

The Role of Early Intervention in Parental Self-Efficacy for Families of Children Who Are Deaf or Hard-of-Hearing

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Abstract

Purpose: To investigate the effects of age at enrollment in early intervention (EI) and dosage of EI services (frequency and intensity) on parental self-efficacy (PSE) and to determine whether parents with better PSE demonstrate more involvement in deciding Individualized Family Service Plan (IFSP) goals, services, and amount of services.

Method: Sixty-five parent-child dyads were included in this retrospective between-subjects study. PSE was measured using the Scale of Parental Involvement and Self-Efficacy (SPISE; DesJardin, 2003). Dosage of EI services and parent/professional involvement in IFSP decision-making were measured using a Child Demographic Questionnaire.

Results: Statistically significant correlations were not found between age at EI enrollment and SPISE subscales. Statistically significant correlations were not found based on frequency or intensity of EI services. Mixed results were found regarding level of parent involvement in decision-making of IFSP goals, kinds of services, and amount of services.

Conclusions: Findings demonstrate the complexities in determining the effects of age at EI enrollment, EI dosage, and central elements of the IFSP on self-efficacy in parents of children who are deaf or hard-of-hearing. Future studies are needed to validate these findings and further the knowledge base about the role of EI in supporting parents' sense of self-efficacy in supporting their child's development.

Keywords: parental self-efficacy, early intervention, deaf or hard-of-hearing

Acronyms: CDQ = Child Demographic Questionnaire; CI = cochlear implant; DHH = deaf or hard of hearing; EI = early intervention; FLT = facilitative language technique; HA = hearing aid; IFSP = Individualized Family Service Plan; PSE = parental self-efficacy; SPISE = Scale of Parental Involvement and Self-Efficacy

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A fundamental goal of early intervention (EI) is to foster parental self-efficacy (Moeller et al., 2013). Grounded in Bandura's social learning theory, parental self-efficacy is the belief that one is capable of positively impacting child development and confident in carrying out parenting tasks to do so (Bandura, 1989). Parental self-efficacy has been identified as a predictor of parental functioning and can mediate the effects of infant temperament and social support on postpartum depression (Coleman & Karraker, 1998). Research demonstrates the benefits of positive self-efficacy for both parents and children, including markers of healthy parent-child relationships, such as parental responsiveness (Teti et al., 1996), having home routines, and setting appropriate developmental goals (Albanese et al., 2019).

Parents who are self-efficacious have the knowledge to set appropriate goals for their child, as well as the tenacity to carry out the requisite tasks to help their child achieve those goals. Conversely, parents who doubt their ability to support their child's development might be less likely to acquire new knowledge, or apply the knowledge they have. To feel confident and competent, parents must: (a) be knowledgeable about various childcare responses (i.e., setting appropriate limits for preschool-age child), (b) be confident in their ability to carry out such tasks; and (c) hold the belief that their child will respond contingently (Coleman & Karraker, 1998).

Self-efficacy is considered a dynamic process, not a fixed trait; when new situations arise, it is possible for individuals to

acquire the knowledge to face those situations and develop the confidence to do so. In the case of parents, it is possible to gain knowledge and acquire new skills, thereby bolstering confidence in parenting. In fact, experiencing success is one of four primary sources of self-efficacy (Bandura, 1989). Conversely, experiencing failures—especially multiple failures—can result in low self-confidence. A second source of self-efficacy is social modeling. For families of children who are deaf or hard-of-hearing (DHH), interacting with and observing other parents of children who are DHH might boost parents' sense that they can successfully raise their child. A third source is social persuasion. For example, a parent of an infant who did not pass their newborn hearing screening may feel encouraged and empowered to follow through with diagnostic audiological testing after talking with a parent who has experienced this process. And finally, emotional arousal, or feelings of stress, can be a source of self-efficacy, or inefficacy. Parents who feel especially anxious about a particular situation may experience feelings of fear and doubt, and subsequently inaction. For instance, the parent who finds early intervention sessions stressful due to worries about having a messy house may be less inclined to fully participate in those sessions.

Parental Self-Efficacy and Children Who Are Deaf or Hard-of-Hearing

DesJardin and colleagues have conducted several foundational studies on the role maternal self-efficacy plays in supporting their children's language development, as well as managing use of sensory devices (e.g., DesJardin, 2005; DesJardin, 2006; DesJardin & Eisenberg, 2007). Using a measurement of parental self-efficacy developed for parents of children who are DHH, the Scale of Parental Involvement and Self-Efficacy (SPISE; DesJardin, 2003), these studies have revealed several important findings. A newly revised version—the SPISE-R—offers updated items and an expanded number of sections, including Parent Beliefs, Knowledge, Confidence, and Actions (Ambrose et al., 2020). Results from the original SPISE indicate that better self-efficacy is positively associated with maternal linguistic input, specifically use of facilitative language techniques (FLT; DesJardin, 2006; DesJardin & Eisenberg, 2007). FLTs are markers of quality parental language input. Higher-level FLTs (e.g., parallel talk, expansion, recast, open-ended questions) promote more complex language in young children at risk for either a delay due to a disability that may interfere with typical development (Baumwell et al., 1997) or an impoverished language environment (Hart & Risley, 1999). In contrast, lower-level FLTs (e.g., labeling, imitating, linguistic mapping, close-ended questions) are less effective than higher-level FLTs at promoting spoken language skills in children who are DHH (Cruz et al., 2013). More precisely, maternal use of open-ended questions was found to be positively associated with children's expressive language skills, and maternal recast was positively associated with children's receptive language skills.

In addition to maternal self-efficacy and involvement being related to quality of parental input, quantity (e.g., mean length of utterances, total word-types) of parental linguistic

input supports children's spoken language development (DesJardin & Eisenberg, 2007). As Cruz et al. (2013) found, recast and open-ended questions (higher-level FLTs) were predictors of expressive language growth and associated with children's better receptive language abilities. Moreover, longer utterances and a greater number of word types used were positively related to children's spoken language. Considering the variability in outcomes for children who are DHH who use cochlear implants (CIs; Niparko et al., 2010), parental self-efficacy is a source of individual differences in child language development worth further investigation because it likely is malleable through early intervention.

Mothers of children who are DHH indicate that they feel more capable and comfortable in managing their child's hearing aid (HA) and/or CI than supporting their child's language development (DesJardin, 2005; DesJardin & Eisenberg, 2007). This may be due to the more straightforward nature of checking batteries and conducting daily listening checks compared to the unexpected task of actively supporting their child's speech and language development. Additionally, it could be due to the importance placed on effective device use by their audiologist and early interventionists. To more fully enhance children's language growth, parents also need to feel confident in their role as language models. This requires a shift in terms of how parents view their role in their children's language development and, thus, the need for supporting parents early in their journey through education and coaching (DesGeorges, 2016).

Parental self-efficacy has been reported to differ between mothers of children with HAs and mothers of children with CIs (DesJardin, 2005). Specifically, relative to mothers of children with HAs, mothers of children with CIs perceived themselves as being more involved in managing their child's device, in particular carrying out a daily listening check with their child. Mothers of children with CIs also reported more involvement in supporting their child's spoken language development, including feeling included and comfortable participating in EI sessions, as well as engaging in language activities at home. Additionally, according to DesJardin (2005), mothers of children with HAs who entered EI earlier reported feeling more competent and confident in managing their child's device and more involved in their child using their device compared to those who enter EI later (although *earlier* and *later* were unspecified). This suggests that early entrance into intervention might be particularly important for supporting parents' development of self-efficacy when their child has a less severe loss and are likely receiving less-frequent intervention compared to parents of children with CIs.

Although research consistently demonstrates benefits of early enrollment in EI for children who are DHH in terms of language development (Yoshinaga-Itano, 2003; Yoshinaga-Itano et al., 1998), less attention has been paid to the effects of early enrollment on parent self-efficacy. Evidence shows that quality EI services can positively influence growth across developmental domains, particularly language. For children who are DHH, early identification and timely enrollment are related to better expressive (Pipp-Siegel et al., 2003; Yoshinaga-Itano et al., 2010) and receptive language

outcomes (Kennedy et al., 2006). Moreover, timely diagnosis and enrollment in EI are strong predictors of expressive and receptive language in children across the range in hearing levels (Holzinger et al., 2011). It is possible that an aspect of the advantage of early enrollment in EI is that it facilitates parent self-efficacy.

Another question related to EI and self-efficacy in parents of children who are DHH is *how much* EI service matters. Do more frequent visits and visits that last longer support parents' perceptions of self-efficacy? Traditional measures of EI *dosage* have been in terms of duration (e.g., time spent receiving EI services from enrollment to transition), intensity (e.g., number of hours an EI provider works with a family), and comprehensiveness (e.g., number of types of services provided, such as occupational therapy or vision services; Guralnick, 1989.) The current investigation takes a slightly different approach to quantifying dosage by focusing on frequency of EI services per month and duration of sessions. Presently, there are no empirically supported recommendations for EI dosage, however, general trends in frequency of sessions fall between once a week and once a month, or based on family need. Duration of EI sessions typically fall between 30 to 90 minutes.

A further consideration regarding parent self-efficacy is the role of parent involvement in developing the driver of EI, the Individualized Family Service Plan (IFSP). Developing the IFSP is a collaborative effort between families and professionals; beginning with identifying the child's strengths and the family's resources, priorities, and concerns. These discussions, along with evaluation and assessment information, guide the IFSP team (e.g., parents/family members, family advocate, service coordinator, EI providers, and other professionals as needed) in determining IFSP goals. Setting goals leads to determining other key elements of the IFSP, including kinds of services (e.g., speech-language, occupational therapy, physical therapy), and intensity (e.g., frequency and length of sessions). Furthermore, we do not know if parents with better ratings of self-efficacy are more involved in determining critical aspects of the IFSP. Therefore, the current study was motivated by the following research questions:

- (1) What effect does age at enrollment in EI services have on parental self-efficacy (PSE)?
- (2) What effect does dosage of EI services (frequency and intensity) have on PSE?
- (3) Do parents with better self-efficacy demonstrate more involvement in deciding IFSP goals, services, and amount of services?

Materials and Method

Participants

Parents/Caregivers

A total of 65 parent-child dyads from a larger longitudinal study investigating the role of the family environment on spoken language and executive function outcomes in children who are DHH were included in this investigation. The data used in this investigation constitute those obtained from

families of children who are DHH at their first of three visits who were enrolled at the time the data were analyzed. The vast majority of parents/caregivers were female ($n = 61$). From this point forward the term parent(s) will be used to encompass mothers, fathers, and other caregivers. Over half of the parents had earned a four-year college or graduate degree and the majority reported a household income of \$50,000 or more. All of the parents were hearing and used English in the home. See Table 1 for parent demographic information.

Children

Children had prelingual bilateral sensorineural hearing loss ranging from moderate to profound with no additional neurodevelopmental disabilities directly related to deafness. All of the children used HAs ($n = 29$) or CIs ($n = 36$) in accordance with their degree of hearing loss. The average chronological age of the children was 6.25 years; and 37 were girls and 28 were boys. All children's hearing loss was identified by 3 years of age, with the vast majority being

Table 1
Parent/Caregiver Demographics

Characteristics	<i>N</i>	Percent	Frequency
Highest Education Level	65		
High School graduate		12.3	8
Associate's degree		10.8	7
Some college		21.5	14
Bachelor's degree		32.8	21
Master's/PhD/ Professional		23.1	15
Annual Household Income	64		
Under \$5,500–\$24,999		10.9	7
\$25,000–\$49,999		15.6	10
\$50,000–\$94,999		31.6	20
\$95,000 and over		42.2	27

identified through newborn hearing screening. All children received EI services by age 3 years ($M = 8.44$, range 1–28 months at EI enrollment) and those with cochlear implants were implanted by age 3.5 years. Most of the children were White with small numbers identifying as Black, Asian, or biracial (e.g., Black/White, Asian/White, Native American/White). Child demographics are presented in Table 2.

Measures

Child Demographic Questionnaire (CDQ)

The CDQ consists of two sections. The first section (CDQ1) collects basic demographic information about the family

and child. The second section (CDQ2) collects information pertaining to the child's hearing loss, including age at diagnosis, age at sensory device fitting, and aided word recognition. Also included are questions about the child's EI and education history, including frequency and length of EI sessions, as well as identifying who made decisions related

Table 2
Child Demographics

Characteristics	Mean (SD; range)
Age at test	6.25 (1.6)
Age at ID (months)	3.1 (7.1; 1–36)
Age at EI enrollment (months)	8.47 (7.4)
Age at first CI	21.85 (12.9)
Age at first HA	8.59 (7.6)
Race (percent)	
White	84.6
Black	8
Black/white	5
Asian/white	2
American Indian or Alaskan Native/white	2
Ethnicity (percent)	
Non-Hispanic	97
Hispanic	3

Note. ID = identification of hearing status; EI = early intervention; CI = cochlear implant; HA = hearing aid.

to IFSP goals, kinds of services received, and frequency and duration of services. The CDQ1 was mailed to families prior to a home visit to collect further data about the family's home environment for the larger, ongoing research study. Parents completed the CDQ2 with the clinical researcher during the home visit. Both parts of the CDQ were collected from the family at the home visit.

Scale of Parental Involvement and Self-Efficacy (SPISE)

The SPISE (DesJardin, 2003) is a self-report questionnaire designed to measure parents' perception of self-efficacy and involvement related to managing their child's amplification use and supporting their child's speech-language development. The questionnaire consists of three sections: Demographic Information, Self-Efficacy, and Parental Involvement. In lieu of having families complete the demographic section of the SPISE, the CDQ was used to collect pertinent demographic information. The remaining two sections of the SPISE, Self-Efficacy and Parental Involvement, are each divided into two subscales: Child Amplification Use and Speech-Language Development. The Self-Efficacy section includes five questions about parents' ability to manage and maintain their child's sensory device and the extent to which they feel like they can affect their

child's language development. The Parental Involvement subscale consists of five questions about device maintenance and seven questions about affecting language development. All items use a 7-point Likert rating scale. Descriptive statistics were calculated for SPISE outcomes for each of the four subscales: (a) Self-Efficacy: Amplification Use; (b) Self-Efficacy: Speech-Language Development; (c) Parental Involvement: Amplification Use; and (d) Parental Involvement: Speech-Language Development.

Procedures

Families were recruited from two universities and their respective partner children's hospitals, as well as through community groups and word of mouth. Two clinical researchers with extensive experience working with children who are deaf and their families visited families' homes to carry out behavioral testing. One researcher worked with the child and one with the parent. Visits lasted up to 2.5 hours (these data constitute a subset of what was collected at the visit). In addition, primary caregivers were mailed a packet of questionnaires, including the CDQ1 and the SPISE, to complete prior to the home visit. All research was approved by the local IRB.

Data Preparation and Analyses

Due to lack of normal distribution, frequency and length of EI sessions were divided into two categories. Frequency of EI sessions per month were categorized as 1–2 visits or ≥ 3 visits. Visit length was categorized as 30–45 minutes and > 45 minutes. IFSP/service plan variables (who decided goals, kinds of services, and amount of services) also were divided into two categories: *my family/my family* and *a professional* made these decisions, or *the professional* made these decisions.

Of note, three parents reported that their children began EI services much later than the rest of the children in the current sample. These participants were removed from the sample due to their age at enrollment falling more than three standard deviations above the mean. One child entered EI at 28 months, which is less than a year from exiting EI services at the standard 3 years of age. Two children actually entered EI after the standard EI timeframe, birth to 3 years. Age at enrollment among these three participants stand in contrast with a mean age of 8.77 months ($SD = 7.4$) for the remaining participants.

Results

Descriptive Statistics

Table 3 displays descriptive statistics for each of the SPISE subscales. Average scores on the Self-Efficacy of Amplification Use and Speech-Language Development subscales fell on the high end of the 7-point Likert scale. Average scores on the Parental Involvement in Speech-Language Development subscales were somewhat lower and were quite a bit lower for Parental Involvement in Child's Amplification Use.

No statistically significant differences were found between parents of children with HAs and parents of children with CIs on three of the SPISE subscales, including Self-Efficacy

of Speech-Language Development (mean HA = 5.9; mean CI = 6.2), Parental Involvement in Child's Amplification Use (mean HA = 3.8; mean CI = 3.6), and Parent Involvement in Speech-Language Development (mean HA = 5.0; mean CI = 5.1). Parents of children with HAs ($M = 5.1, SD = .61$) had significantly lower scores than those of children with CIs ($M = 6.34, SD = 1.03$) on Self-Efficacy of Amplification Use, $t(58) = 6.04, p < .001$. Age at enrollment in EI also was not significantly different ($p = .655$) between children with HAs (9.0) and those with CIs (8.1).

Descriptive statistics were also calculated for frequency and length of EI sessions (see Table 4). Note that a small number

Table 3
Descriptive Data for the Scale of Parental Involvement and Self-Efficacy

Subscales	N	Mean	SD
Self-efficacy			
Sensory aid use	65	5.8	1.0
Speech-language development	65	6.1	0.8
Parental involvement			
Sensory aid use	65	3.7	0.6
Speech-language development	65	5.1	0.9

of parents did not complete the questions about frequency and length of EI session. Just over half of families reported that they received EI services 3 or more times per month; the remaining families received EI services 1 to 2 times per month or did not respond. The majority of families reported that EI sessions were longer than 45 minutes, with a small percentage reporting participating in EI sessions that lasted 30–45 minutes. No statistically significant differences were found between parents of children with HAs versus CIs on frequency ($p = .203$) or length of EI sessions ($p = .736$).

Table 5 displays the descriptive statistics for who made decisions regarding IFSP goals, kinds of services, and amount of services. Of the 65 responses, the majority of parents reported that either their family or their family in collaboration with professionals determined IFSP goals. The responses to who decided the kinds of EI services and amount of services was split almost evenly between (a) families who reported that their family or their family with a professional made these decisions, and (b) those reporting that the professional alone made the decision.

An independent samples *t*-test was conducted to compare each of the three aspects of decision-making based on type of device (e.g., HA or CI). No statistically significant differences were found between parents of children with HAs versus CIs regarding who decided goals ($p = .780$) or kinds of services ($p = .778$). A statistically significant difference was found between parents of children with HAs and parents of children with CIs regarding deciding the amount of services,

Table 4
Descriptive Data for Early Intervention (EI) Dosage

Variable	N	Percent	Frequency
Number of EI visits per month			
1–2 visits/month		40	24
3+ visits/month		60	36
Average length of EI sessions			
30–45 minutes		16.4	10
More than 45 minutes		83.6	51

$t(63) = 2.43, p = .018$. Compared to parents of children with CIs (36%), more parents of children with HAs (66%) reported that the professionals determined the amount of services.

Correlation Analyses: Age at Enrollment in EI Services and Parental Self-Efficacy

There were no statistically significant correlations between age at enrollment and any subscale of the SPISE: Self-Efficacy of Device Use ($p = .987$), Self-Efficacy of Speech-Language Development ($p = .672$), Parental Involvement in Device Use ($p = .756$), and Parental Involvement in Speech-Language Development ($p = .831$). See above for values of each *p*.

Table 5
Descriptive Data for Individualized Family Service Plan (IFSP) Decision-Making

Variable	N	Percent	Frequency
Who decided the goals or outcomes for your child on their IFSP or Service Plan?			
Mostly my family/our family and professionals together	65	83.1	54
Mostly the professionals		16.9	11
Who decided the kinds of services for your child on their IFSP or Service Plan?			
Mostly my family/our family and professionals together	65	53.8	35
Mostly the professionals		47.7	31
Who decided on the amount of services for your child on their IFSP or Service Plan?			
Mostly my family/our family and professionals together	65	50.8	33
Mostly the professionals		49.2	32

Relation Between Dosage of EI Services and Parental Self-Efficacy

Independent samples *t*-tests were conducted to compare group means on each of the SPISE subscales between families who received on average 1 to 2 EI sessions per month and those who received 3 or more visits per month. No statistically significant differences were found between the two groups on any of the SPISE subscales: Self-Efficacy of Device Use for families receiving 1 to 2 EI sessions ($M = 5.68$, $SD = .99$) and 3 or more EI sessions ($M = 6.04$, $SD = .92$) per month, $t(58) = -1.422$, $p = .160$; Self-Efficacy of Speech-Language Development for families receiving 1 to 2 EI sessions ($M = 6.06$, $SD = .93$) and 3 or more EI sessions ($M = 6.10$, $SD = .73$) per month, $t(58) = -.182$, $p = .856$; Parental Involvement in Sensory Device Use for families receiving 1 to 2 sessions ($M = 3.80$, $SD = .68$) and 3 or more sessions ($M = 3.65$, $SD = .57$) per month, $t(58) = .957$, $p = .342$; and Parental Involvement in Speech-Language Development for families receiving 1 to 2 sessions ($M = 5.14$, $SD = 1.03$) and 3 or more sessions ($M = 4.98$, $SD = .89$) per month, $t(58) = .619$, $p = .538$.

Independent samples *t*-tests also were conducted to compare means on each of the SPISE subscales between families whose EI sessions ranged from 30 to 45 minutes and those who received visits that lasted more than 45 minutes. As with frequency of EI services, there were no significant differences on SPISE subscales between these two groups: Self-Efficacy of Sensory Device Use for families receiving 30–45 minute EI sessions ($M = 5.62$, $SD = 1.13$) and those receiving EI sessions lasting more than 45 minutes ($M = 5.88$, $SD = 1.03$), $t(59) = -.742$, $p = .461$; Self-Efficacy of Speech-Language Development for families receiving 30–45 minute EI sessions ($M = 5.74$, $SD = .98$) and those receiving EI sessions lasting more than 45 minutes ($M = 6.09$, $SD = .82$); $t(59) = -1.222$, $p = .226$; Parental Involvement in Sensory Device Use for families receiving 30–45 minute EI sessions ($M = 3.66$, $SD = .61$) and those receiving EI sessions lasting more than 45 minutes ($M = 3.74$, $SD = .62$); $t(59) = -.404$, $p = .688$, and Parental Involvement in Speech-Language Development for families receiving 30–45 minute EI sessions ($M = 4.73$, $SD = .88$) and those receiving EI sessions lasting more than 45 minutes ($M = 5.1$, $SD = .98$), $t(59) = -1.142$, $p = .258$.

Parental Self-Efficacy and Involvement in IFSP Decision-Making

Independent samples *t*-tests were conducted to compare group means on each of the SPISE subscales for two groups of families: those who reported that their family or their family with a professional decided IFSP goals, services, and amount of services; and families who reported that the professionals decided on these aspects of the IFSP. Independent samples *t*-tests were also conducted to compare group means of parents of children with HAs and parents of children with CIs on each of the aforementioned variables.

Who Decided: IFSP/Service Plan Goals

There was not a statistically significant difference in Self-Efficacy for Amplification Use or Speech-Language Development ($p \geq .454$) between families reporting that they

alone or with the help of professionals decided IFSP goals and families reporting that professionals decided goals. In contrast, there was a statistically significant difference in Parent Involvement in Amplification Use, $t(63) = -2.41$, $p = .02$, with families who reported that professionals decided goals ($M = 4.16$, $SD = .66$) having higher levels of involvement in their child's sensory aid than families reporting that they alone or they with professionals decided IFSP goals ($M = 3.63$, $SD = .57$). There also was a significant difference in Parent Involvement in Speech-Language Development, $t(63) = 2.93$, $p = .005$, with families reporting that they alone or they with professionals decided IFSP goals ($M = 5.2$, $SD = .92$) having higher levels of parent involvement in speech-language than those reporting that professionals decided goals ($M = 4.18$, $SD = .86$).

Who Decided: Kinds of Services

Self-Efficacy for Amplification Use and Speech-Language Development was not significantly different based on who decided the kinds of EI services ($p \geq .569$). In contrast, there was a statistically significant difference in Parent Involvement in Amplification Use, $t(64) = -2.13$, $p = .04$, with families who reported that professionals decided kinds of services ($M = 3.97$, $SD = .61$) having higher levels of involvement in device use than families reporting that they alone or with professionals decided the kinds of services ($M = 3.61$, $SD = .58$). However, there was not a significant difference in Parent Involvement regarding Speech-Language Development between the two groups ($p = .32$).

Who Decided: Amount of Services

Families who reported that they alone or with the help of professionals decided the amount of services ($M = 6.07$, $SD = .82$) had statistically higher levels of Self-Efficacy for Amplification Use than families reporting that professionals decided the amount of services ($M = 5.49$, $SD = 1.14$), $t(63) = 2.17$, $p = .023$. Self-Efficacy for Speech-Language Development approached significance based on who decides the amount of services ($p = .07$) with families who reported that they alone or with professionals decided the amount of services having more involvement ($M = 6.25$, $SD = .69$) compared to families who reported that the professional decided amount of services ($M = 5.88$, $SD = .95$).

Concerning parent involvement, families reporting that professionals decided the amount of services ($M = 4.0$, $SD = .61$) had significantly higher levels of involvement regarding Amplification Use than families reporting that they alone or they with professionals decided amount of services ($M = 3.45$, $SD = .46$), $t(63) = -4.10$, $p = .001$. In terms of Parent Involvement in Speech-Language Development, families reporting that they alone or with professionals decided the amount of services ($M = 5.32$, $SD = .89$) had significantly higher levels of involvement compared to families reporting that professionals decided amount of services ($M = 4.8$, $SD = .96$), $t(63) = 2.234$, $p = .029$.

Discussion

The purpose of this study was to investigate parental self-efficacy relative to age at entry into EI, EI dosage (frequency

and length of EI sessions), and level of parental involvement in IFSP decision-making. Our findings indicate no statistically significant correlation between parental self-efficacy and children's age at enrollment in EI. Moreover, parental self-efficacy did not differ based on frequency and length of EI sessions. Finally, mixed results were found regarding whether parents with better self-efficacy demonstrate more involvement in deciding IFSP goals, services, and amount of services.

Overall, SPISE outcomes for the current sample of parents are comparable to outcomes from previous studies on self-efficacy in parents of children who are DHH (e.g., DesJardin, 2005; DesJardin & Eisenberg, 2007). Previous studies found that parents report better self-efficacy in managing their child's device rather than supporting their language development. In the current study, parents also reported higher levels of self-efficacy regarding device use than supporting their child's language development.

Age at EI Enrollment and Parental Self-Efficacy

DesJardin (2005) found that for mothers of children with HAs, but not for those of children with CIs, early enrollment in EI correlated with better perceptions of self-efficacy and involvement in supporting their child's language development and device management. By comparison, the current study found a correlation between age at EI enrollment and self-efficacy for sensory device use, but not speech-language development, for parents of children with HAs. Similar to DesJardin (2005), we did not find a correlation between age at enrollment into EI and SPISE outcomes for parents of children with CIs.

Comparing SPISE subscale mean scores collapsed across device group in the current study with mean scores from DesJardin (2005) indicates slight differences in three of the subscale scores, and a larger difference for one of the subscales. Parents in the current study reported slightly lower self-efficacy regarding device use (difference of .47 points) and slightly higher self-efficacy regarding speech-language development (difference of .64 points) than those in the Desjardin (2005) study. Also, parents in the current study reported lower parent involvement regarding device use compared to those in the 2005 study, with a difference of 2.63 points, and very similar scores (a difference of .07 points) on the parent involvement regarding speech-language development subscale. Of note, average scores for both groups on each subscale were rather high, ranging between 6 and 7.

One potential explanation for the relatively high subscale scores in the DesJardin (2005) study and the current study is related to the psychometrics of the tool. In the current study, the level of sensitivity in the version of SPISE administered may have been insufficient to capture the degree of parents' sense of self-efficacy. In fact, Coleman and Karraker (1998) identified several factors that have inhibited investigations of parental self-efficacy, one of which is the lack of psychometrically sound measures of the construct. Although there is a relatively long history of acknowledging parental self-efficacy in the literature as an important variable in

effectively and successfully parenting children with disabilities, there are some criticisms of the measurement tools that have been used. Most measures of parental self-efficacy, including the SPISE, are minimally validated and include rather vague descriptions of certain concepts related to self-efficacy (Coleman & Karraker, 1998).

Furthermore, translating a complex human construct like self-efficacy into a quantifiable unit is an enduring challenge (Cook & Bechman, 2006). Likert scales are a frequently-used method of capturing strength of human attributes, such as attitudes, opinions, and perceptions, but as with all forms of measurement, they come with advantages and disadvantages (Joshi et al., 2015). A major advantage of Likert scales is the ubiquity with which they are used—most people are familiar with completing them. A major disadvantage is that they are an indirect measure of multidimensional constructs (Hasson & Arnetz, 2005). Perhaps a slightly wider range in scale would provide a clearer understanding of the relation between age at EI enrollment and parent involvement and self-efficacy. Future studies might investigate parental self-efficacy longitudinally. Perhaps parents demonstrate greater self-efficacy in relation to age at enrollment further into their parenting journey beyond the birth to three years. The absence of a relationship between age at EI and parental self-efficacy may be explained by the limited variability in age at enrollment. Greater variability in age at EI, (i.e., 2 months to 3 years), might yield a different outcome.

Effect of Dosage of EI Services

The current study is the first to investigate the effects of EI dosage on parental self-efficacy among parents of children who are DHH. No significant differences in self-efficacy were found between parents who participated in EI sessions more or less frequently (e.g., 1–2 per month or ≥ 3 per month), or for shorter or longer sessions (e.g., 30–45 minutes or > 45 minutes). There are a couple considerations that should be made in explaining this null finding. The first consideration is the demographics of the current sample, which included children who are DHH without additional diagnoses. Most children were from relatively resource-rich households with college-educated parents. Hallam and colleagues (2009) indicated that Medicaid status, access to third party insurance, and children's developmental abilities influence level and intensity of EI services. If the current sample were more diverse demographically, perhaps a different outcome would have emerged. Future studies might implement research-supported strategies for recruiting and retaining underrepresented populations, including collaboration with community partners (Brannon et al., 2013; Wallerstein & Duran, 2010) and employing a dedicated staff member to walk families through the study consent process, assist in completing paperwork, and mentorship (Brannon et al., 2013; Flores et al., 2017).

The second consideration is how dosage is quantified in the current study compared to methods of quantification in previous studies (e.g., Hallam et al., 2009). Hallam and colleagues measured dosage by the number of events (e.g., visits), units (e.g., total hours within a 6-month period), and services (i.e., speech-language services, physical therapy,

occupational therapy) as opposed to the length of EI sessions measured in minutes. Furthermore, perhaps the difference between 30 to 45 minute EI sessions and sessions lasting 45 minutes or longer is too close to produce significant differences between the two groups. Also, of note, the measure of dose in the current study is based on parent report, in some cases 3 to 4 years prior to data collection. Perhaps parent recall of exact frequency and length of EI sessions influenced the findings. Future studies might evaluate parent self-efficacy in relation to EI dosage using different methods of quantification and document EI dosage information closer to the actual age of enrollment.

Parental Self-Efficacy and Involvement in IFSP Decision-Making

Analyses of parental self-efficacy and involvement in IFSP decision-making produced mixed results, some of which are seemingly counterintuitive. There was not a statistically significant difference in either type of self-efficacy between parents who were involved in determining IFSP goals or kinds of EI services and parents who were not involved. Parents perceived themselves as competent and confident in these two areas, regardless of involvement in establishing goals and determining the appropriate services.

However, differences were found between the two groups in terms of self-efficacy in determining amount of services. Goals and kinds of services may be more salient to parents compared to amount of services. Parents may feel more capable of identifying what they want for their child considering language, sensory technology, and social-emotional health, but feel less knowledgeable about *how much* will be required to achieve their goals. In partnership with EI professionals, particularly professionals with expertise in deafness, parents of children who are DHH may also have an easier time identifying the kinds of services needed. This may be due to severity of deafness or presence of a condition that makes the case for kinds of services more obvious. It may be the case that this element of services is less salient to parents, thus requiring more input from professionals.

Regarding parent involvement in device use and speech-language development, families reporting that professionals decided EI goals had higher levels of involvement in device use compared to families reporting that they decided IFSP goals or they worked with professionals to decide on goals. This finding indicates a relationship between level of parent involvement in determining IFSP goals and involvement in their child's device use, but runs counter to the expectation that the more parents are involved in developing their child's EI services, the more they would be involved in their child's use of a device. Perhaps parents, at this early point in their journey, rely on professionals to guide them in their process of setting IFSP goals and that support results in them feeling involved in managing their child's HAs or CIs. Or, perhaps the explanation lies in the training and experience of the EI providers: It is possible that highly qualified EI providers are skilled at guiding the development of IFSP goals while at the same time actively engaging parents in managing their child's devices.

There was a statistically significant difference based on level of parent involvement regarding device use (e.g., daily listening checks with the device, putting on the device, and attending scheduled audiology and speech-language appointments) in relation to determining kinds of EI services. Families reporting that professionals decided kinds of services had higher levels of involvement in their child's device use than families reporting that they alone or they with professionals decided kinds of services. This finding is somewhat counterintuitive, warranting further examination. It would be expected that the more involved parents are in the development of their child's IFSP, the more involved they would be in their child's use of a sensory device, or vice versa. There was a significant difference in parent involvement regarding speech-language development between the two groups in determining the amount of EI services. Families reporting that they were involved in the decision about the amount of services had higher levels of involvement regarding device use than families reporting that the professionals decided amount of services.

To better understand the mixed results between parent involvement in IFSP development and parental self-efficacy, the authors offer two areas for consideration. First, parental temperament or personality might be contributing to the relation between self-efficacy and IFSP decision-making. It is possible that, depending on temperament, some parents feel quite comfortable deferring IFSP decision-making to professionals yet view themselves as engaged in the process. Some parents may feel more involved in their child's device use and more apt to follow the professional's instructions on managing their child's device use when professionals take the lead in these matters.

A second consideration is parents' views on the relationship between sensory devices and spoken language development. Parents may view setting IFSP goals as more closely related to speech-language development than to managing technology. Parents who report less involvement in EI may have greater sense of reliance on the device to help their child acquire spoken language. Parents who are more involved in EI may view themselves, as parents, as having a larger impact on their child's spoken language development. Both considerations should drive future directions of research on the relationship between parental self-efficacy and involvement in EI.

Conclusions

Previous studies on self-efficacy among mothers of children who are DHH demonstrate the importance of building families' sense of competence and confidence in the early years so that they can better support language development and manage sensory device use (DesJardin, 2005, 2006; DesJardin & Eisenberg, 2007). Research also demonstrates the benefits of early enrollment in EI for this population of children (e.g. Moeller, 2000; Yoshinaga-Itano, 2003). Furthermore, EI best practices call for providers to directly involve parents in developing the IFSP and developing a partnership to achieve IFSP goals. However, findings from the current study demonstrate the complexities in determining the relation between these variables. In light of these findings, EI

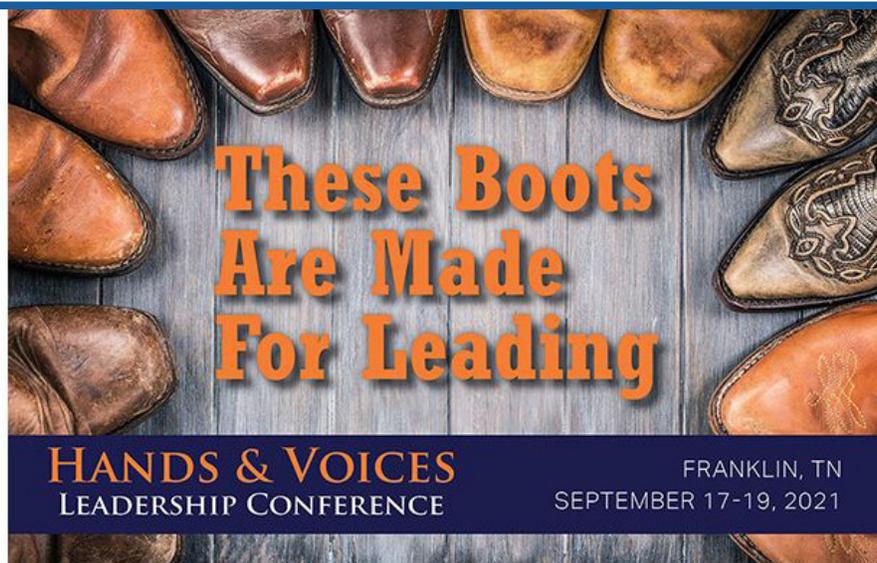
providers and clinicians should continue to coach parents and caregivers on implementing facilitative language techniques and emphasize the important role they play in between EI sessions. Future studies are needed to validate these findings and further the knowledge base about the role of EI in supporting parents' sense of self-efficacy in supporting their child's development.

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