reviews beginning, middle, and end of book.		Displays overall enjoyment of storybook interaction.	
D. Interactive Reading			
1. Gives child opportunity to hold the book and turn the pages.			
2. Responds to child's vocalizations or answers child's questions.			
3. Follows child's lead (e.g., allows child to make choices).			
4. Utilizes appropriate speed and volume of speech.			
5. Allows time for child to process, observe, or respond (e.g., does not talk continuously to fill up silence, but rather allows pauses).			
Parent Total Scores			
A _____ B _____ C _____ D _____ Total _____			

SCORE (0–3)

3 = most of the time (80% of time)

2 = some of the time (50%–79% of time)

1 = infrequently (<49% of time)

0 = no evidence

Child Total Scores

A _____ B _____ C _____ Total _____

Table 1

Description and Examples of Facilitative Language Techniques (FLT).

FLT	Description	Example
Lower level		
Linguistic mapping	Putting into words or interpreting the child's vocalization that is not recognizable as a word.	Child vocalizes as she is looking at the storybook and parent says, "doggie."
Comments	Statement or phrase that signals that a message has been received or an utterance to keep conversation going.	Mother says, "yeah!" or "thank you."
Imitation	Repeating verbatim the child's preceding vocalization without adding any new words.	Child says, "baby" and mother says, "Yes, baby."
Label	Stating the name for a picture in the storybook.	Father says, "There is a doggie."
Directive	Tells or directs child to do something.	Parent says, "Look at this picture."
Closed-ended question	Stating a question in which the child can only answer with a one-word response.	Father asks child, "Do you like this book?"
Higher level		
Parallel Talk	Parent talks aloud about what the child is directly looking at or referencing.	Child is looking directly at a picture of a frog and parent says, "The frog is jumping off the log."
Open-ended question	Parent provides a phrase/question in which the child can answer using more than one word.	While looking at a picture, parent says, "What is happening in this picture?"
Expansion	Parent repeats child's verbalization providing a more grammatical and complete language model without modifying the child's word order or intended meaning.	Child says, "baby cry" and the caregiver says, "The baby is crying."
Recast	Parent restates the child's verbalization into a question format.	Child says, "baby cry" and the caregiver says, "Is the baby crying?"

Table 2

Demographic Characteristics of Parents in Study.

Parent characteristic	Child with hearing loss (<i>n</i> = 45)	Child with normal hearing (<i>n</i> = 60)
Age in years <i>M</i> (<i>SD</i>)	33.6 (6.4)	33.7 (5.7)
Age range	19–50	19–43
Gender <i>n</i> (%)		
Male (father)	1 (1.0)	3 (5.0)
Female (mother or grandmother)	44 (99.0)	57 (95.)
Race <i>n</i> (%)		
Caucasian	34 (75.6)	48 (80.0)
African American	2 (4.4)	6 (10.0)
Asian	3 (6.7)	3 (5.0)
Other	3 (6.7)	3 (5.0)
Ethnicity <i>n</i> (%)		
Hispanic	12 (26.7)	11 (18.3)
Non-Hispanic	33 (73.3)	49 (81.7)
Highest education level <i>n</i> (%)		
high school	6 (13.3)	5 (8.4)
Some college	13 (28.9)	13 (21.7)
College degree	21 (46.7)	26 (43.3)
Postgraduate	4 (8.9)	15 (25.0)
Unknown	1 (2.2)	1 (1.7)
Household annual income <i>n</i> (%)		
US\$49,000	14 (31.0)	13 (21.7)
US\$50,000	15 (33.4)	20 (33.3)
US\$100,000	12 (26.7)	23 (38.3)
Not reported	4 (8.9)	4 (6.7)
Marital status <i>n</i> (%)		
Married	32 (71.1)	48 (80.0)
Single or living with partner	12 (26.7)	12 (20.1)
Divorced	3 (7.1)	0 (0.0)
Unknown	1 (2.2)	0 (0.0)

Note. NH = normal hearing; HL = hearing loss.

^aSignificant differences between groups.

Table 3

Demographic Characteristics of Children in Study.

Child characteristic	Child with hearing loss (<i>n</i> = 45)	Child with normal hearing (<i>n</i> = 60)
Age in months <i>M</i> (<i>SD</i>)	25.8 (13.5)	18.6 (10.4)***
Age range in months	11–49	11–48
Gender <i>n</i> (%)		
Male	22 (48.9)	30 (50.0)
Female	23 (51.1)	30 (50.0)
Race <i>n</i> (%)		
Caucasian	39 (80.0)	48 (80.0)
African American	2 (4.4)	5 (8.3)
Asian	3 (6.7)	2 (3.3)
Other	4 (8.9)	5 (8.3)
Ethnicity <i>n</i> (%)		
Hispanic	12 (26.7)	11 (18.3)
Non-Hispanic	33 (73.3)	49 (81.7)
Newborn hearing screening <i>n</i> (%)	38 (84.4)	
Hearing loss <i>n</i> (%)		
Mild (PTA-4 = 21–39 dB)	15 (33.3)	NA
Moderate (PTA-4 = 40–54 dB)	18 (40.0)	NA
Moderately severe (PTA-4 = 55–69 dB)	11 (24.4)	NA
Severe (PTA-4 = 70–89 dB)	1 (2.2)	NA
Age at hearing loss <i>M</i> (range)	6.2 months (birth–40)	NA
Age at hearing aid use <i>M</i> (range)	9.5 months (1–40)	NA
Age of enrollment in early intervention	9.5 months (3–40)	NA
PTA-4 BTE-unaided <i>M</i> (range)	45.7 (21–40)	NA
AC SS <i>M</i> (range)	89.6 (50–121)	100.1 (76–142)***
AC Age Equivalent <i>M</i> (range)	23.6 months (8–55)	21.6 months (10–75)**
EC SS <i>M</i> (range)	98.2 (61–131)	108.6 (82–137)**
EC Age Equivalent <i>M</i> (range)	25.6 months (11–65)	23.2 months (11–65)**

Note. PTA-4 = Pure-tone average threshold (hearing level from 500 Hz to 4000 Hz for both ears); AC SS = *Preschool Language Scale-4* Auditory Comprehension standard score (controlling for child age); BTE = Behind the ear; EC SS = *Preschool Language Scale-4* Expressive Communication standard score (controlling for child age). NH = normal hearing; HL = hearing loss

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4
 Summary Scores for Joint Book Reading Subscales of the Responsive Adult–Child Engagement During JBR Scale.

Subscale	Child with hearing loss (<i>n</i> = 45)		Child with normal hearing (<i>n</i> = 60)		<i>F</i> scores	<i>p</i> values	η^2
	<i>M</i> (<i>SD</i>)		<i>M</i> (<i>SD</i>)				
Parent							
Engagement	12.50 (3.74)		12.70 (3.53)		0.039	.845	.00
Literacy strategies	7.58 (2.50)		6.16 (2.73)		11.34	.001	.10
Teacher techniques	4.07 (3.39)		3.12 (3.09)		4.79	.031	.05
Interactive reading	9.37 (3.83)		10.00 (3.12)		0.000	.984	.00
Total behaviors	33.74 (10.32)		32.12 (9.94)		2.78	.101	.03
Child							
Engagement	10.83 (3.99)		10.57 (3.21)		1.42	.237	.01
Interactive reading	4.57 (4.78)		3.67 (4.12)		2.39	.126	.02
Guided reading	6.62 (3.45)		6.18 (3.14)		1.20	.275	.01
Total behaviors	22.33 (10.12)		20.25 (8.51)		3.01	.086	.03

Note. JBR = joint book reading; NH = normal hearing; HL = hearing loss.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 5

Summary Scores for Parent Facilitative Language Techniques (FLTs).

FLT	Child with hearing loss (<i>n</i> = 45)		Child with normal hearing (<i>n</i> = 60)		<i>F</i> scores	<i>p</i> values	η^2
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)			
Total parent utterances	144.58 (62.33)	107.82 (64.51)	9.72	.002	.09		
Total higher level FLTs	51.92 (29.10)	43.88 (42.31)	3.12	.061	.02		
Proportional score HLTs	0.38 (0.19)	0.35 (0.18)	1.60	.209	.01		
Open-ended question	13.71 (9.18)	12.32 (14.78)	3.31	.069	.03		
Expansion	0.95 (1.30)	1.88 (4.33)	1.27	.264	.03		
Expiatiation	0.55 (1.69)	0.17 (0.56)	1.80	.182	.02		
Recast	1.44 (2.37)	1.17 (2.19)	1.03	.312	.01		
Parallel talk	30.82 (26.80)	27.75 (28.41)	1.55	.216	.02		
Total lower level FLTs	92.29 (52.39)	64.37 (33.79)	8.53	0.002	.09		
Proportional score LLTs	0.80 (0.78)	0.65 (0.18)	0.526	0.470	.00		
Closed-ended question	18.86 (8.34)	17.70 (12.75)	1.83	1.79	.02		
Imitation	2.76 (3.55)	2.53 (5.18)	0.874	0.352	.01		
Label	17.19 (20.72)	4.75 (4.60)	13.33	0.000	.12		
Directive	23.33 (21.29)	16.60 (13.00)	0.787	0.377	.01		
Comment	28.74 (19.19)	22.08 (14.97)	5.66	0.019	.06		
Linguistic mapping	2.05 (5.43)	.55 (1.11)	5.17	0.025	.05		

Note. NH = normal hearing; HL = hearing loss; HLT = higher level techniques; LLT = lower level techniques.

Table 6

Summary Scores for Joint Book Reading (JBR) and Facilitative Language Techniques (FLT) Within Language Groups.

Parent JBR subscales & FLTs	Child with normal hearing (<i>n</i> = 60)		Child with hearing loss (<i>n</i> = 45)	
	90 AC SS (<i>n</i> = 30)	>90 AC SS (<i>n</i> = 30)	90 AC SS (<i>n</i> = 25)	>90 AC SS (<i>n</i> = 20)
Engagement	13.23* (2.73)	12.17 (4.16)	12.88 (4.13)	12.05 (3.25)
Literacy strategies	6.07 (2.21)	6.27* (3.20)	8.68 (2.95)*	7.60 (1.88)
Teacher techniques	2.37 (2.17)	3.87* (3.40)	4.20 (3.88)	3.80 (2.74)
Interactive reading	10.10 (2.91)	9.90 (3.37)	9.00 (3.98)	10.45 (3.35)
Total lower level FLTs	60.23 (36.70)	68.50 (30.65)	107.32*** (64.61)	79.30 (12.38)
Total higher level FLTs	36.33 (36.81)	50.23* (45.70)	47.52 (27.21)	54.85 (34.30)

Note. AC SS = *Preschool Language Scale* (4th ed.) Auditory Comprehension standard score. NH = normal hearing; HL = hearing loss.

* $p < .05$.

** $p < .01$.

*** $p < .001$.