Theory/Review

Children Who Are Deaf or Hard of Hearing in Inclusive Educational Settings: A Literature Review on Interactions With Peers

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This review is conducted to describe how children who are deaf or hard of hearing (D/HH) interact with hearing peers in inclusive settings, illustrate the difficulties and challenges faced by them in interacting with peers, and identify effective interventions that promote their social interaction in inclusive education. A systematic search of databases and journals identified 21 papers that met the inclusion criteria. Two broad themes emerged from an analysis of the literatures, which included processes and outcomes of interactions with peers and intervention programs. The research indicates that children who are D/HH face great difficulties in communicating, initiating/entering, and maintaining interactions with hearing peers in inclusive settings. The co-enrollment and social skills training programs are considered to be effective interventions for their social interaction. Communication abilities and social skills of children who are D/HH, responses of children with normal hearing, and the effect of environment are highlighted as crucial aspects of social interactions. In addition, future research is needed to study the interaction between children who are D/HH and hearing peers in natural settings, at different stages of school life, as well as improving social interaction and establishing an inclusive classroom climate for children who are D/HH.

The global increase toward inclusive education has been one of the most important paradigm shifts to occur in education over the past two decades (Forlin, 2010). An inclusive model of education embraces a social model of disability that encompasses the rights of all children to be educated together and is supported both ethically and morally (Forlin, 2006; 2010). Many countries at the World Conference on Special Needs Education, Salamanca, Spain (United Nations Educational Scientific and Cultural Organization, 1994), signed the statement, which outlined that inclusive education was for all children, including learners with special educational needs and/or disabilities in regular schools (Peters & Forlin, 2010; 2013). With the advance in universal screening and the improved technology of sensory aids (e.g., cochlear implants), growing numbers of children who are deaf or hard of hearing (D/HH) attend regular schools (Kelman & Branco, 2009).

The literature concerned with inclusive education and learners who are D/HH has emphasized three principal benefits of inclusive education, social interaction and contact with children with normal hearing, naturalistic access to typical linguistic and behavioral models of hearing peers, and children's social acceptance by hearing peers (Eriks-Brophy et al., 2012). Nevertheless, others state that simply placing children who are D/HH in regular classrooms does not automatically facilitate meaningful social interaction, peer acceptance, positive inclusion, and/or improvement in the children's social communication skills (Antia, Stinson, & Gaustad, 2002; Bobzien et al., 2013; Hyde & Power, 2004; Weisel, Most, & Efron, 2005).

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Peer acceptance and the popularity of children who are D/HH in regular schools, when compared to children who are D/HH attending special schools, is of concern (Wolters, Knoors, Cillessen, & Verhoeven, 2011). Research indicates that children who are D/HH are more likely to be neglected by their hearing peers in regular schools and less likely to have a friend in the class than their classmates with normal hearing (Nunes, Pretzlik, & Olson, 2001). Children who are D/HH who have poorer speech intelligibility are also reported to experience more loneliness and less coherence than those with better speech intelligibility in the classrooms where they are included individually (Most, 2007; Most, Ingber, & Heled-Ariam, 2011). Even when children who are D/HH have good spoken language and have the assistance of cochlear implants or hearing aids, they still have many difficulties in social interaction especially when in group situations and in noisy environments (Punch & Hyde, 2011).

A vast quantity of research concerns the social outcomes of children who are D/HH in inclusive education; however, a preliminary scrutiny of the research base indicates there is paucity in the quality of these studies, and those that meet evidence-based practice indicators are few. One of the purposes of the current article, therefore, is to examine the literature in light of quality indicators for evidence-based practice to identify up to date and effective practices to support children who are D/HH and their interactions with peers in inclusive settings.

Definition of Interaction

Interaction is defined as the social exchange between two individuals, which can be of some duration and where the participants' actions are interdependent (Rubin, Bukowski, & Parker, 2006). In addition, the meaning of interaction can refer to any attempt to gain a listener's attention or to communicate through linguistic and/or by nonlinguistic means (Kreimeyer, Crooker, Drye, Egbert, & Klein, 2000), furthermore, linguistic and nonlinguistic exchanges can be positive and/or negative (Antia & Kreimeyer, 2003). Based on the combined definitions by authors in the field of investigating social interactions of children (Rubin et al., 2006) and those concerned with interactions between children who are D/HH and peers in regular schools (Antia & Kreimeyer, 2003; Kreimeyer et al., 2000), interaction in this review refers to any social exchange, any nonlinguistic or linguistic communication, and social play.

Previous Reviews Concerning the Social Interactions of Children Who Are D/HH

Literature reviews that specifically relate to the social interactions of children who are D/HH in inclusive settings are few. One review conducted by Kluwin, Stinson, and Colarossi (2002) focuses on the social and affective outcomes of children who are D/HH integrated into regular schools. Antia and Kreimeyer's (2003) review also examines the interactions of children who are D/HH and peers in both inclusive and segregated educational settings. Studies dating from 1980s were reviewed in these two articles, which were published 10 years ago and not up to date for providing reference for future studies. The focus on integration is also problematic as this perspective emphasizes child's deficits rather than the limitations of the educational environment (Donnelly & Watkins, 2011). The term integration is consistently found in the studies reviewed by Kluwin et al. (2002) and Antia and Kreimeyer (2003). The social model of disability and the philosophy of inclusion in education, however, has superseded the integration perspective of addressing students' needs, which makes the findings by Kluwin et al. (2002) and Antia and Kreimeyer (2003) important from a historical point of view, but in need of revision. A recent review by Battern, Oakesm, and Alexander (2014) focused on the factors that affect the social interaction of children who are D/HH with hearing peers. However, further information such as how they interact with hearing peers, and how to improve their social interaction, is needed for both researchers and educators who are concerned with inclusive education for children who are D/HH.

Purpose of the Study

The current article, therefore, is a review of studies dating from 2000 to 2013 that takes a thematic approach in the analysis. The reason for this approach is to make the information accessible for teachers, educators, and researchers. The following research questions drive the inquiry.

1. How do children who are D/HH interact with their hearing peers in inclusive settings?
2. What are the difficulties and challenges faced by children who are D/HH in relation to social interactions with hearing peers in inclusive educational settings?
3. What interventions and/or pedagogical approaches promote social interactions between children who are D/HH and hearing peers in inclusive education?

Method

In agreement with the research team, which comprised three people, indicators of evidence-based practice were adopted and the quality indicators provided by Cook, Tankersley, and Landrum (2009) were used to justify the inclusion of articles in the review. The quality indicators were sufficient information about the participants, participant comparability, descriptions of the interventions, measures of outcomes for interventions, general performance of participants gathered at appropriate times, and data analysis that links to the study's research questions. Furthermore, desirable qualities of evidence-based practice include a detailed assessment of intervention implementation, descriptions of treatment fidelity, and the nature of instruction in comparative conditions (Cook et al., 2009; Gersten, Fuchs, Coyne, Greenwood, & Innocenti, 2005). The research methodology and quantity of supporting research were also identified as important factors for consideration.

In addition, the different terms used for educational environments were noted. These terms included regular schools/classrooms, mainstream kindergartens/schools/classrooms, integrated kindergartens/schools/classrooms, inclusive educational kindergartens or schools or classrooms, general educational kindergartens, schools or classrooms. In agreement with the research team, these terminologies were considered as inclusive educational settings.

Data Collection

The search procedure comprised five steps.

Step 1. The first researcher, who was also the first author of the paper, conducted the search by accessing the electronic repositories of the supporting University. The database EBSCO host Complete was chosen because it included several other databases such as, Academic Search Premier, ERIC, PsyINFO, SocINDEX, PsyARTICLES, and MEDLINE.

The first researcher was undertaking a doctoral degree and was experienced in searching literature in electric databases. The key words used in the search included peer interaction, peer relations, peer communication, social interaction, social play, social networks, social contact, social inclusion, social competence, friendship, and initiation, in combination with the hearing impairment, hearing loss, deaf, and hard of hearing.

Step 2. A manual search was conducted of peer-reviewed journals that related to children who are D/HH by the first researcher. The rationale for this step was to check the findings of the e-search to expose further articles that did not show in the online search. In agreement with the second researcher/author, the selection of journals included: Journal of Deaf Studies and Deaf Education, The Volta Review, Language Speech and Hearing Services in Schools, Journal of Speech, Language and Hearing Research, Deafness and Education International, International Journal of Language and Communication Disorders, and American Annals of the Deaf.

Step 3. The first researcher reviewed all titles and abstracts. Articles that did not meet the inclusion criteria were removed, because they did not focus on children who were D/HH in inclusive educational settings or they did not concern interactions with peers. In addition, duplicates were also discarded. The research team reviewed the remaining articles. For papers where there was doubt, a consensus was sought.

Step 4. The first researcher, under the supervision of the second researcher, scrutinized the final selection of articles. Furthermore, reference lists of the articles were examined to exhaust all sources.

Step 5. Studies that met the agreed inclusion criteria were discussed with the second and third researchers. The third researcher had experience of exploring data for themes.

There were 1,902 peer-reviewed articles published from 2000 to 2013 found in Step 1. The manual search of the seven journals yielded an additional two studies, therefore, 1,904 articles were found. After examining the titles and abstracts in Step 3, 1,858 articles were eliminated from the review because they did not meet the inclusion criteria or were duplicate articles. This preliminary analysis exposed 46 articles. Using inclusion criteria based on the quality indicators of Cook et al. (2009), 21 articles were selected and 25 were rejected.

A primary reason for rejection was that some studies did not specially focus on social interactions of children who are D/HH in inclusive educational settings ($n = 12$), but on psychosocial development, for instance. Moreover, some studies did not contain empirical data ($n = 8$) and five studies did not adopt valid and reliable instruments to collect data. The studies included for detailed review are shown in Table 1.

Data Analysis

The stages for analyzing the literature were as follows.

Stage 1. The preliminary exploration of the 21 papers involved gaining a general overview, after which the papers were scrutinized and coded. Coding the articles helped in generating initial themes and multiple readings enabled 10+ codes to emerge from the literature. The 10+ codes were checked against the research questions and applied to all 21 papers.

Stage 2. Underlying themes that ran through each of the papers were also explored and discussed with the research team. The initial themes found in Stage 1 were applied to the papers as a means to verify themes.

Stage 3. All the themes that emerged were listed and similar themes were grouped together. The groups were conflated and organized into major themes and broad themes. The themes were applied to the remaining papers and the collective themes were used to provide answers to the research questions.

Findings

The two broad themes identified were processes and outcomes of interactions of children who are D/HH with peers in inclusive settings, and intervention programs to promote their social interactions with peers. The broad themes and major themes are presented in Figure 1.

Processes and Outcomes of Interactions With Peers

The major themes of communication, initiation/entry, and maintenance of interactions were subsumed to form the broad theme of processes and outcomes of interactions of children who are D/HH with hearing peers in inclusive settings. There were 10 studies concerned with communication, 5 studies that focused on the children's abilities to make initiations and/or entry into peers' activities, and 2 studies which looked at children who are D/HH and their abilities to maintain interactions.

Communication

Communication is crucial for children who are D/HH in establishing and maintaining interactions and relationships with hearing peers. This major theme composed 10 studies and together with the other major themes of initiation/entry and maintenance of interactions to form the broad theme of processes and outcomes of interactions with peers.

Communication exchanges to occur in natural play settings were investigated by Preisler, Tvingstedt, and Ahlstrom (2002) over a 2-year period. Participants were aged between 2 and 6 years when the study began and between 4 and 8 years at the end of the study. The findings showed there was no symbolic communication between the preschool children who were D/HH ($n = 22$) and their hearing peers, furthermore, the children who were D/HH who participated in peer play tended to take on a noncommunicative role. Elementary school children were the focus of Keating and Mirus (2003), who investigated children's communication interactions during lunch and recess. Keating and Mirus (2003) found that the children who were D/HH ($n = 4$) in second and third grade of school made several attempts at turn-taking and eye gazes, however, their initial attempts were often ignored by hearing peers. Even when peers responded to the children's initiations, conversational interactions often lacked real

Table 1 Summary of studies

Authors	Country	Targeted participants (children who are D/HH)		
		Number	Age	Sensory aids
Communication				
Bat-Chava & Deignan (2001)	USA	25	6–10 years	All with CI
Bat-Chava et al. (2005)	USA	41	1.3–7.1 years at Time 1 7.3–13 years at Time 2	All with HA at Time 1 29 with CI, 12 with HA at Time 2
Bobzien et al. (2013)	USA	4	42–65 months	3 with HA 1 with CI
Keating and Mirus (2003)	USA	4	Grades 2 and 3	Not reported if CI/HA
Ibertsson et al. (2009)	Sweden	8	11–19 years	All with CI
Preisler et al. (2002)	Sweden	22	2–6 years when study began 4–8 years when study ended	All with CI
Preisler et al. (2005)	Sweden	11	8.5–10.5 years	All with CI
Punch and Hyde (2011)	Australia	29	28 children: 1.7–17.5 years 1 child: 25 years	All with CI
Sandgren et al. (2011)	Sweden	13	11–19 years	All with CI
Toe and Paatsch (2010)	Australia	34	7 years 4 months to 12 years 9 months	21 with CI 13 with HA
Initiation/entry of interactions				
Boyd et al. (2000)	USA	34	6–14 years	All with CI
Brown et al. (2000)	Australia	10	49–63 months	1 with CI 9 with HA
DeLuzio and Girolametto (2010)	USA	12	37–62 months	6 with CI 6 with HA
Martin et al. (2010)	USA	10	5 years 1 month to 6 years 10 months	All with CI
Weisel et al. (2005)	Israel	4	2–3 years	1 with CI 3 with HA
Maintenance of interactions				
Brown et al. (2008)	Australia	10	49–62 months	Not reported if with CI/HA
Martin and Bat-Chava (2003)	USA	35	5–11 years	25 with CI 10 with HA
Co-enrollment program				
Bowen (2008)	USA	5	Grades 3 and 4	1 with CI, 3 with HA 1 with no aids
Kreimeyer et al. (2000)	USA	7	9–10 years	6 with CI 1 with HA
McCain and Antia (2005)	USA	10	9–12 years	Not reported if with CI/HA
Social skills training program				
Suarez (2000)	Spain	18	9 years 1 month to 13 years 6 months	Not reported if with CI/HA

Note. CI = cochlear implant; D/HH = deaf or hard of hearing; HA = hearing aids.

linguistic content and ended quickly. The children who were D/HH in the study were reported to use multimodal communicative channels (e.g., visual and auditory). Sign language was not their main communication mode; even so, the children often used visual means (e.g., eye gaze) to interact with hearing peers. Findings indicated that children who were D/HH became easily isolated in regular schools, where unshared sociolinguistic practices and hearing-oriented participation framework were crucial factors contributing to communicative failure between them and their hearing peers.

Bobzien et al. (2013) observed and recorded the social communication behaviors of children aged from 42 to 65 months during quasi-natural play sessions. Four children who were D/HH participated in the study. The results indicated that children who were D/HH produced fewer verbal initiations than hearing peers. However, they had a higher rate of verbal turns

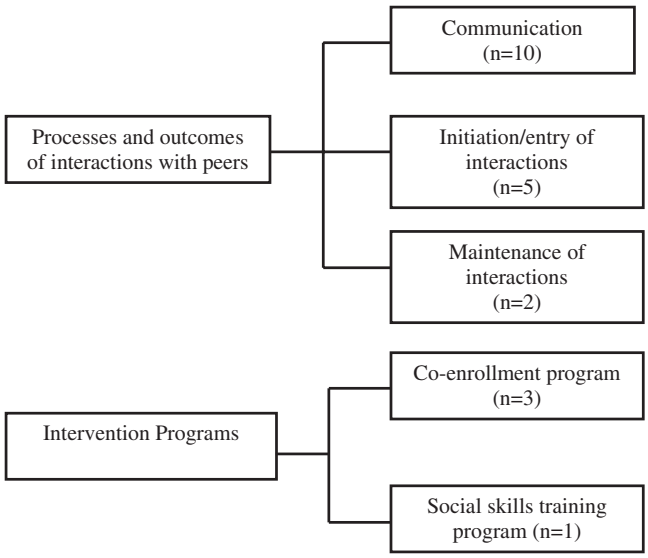

Figure 1 The themes found within the literature for the interactions of children who are D/HH with peers in inclusive educational settings. The numbers in parentheses indicate the number of articles found under each theme.

and play turns than children with normal hearing. It was probably because children who were D/HH were likely to repeat phrases such as "put it here" frequently which served them well during play. In addition, children who were D/HH attempted to control play materials and relied more heavily on their visual and tactile senses (i.e., sight/vision and touch) than hearing peers during play because of their auditory impairment, thus they made more play turns than their playmates with normal hearing.

Studies that concerned children with cochlear implants and social communication in regular schools gathered qualitative data through interviews with parents, teachers, and children (Bat-Chava & Deignan, 2001; Bat-Chava, Martin, & Kosciw, 2005; Preisler, Tvingstedt, & Ahlstrom, 2005; Punch & Hyde, 2011). The studies indicated that cochlear implants contributed to the children's improved social communication in inclusive settings. For instance, Bat-Chava et al. (2005) focused on children who used hearing aids or cochlear implants who attended regular schools. A longitudinal study design was adopted to examine the children's communication and socialization development. The study involved 41 children who were D/HH. The children's parents completed the questionnaires on children's communication, daily living skills, and socialization when the children were at the average age of 3.3 and 10.7 years, respectively. The results showed that children with cochlear implants made significant progress in communication skills, even when their communication delay was more than children with hearing aids. However, researchers found the functioning of the cochlear implants varied between the children. Some children with the implants performed well in communicating orally with hearing peers, while others showed no benefits in communication skills and continued to lag behind their hearing peers (Bat-Chava & Deignan, 2001; Bat-Chava et al., 2005; Preisler et al., 2005; Punch & Hyde, 2011). Additional findings indicated that it was easier for children who were D/HH to communicate with hearing peers in one-on-one situations, as following conversations in groups was challenging even for children with cochlear implants and age-appropriate spoken language skills (Bat-Chava & Deignan, 2001; Punch & Hyde, 2011).

Communicating with hearing peers in experimental situations has been investigated by a number of researchers (Ibertsson, Hansson, Maki-Torkko, Willstedt-Svensson, & Sahlen, 2009; Sandgren, Ibertsson, Andersson, Hansson, & Sahlen, 2011; Toe & Paatsch, 2010). Ibertsson et al. (2009) modified a referential communication experimental design to investigate the use of requests for clarification made by listener in conversations between students who were D/HH (n = 8) and hearing peers (n = 8) aged 11–19 years. In this study, each student chose a conversational partner

and the pairs were seated at a table. The task was to describe two sets of pictures and the role of describer and receiver was shared. No experimenter controlled and supervised the process, and there was no barrier placed between each pair of participants, thus students could see each other and interact as in real life. In comparison with their hearing counterparts, students who were D/HH produced more requests for clarification, especially when confirming new information. In addition, students who were D/HH preferred to use specific rather than nonspecific requests for clarification.

Sandgren et al. (2011) repeated the experiment to expand Ibertsson et al. (2009) study. The study of Sandgren et al. (2011), however, focused on the responses to requests for clarification which concerned speaker skills. Thirteen students who were D/HH and 13 students with normal hearing aged 11–19 years participated in the study. The study verified that students who were D/HH produced more requests for clarification than students with normal hearing, however, no group differences were found in the distribution of specific and nonspecific requests for clarification. Additionally, there were no significant differences between participants regarding the responses to requests for clarification. The findings of this study indicated that students who were D/HH at secondary school levels had similar conversation skills when compared to their hearing counterparts.

Toe and Paatsch (2010) investigated the capacity of children who were D/HH to accurately receive, transmit questions and provide accurate responses to communication partners. This study involved 68 participants, 50% of whom were children who were D/HH aged from 7 years 4 months to 12 years 9 months. The participants attended regular primary schools. The pairs comprised children who were D/HH and hearing peers, and were matched by gender and grade level. Each pair of participants were asked to play a question-and-answer trivia game and to alternate between the role of questioner and responder. Findings indicated that children who were D/HH displayed significantly more difficulties in repeating trivia questions verbatim than hearing peers, especially when repeating multiple-choice questions which were more complex. However, children who were D/HH provided more correct answers to trivia questions and requested more general clarifications (e.g., "what?" or "pardon?") than hearing peers, which indicated children who were D/HH had sufficient world knowledge and some well-developed general clarification strategies.

Summary. The methodology of the studies contained within the major theme of communication tended toward the use of observations, questionnaires, and experiments to gather data. Observational studies mainly involved preschool children, and studies that used questionnaires and experiments targeted pupils and students in regular schools. An overview of findings indicated that fewer communication interactions occurred between children who were D/HH and their hearing peers when compared to the interactions between those with normal hearing, even when children had a cochlear implant. However, with maturity and experience, similar levels of some communication abilities were found among secondary students who were D/HH in comparison to students with normal hearing. Studies that focused on pragmatic skills development demonstrated that children who were D/HH could understand their peers well when in a quiet environment. Nonetheless, children who were D/HH had significant difficulties in expressing complicated linguistic content.

Initiation/Entry of Interactions

Initiating an interaction and/or entering into a peer activity is a functional skill that supports social communication and interaction, further, this major theme combined with other major themes of communication and maintenance of interactions to formulate the broad theme of processes and outcomes of interactions with peers. Five studies were concerned with initiation and/or entry of children who are D/HH into interactions with hearing peers in inclusive educational settings.

Weisel et al. (2005) examined the initiation of social interactions by young preschoolers who were D/HH ($n = 4$) aged 2–3 years with a dual placement at a special center and a regular kindergarten. Findings revealed that although preschool children who were D/HH made more attempts to initiate interaction with hearing peers than with other children who were D/HH, the success rate of initiations by the children in the regular program was poorer than initiations made toward peers

who were D/HH in the special program. Vocalization was the most frequent strategy used by children who were D/HH in both programs; however, their vocalizations were mostly preverbal and unintelligible. It was possible that this was the reason for the low rate of successful initiations with partners with normal hearing in the regular program. Other strategies used by the children who are D/HH included moving closer, object-related social actions and neutral touch when interacting with classmates in regular kindergartens. By comparison, the same children used sign, direct entrance into play, interaction, and turning their partner's head when they were in the special program. The study indicated that the young children who were D/HH were able to adapt their initiation strategies according to their partner's hearing status.

DeLuzio and Girolametto (2011) found there were no significant differences in the initiation and response skills between children who were D/HH (n = 12) and children with normal hearing (n = 12) aged from 37 to 62 months. They found similarities in the means for the proportion of responses and the frequency and duration of interactions. Moreover, DeLuzio and Girolametto (2011) noted that when compared to hearing peers, children who were D/HH systematically received much fewer responses from their playmates with normal hearing over time. Conclusions drawn emphasized that children who were D/HH were excluded from interactions by their hearing peers, even when they had age-appropriate language skills.

Participants' success to enter into an activity with one or more peers was investigated by Brown, Remine, Rickards, and Prescott (2000). Participants were aged from 49 to 63 months. It was found that the two groups of children who were D/HH (n = 10) and children with normal hearing (n = 10) experienced similar levels of success when engaged in sociodramatic play, whereas children who were D/HH were much less successful in entering nonplay activities than hearing peers. In the nonplay context, children with normal hearing often focused their entry behavior on the peer group activity. In contrast, children who were D/HH were more likely to wait and hover on the periphery of the activity, to use behavior unrelated to the ongoing activity, and/or to use disruption in an attempt to enter activities. The researchers concluded that children who were D/HH were able to orient themselves to the group's activities but were inexperienced in appropriate entry strategies.

Boyd, Knutson, and Dahlstrom (2000) adapted the Peer Task (Putallaz & Gottman, 1981) to examine the ability of pupils who were D/HH with a cochlear implant to enter into play situations with two others with normal hearing. Participants consisted of 34 children who were D/HH and 20 children with normal hearing aged 6–14 years. The task involved two pupils with normal hearing playing in a laboratory room equipped with comfortable furniture and age-appropriate toys for 5 min. The child who was D/HH and had a cochlear implant was introduced to the group after 5 min and the group's social interactions were observed. The results showed that the children with a cochlear implant took longer to enter into play with the other two participants, had less continuous interaction, experienced more failures in entering into the established play, and were less verbal and cooperative than children with normal hearing. In comparison to children with less than 24 months of implant use, children with 24 or more months of implant use showed no obvious improvement in peer group entry behavior over time as a result of the cochlear implant.

Martin, Bat-Chava, Lalwami, and Waltzman's (2010) study confirmed the findings of the types of barriers found by Boyd et al. (2000) as children who were D/HH were placed in dyadic and triadic groups with hearing peers. Ten children who were D/HH aged from 5 years 1 month to 6 years 10 months participated in the study. The results demonstrated that 20% of children were unsuccessful in dyadic situations and that 40% were unsuccessful in triadic exchanges. The difficulties that children who were D/HH experienced when entering into established groups were highlighted. In addition, interactions with peers in larger social situations were thought problematic for the children who were D/HH.

Summary. Most studies found under this major theme focused on initiation and peer group entry. Observations in naturalistic preschool settings were the most common means for data collection. The peer task experiments, however, were conducted with older aged children and comprised quasi-natural settings. Studies demonstrated that children who were D/HH made more initiations to

hearing peers than peers toward each other, however, the success rates of children who were D/HH were much lower when compared to the frequencies of initiations made by hearing peers. Additionally, they faced more challenges in entering ongoing activity with peer group than children with normal hearing. The factors thought to affect the children's interactions with peers were low levels of vocalization and limited vocabulary. In addition, the children's inappropriate initiation strategies were compounded by social and acoustic challenges. Moreover, children who were D/HH were often rejected or ignored by their hearing peers.

Maintenance of Interactions

The major theme of maintenance of interactions subsumed with the other major themes of communication and initiation/entry of interactions form the broad theme of processes and outcomes of interactions with peers. This theme is important because successful initiation and/or entering into interactions with peers does not ensure effective maintenance of involvement in social interaction. Two articles contributed to the major theme of maintenance of interactions.

Brown, Bortoli, Remine, and Othman (2008) investigated the social engagement, social attention skills, and social competence of preschool children who were D/HH (n = 10) aged 49–62 months and their peers with normal hearing (n = 10) aged 51–64 months. Children's behaviors during free play in inclusive kindergarten settings were coded through close examination of videotapes to measure the types of social engagement opportunities created by them, the level of children's attention and social competence. The results revealed no difference in the children's abilities to notice, acknowledge, follow, initiate, and/or respond to others. However, when the observation and communicating skills of children who were D/HH were compared to the skills of their hearing counterparts, the former were of poorer quality. Furthermore, children who were D/HH were more likely to be distracted and less likely to display alert, sustained and focused attention during interactions than children with normal hearing. The findings demonstrated that children who were D/HH tended to be less vigilant of the social context through visual strategies (e.g., observation) to keep social engagement and less competent to manage attention to maintain interactions with peers than children with normal hearing.

Martin and Bat-Chava (2003) focused on the role of gender in the coping strategies used by children who were D/HH (n = 35) aged between 5 and 11 years to maintain the interactions and relationships with hearing peers in inclusive educational settings. Data comprised parental reports and findings indicated that girls tended to use strategies such as assertiveness, advocating needs, and requesting repetition in social interactions. These strategies were also effective for boys, however, excelling in sports was the most effective strategy for boys in achieving good relationships with peers. There were some gender differences in the children's coping strategies as the boys emphasized their social status through their abilities at sport and were more competitive, whereas girls were more cooperative.

Summary. As found in the other major themes that comprised the broad theme of processes and outcomes of interactions with peers, the major theme of maintenance of interactions exposed that the methods for conducting studies with preschool-aged children used observation. The findings showed that children who were D/HH were less capable to maintain their engagement in interactions with hearing peers when compared to children with normal hearing. In relation to children of school age, parents were asked to report their children's coping strategies in maintaining interactions with hearing peers. In addition to the findings of the previous two major themes, studies under the theme of maintenance of interactions showed there were differences between genders.

Intervention Programs

The second broad theme concerned the intervention programs used to promote interactions of children who are D/HH with hearing peers in inclusive educational settings. The major theme of co-enrollment program combined with the other major theme of social skills training program to form the broad theme of intervention programs. Three studies were found for the major theme of co-enrollment program and one study concerned social skills training program.

Co-Enrollment Program

Kreimeyer et al. (2000) stated that an important program to contribute to the success of inclusive education for students who were D/HH was the co-enrollment program. In this program, students who were D/HH were educated with normally hearing students in the same classroom where both the general education and special education teachers worked together in providing instruction. Each class composed of 25–30 students, and a third of members were students who were D/HH. The academic performance and social interactions of the students (n = 7) in grades 3 and 4 were examined through informal interviews with the school principal and the teaching team. Additional data consisted of observations of social interactions throughout the duration of the program (Kreimeyer et al., 2000). The results showed that interactions in the classroom setting and in the lunchroom increased between students who were D/HH and students with normal hearing.

McCain and Antia (2005) investigated classroom communication, participation, and the social behavior of children who were D/HH and children who were D/HH with additional disabilities alongside peers with normal hearing in a co-enrolled classroom program. The children with normal hearing communicated with their nonhearing peers by using a combination of sign and speech. Participants were 18 pupils with normal hearing, 5 pupils who were D/HH, and 5 pupils who were D/HH with additional disabilities. All pupils were aged 9–12 years. The children who were D/HH showed no difference in classroom communication and social behavior when compared to their hearing peers. Children who were D/HH with additional difficulties, however, expressed they had greater challenges in engaging peers in interactions, additionally these pupils spoke about their negative feelings concerning their classroom. The co-enrollment program was believed to be more effective for children who were D/HH than for children who were D/HH with additional difficulties.

Bowen (2008) compared the friendship patterns, attitudes, beliefs, and perceptions about sign language and deafness of students in a co-enrolled classroom and a traditional classroom at the third-grade/fourth-grade level in a regular school. There were five students who were D/HH in the study. Data consisted of sociograms, interviews, and videotape. Bowen (2008)'s findings suggested that the co-enrollment program not only benefitted the academic achievement of students who were D/HH but also had positive effects on the social communication of all individuals involved in the co-enrollment program. Students who were D/HH in the program experienced similar levels of social acceptance experienced by students with normal hearing. The benefits for students with normal hearing in co-enrolled classroom included a more positive attitude toward people who were D/HH, a greater awareness of the effects of hearing loss and better skills in using sign language than those in traditional classroom.

Social Skills Training Program

The major theme of social skills training program was merged with co-enrollment program to form the broad theme of interventions. According to Martin and Bat-Chava (2003), social skills are needed at each level of development, especially if one is to make friends and interact with others. One study that explored social skills training program was found for review.

A cognitive-social skills program developed by Suarez (2000) aimed to improve the thinking and social skills of children who were D/HH in order to promote social, emotional, and personal adjustment. The participants consisted of 18 children who were D/HH and 18 children with normal hearing (ages ranged from 9 years 1 month to 13 years 6 months) participated in the program. The program consisted of two parts. The first part was an interpersonal problem-solving training program that included 15 lessons and was taught only to the children who were D/HH; the second part was a social skills training program that was composed of six 1-hr sessions and was taught to both children who were D/HH and those with normal hearing. The program focused on the children's cognitive skills and social abilities and included training to apologize, negotiate with peers, how to avoid problems with others, how to recognize and deal with group influence, and how to cooperate and share in a group. The results demonstrated that this invention program succeeded

in improving all participants' social and emotional adjustment, social problem-solving skills and assertive behaviors, especially in solving interpersonal problems.

Summary. Two programs that were evidence based were found under the major theme of intervention programs to promote interactions with peers. Both co-enrollment and social skills training programs focused on pupils of school age. The findings of the studies indicated that both children who were D/HH and children with normal hearing benefitted from their involvement in either program.

Discussion

The review of literature involved an extensive search of available research that concerned children who are D/HH in inclusive educational settings and their interactions with hearing peers in order to answer the following research questions: How do children who are D/HH interact with hearing peers in inclusive settings? What are the difficulties and challenges faced by children who are D/HH in relation to social interactions with their hearing peers in inclusive educational settings? What interventions and/or pedagogical approaches promote social interactions between children who are D/HH and hearing peers in inclusive education? Using the quality indicators suggested by Cook et al. (2009), 21 studies met the inclusion criteria stipulated at the beginning of the paper.

In answering the first and second questions, the broad theme of processes and outcomes of interactions with peers exposes how children who are D/HH interact with hearing peers and the difficulties and challenges faced by them in inclusive environments. Children who are D/HH have many barriers to communicating, initiating and/or entering into social groups, and maintaining interactions with hearing peers, even though today they are more likely to be identified in early life and fitted with advanced sensory aids from a very young age. Nonetheless, the findings are not all negative. Some studies indicate that children with cochlear implants experience social success in inclusive settings, especially in one-on-one interactions (Bat-Chava & Deignan, 2001; Punch & Hyde, 2011). Furthermore, it is worth noting that the sample size of participants who are D/HH in some studies is small, which severely restricts the possibilities to make any generalizations. In providing an answer to the study's third question, current intervention models such as the co-enrollment and social skills training programs can be considered as a starting point for regular classrooms and the development of inclusive pedagogy and practice: The caveat is to support children who are D/HH toward enablement and their active participation as communicative members in inclusive schools.

This paper highlights the paucity of extant research articles concerned with children who are D/HH in regular schools in terms of interactions with hearing peers; moreover, there is a lack of research concerning the types of interventions that promote social interactions between children who are D/HH and their hearing peers in inclusive education. It is, therefore, essential that future research concerned with inclusive education addresses the highlighted themes of communication abilities and social skills of children who are D/HH, responses of children with normal hearing, and the effect of environment. In addition, a further four areas are suggested for future research.

Communication Abilities

Findings concerning communication highlight that the spoken language and speech ability of children who are D/HH is delayed (Brown et al., 2008). The delay may partially explain the low quality and the few communications of the children who are D/HH with hearing peers, which is reiterated by Toe and Paatsch (2010). Weisel et al. (2005) relate their findings to the children's preverbal vocalizations and the inability of hearing peers to understand children who are D/HH. Furthermore, Most (2007) implies that poor speech intelligibility is a contributory factor to the loneliness and lack of coherence of children who are D/HH in regular classrooms. Also, Ibertsson et al. (2009) indicate that children who are D/HH tend to use more requests for clarification in a referential communication task than hearing peers in order to avoid communication breakdown. Most (2002) posits that children who are D/HH do not know enough strategies to repair communication breakdown appropriately, perhaps because of some of their poor language skills (e.g., receptive

language and expressive vocabulary). Toe and Paatsch (2010) add that quiet environments are important for successful communication. These findings emphasize that developing age-appropriate communication abilities of children who are D/HH is crucial for them to engage meaningful social interactions with hearing peers so that appropriate practice may be deployed in inclusive education. Moreover, what is important for children who are D/HH of school age (e.g., quiet environments and increased vocabulary) might be transferable into preschool practice.

Social Skills

Appropriate social skills and strategies for initiation/entry and maintenance of social interactions are important to support children who are D/HH and their interactions with hearing peers in inclusive educational settings. Children who are D/HH often experience more failures in initiating interactions than hearing peers (Boyd et al., 2000; Martin et al., 2010; Weisel et al., 2005). Additionally, entering into ongoing activities with more than one peer and keeping up with interactions in larger social situations is especially tough for children who are D/HH (Bat-Chava & Deignan, 2001; Preisler et al., 2005; Punch & Hyde, 2011). Children who are D/HH may be inexperienced in appropriate initiation/entry strategies, which contribute to their failure in interactions with hearing peers, for example, they use unrelated behaviors or disruption to enter ongoing peer activities (Brown et al., 2000). Brown et al. (2008) also posit that the children's lack of ability to alert, sustain, and focus their attention during interactions with peers impedes their ability to maintain interactions. The present paper establishes the importance of initiation/entry of interactions which is critical to provide social opportunities for children. It also emphasizes building appropriate initiation and entry strategies and specific skills in maintaining interactions to improve social relationships between children who are D/HH and hearing peers in inclusive educational environments.

Responses of Children With Normal Hearing

The findings from the analysis suggest that children with normal hearing need to be encouraged to interact with children who are D/HH in regular schools. Children who are D/HH have strong desire to interact with children with normal hearing and make actively initiations toward them. However, children who are D/HH often receive few responses from their hearing peers over time (DeLuzio & Girolametto, 2011; Weisel et al., 2005). Children with normal hearing often ignore children who are D/HH in their attempts to interact through turn-taking and eyes gazing (Keating & Mirus, 2003). They are also impatient when asked by children who are D/HH to repeat themselves (Martin & Bat-Chava, 2003). Children with normal hearing may regard children who are D/HH as different from them and/or unable to understand (DeLuzio & Girolametto, 2011; Keating & Mirus, 2003). Thus, they prefer to interact with other hearing peers rather than with peers who are D/HH (Bobzien et al., 2013; DeLuzio & Girolametto, 2011; Keating & Mirus, 2003; Martin & Bat-Chava, 2003). The negative responses of children with normal hearing to initiation addressed by children who are D/HH may impede social interactions between them in inclusive educational settings. A potential explanation may be that children with normal hearing lack sufficient social skills (i.e., the visual communication skills such as using eye contact and gestures) to interact appropriately with children who are D/HH (Keating & Mirus, 2003). This aspect of school life needs further investigation so that appropriate measures may be taken to support all children in inclusive schools.

Environment

The aspect of the effects of the environment was under reported. Studies mention some of the situational factors found to contribute to children's difficulty in social interactions (DeLuzio & Girolametto, 2011; Punch & Hyde, 2011). Children who are D/HH do well in one-on-one interactions, whereas participating in group interactions present greater challenges (Bat-Chava & Deignan, 2001; Punch & Hyde, 2011; Martin et al., 2010). Martin et al. (2010) explain that more noises combined with higher level of social skills required in larger social situations increase difficulty for children who are D/HH to interact with hearing peers. It is worth noting that the context and situation of social interactions is a very important aspect that teachers

need to consider in their daily practice. The types of early play that impact on the success rate of children who are D/HH and their entry into ongoing activities with hearing peers needs careful investigation. For example, children who are D/HH find it is easier to enter sociodramatic play with hearing peers than to enter nonplay activities (Brown et al., 2000). Further research is needed to examine the environment's effect on interactions of children who are D/HH with hearing peers in inclusive settings so that appropriate educational practice may be employed.

Only two types of intervention programs identified in this review for children who are D/HH improve interactions with hearing peers in inclusive educational settings, namely, co-enrollment and social skills training. Although both programs are important areas for development, there seems to be a dearth of research concerning the social aspects of learning and interventions in inclusive settings. Based on the findings from the analysis of articles in this paper, a theoretical underpinning of social models of disability should form the basis of future research.

Implications for Further Research to Improve Educational Practice

Based on our analysis of the literature, we suggest four possible directions for future research. Firstly, we propose that investigations of communication ability in less structured and natural settings are essential in order to understand the effects of the environment on children who are D/HH. Potential investigations, therefore, might focus on analyzing naturalistic conversations with peers and/or study the children's use of visual means (e.g., eye gaze and body language) when communicating in unstructured learning environments and in informal settings such as playground. Secondly, we recommend a focus on interactions between children who are D/HH and peers at different stages of school life. Many studies focus on preschoolers who are D/HH, especially in examining the children's abilities for initiating/entering and maintaining interactions in free play. We propose that the characteristics of communication change with the individual's growth in cognition, socialization, emotion, and other physical and psychological aspects of development, therefore, an investigation of the characteristics of interaction with peers and the need for communication in inclusive educational settings must also change over time. Thirdly, we propose that improving social interactions between children who are D/HH and hearing peers in inclusive educational settings is urgent; therefore, pedagogy and inclusive practice need to further explore support for all children in inclusive schools. For example, peer-mediated interventions and cooperative learning methods need exhaustive investigation. Fourthly, investigations of classroom climate would also be needed, as research has shown that classroom climate affects not only students' academic performance but also their social development (e.g., social competence and peer relationships) (Brophy-Herb, Lee, Nievar, & Stollak, 2007; Howes, 2000). Teacher's beliefs and behaviors in building and maintaining a warm and inclusive classroom climate for children who are D/HH may be an important variable for further inquiry.

Conclusions

This review has provided a picture of interactions between children who are D/HH and hearing peers in inclusive educational settings, which may contribute to the basic and applied understanding of social adaptation and development of children who are D/HH. The findings have shown that social interactions of children who are D/HH in inclusive educational settings are neither completely negative nor completely positive. This review highlights that the children who are D/HH face challenges and difficulties in communicating, initiating/entering, and maintaining interactions with hearing peers. There is an urgent need for further research concerning interventions that promote their social interactions in inclusive education.

Children's abilities to share experiences and meaning are central areas for future development, therefore, the social and affective outcomes for children who are D/HH in inclusive education need urgent attention. The participation of all children is a purpose of inclusive practice and classroom activities. However, it cannot be assumed that social communication and interaction between children who are D/HH and hearing peers will occur naturally. It is essential that opportunities for all children to interact with each

other must be appropriately designed, supported, and developed in inclusive educational practice. Therefore, professionals must strive to work together to support all learners in inclusive education and provide children with the means to collaborate in learning activities.

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Conflicts of Interest

No conflicts of interest were reported.

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