Empirical Article

A Comparison of Pragmatic Abilities of Children Who Are Deaf or Hard of Hearing and Their Hearing Peers

Louise E. Paatsch*, Dianne M. Toe
Deakin University

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Pragmatic skills are the key to a satisfying and sustained conversation. Such conversation is critical for the development of meaningful friendships. Previous studies have investigated the conversational skills of deaf children while interacting with adults or when interacting with peers in structured referential tasks. There are few published studies that have compared the pragmatic skills of children who are deaf or hard of hearing (D/HH) in free conversation with their hearing peers. In this study, the conversational skills of 31 children who are D/HH when interacting with a hearing friend were compared with those of 31 pairs of hearing children. Findings suggest that school-aged children (Years 3–6 of study; aged 8–12 years) who are D/HH have a wide range of pragmatic skills that they use effectively when conversing with their hearing peers. Specifically, these children asked more questions, made more personal comments, initiated more topics, and took longer turns in their conversations with a hearing friend. In contrast, the conversations between hearing peers were very balanced with similar topic initiation, length of turn, numbers of questions, personal comments, and minimal answers. These findings will help teachers to provide support for both pragmatic and social skills in children who are D/HH.

A large body of research has investigated the impact of hearing loss on the development of spoken-language skills (Blamey et al., 2001a, 2001b; Geers, Nicholas, & Sedey, 2003; Ibertsson, Hansson, Asker-Arnason, & Sahlen, 2009a). Much of this research has measured school-aged children’s semantic, syntactic, morphological, and phonological skills and has reported the challenges these children face with developing age-appropriate language skills. Since the late 1970s, there has also been a focus, but to a lesser extent, on exploring the pragmatic skills of children with hearing loss, predominantly during interactions with adults (Kretschmer & Kretschmer, 1989; Wood, Wood, Griffiths, Howarth, & Howarth, 1982). There is a paucity of research, however, which has specifically investigated children’s pragmatic skills during spontaneous conversations with their hearing peers.

Pragmatics relates to the way language is used in social contexts. Pragmatic behaviors such as turn taking, eye gaze, topic initiation, topic maintenance, asking questions, and responding to the partner’s utterances relate to the rules needed to use language appropriately and effectively (Most, Shinga-August, & Meilijson, 2010; Prutting & Kirchner, 1987; Toe, Beattie, & Barr, 2007). Typically, pragmatic skills develop within the first 8 years of life through experience in everyday conversations with a range of partners. Participants learn to understand what it means to be both a sender and a receiver of information by engaging in these interactions (Ibertsson et al., 2009a; Most, 2002; Toe et al., 2007). Like other aspects of language acquisition, the process of acquiring pragmatic skills is instinctive and apparently effortless (Chomsky, 1975). Children with normal hearing also have many opportunities to overhear conversations that occur around them, both at home and at school, and as a consequence, they also learn pragmatic skills through incidental learning.

Conversation is a co-constructed activity by both partners, whereby contributions rely on the ability to

*Correspondence should be sent to Louise Paatsch, Faculty of Arts and Education, School of Education, Deakin University, Geelong, Victoria, 3220 Australia (e-mail: louise.paatsch@deakin.edu.au).
consider prior contributions and prepare for contributions that follow (Ibertsson et al., 2009a, 2009b). Spontaneous and informal conversation is the context in which language skills are acquired (Lloyd, Lieven, & Arnold, 2001) and is the medium through which children develop and maintain social relationships (Yont, Hewitt, & Miccio, 2002). According to Stinson and Foster (2000), true friendships are more likely to develop when there are ample opportunities for informal conversations.

Prelingual hearing loss is likely to have a significant impact on the development of pragmatic skills. Children with delayed language skills may have less opportunity to engage in extended conversations with as many partners as their hearing peers (Stinson & Foster, 2000). Reduced opportunities for incidental learning may be far reaching in this area of development. Children with normal hearing can “listen in” on many conversations that occur around them. Access to casual, regular interchanges between their peers and family members is considered necessary for language growth (Seigal, 2008). In contrast, children with significant hearing loss are often considered to need direct, explicit language-learning opportunities (McConkey Robbins, 2006; Paatsch, Blamey, Sarant, & Bow, 2006). Hearing loss, especially profound hearing loss, reduces children’s access to speech heard at a distance. Although cochlear implants (CIs) and improved hearing aids have significantly improved access for both children with profound hearing loss and children who are hard of hearing (HH), these children still require intervention to develop age-appropriate language skills (McConkey Robbins, 2006; Paatsch et al., 2006). Technology is not yet sufficiently sophisticated to allow them to overhear conversation in the same way their hearing peers do. Reduced opportunities for incidental learning about how conversations work may account for some of the differences that have been observed between hearing children and children who are deaf or hard of hearing (D/HH).

In Australia, the majority of children with hearing loss are now educated in inclusive settings (Hyde & Power, 2003; Watson, Gregory, & Powers, 1999). It has been estimated that approximately 83% of these school-aged population of students who are D/HH were placed in regular classrooms and used spoken language as their main mode of communication (Hyde & Power, 2003). Furthermore, at least 80% of children with profound hearing loss in Australia receive CIs, most now bilateral (Hyde & Power, 2006). Specifically, in the state of Victoria, many of these students are enrolled in mainstream schools that also include a specialist facility or special unit for students with hearing loss. Many of the teaching practices employed in these primary schools incorporate inquiry-based learning involving small-group cooperative learning situations and high levels of student-to-student conversation (Punch & Hyde, 2010). Teachers of the deaf employed at these schools provide support for these students during classroom activities and within small group and/or individual sessions in the specialized unit. In the context of the current study, all students who participated in this research were enrolled in mainstream primary schools with a specialized unit or facility and received support from teachers of the deaf. They all relied on spoken language for communication and did not use sign. Some of these students may have been the only student with hearing loss in the class, while others may have been in a class with a small number of students with hearing loss. In general, the majority of these students would have been enrolled in these schools from the first year of schooling (aged 5 years) and would have attended an early intervention center prior to school. In Victoria, these early intervention centers include integrated preschool activities with their hearing peers. Consequently, their communication partners, both in the classroom and in the playground, will be hearing students. Little is known about how well school-aged students, both D/HH and their hearing peers in inclusive settings, understand each other during spontaneous conversation.

Research of Pragmatic Skills of School-Aged Students With Hearing Loss

Much of the research that has investigated the pragmatic skills of young people with hearing loss has measured these skills within three contexts: (a) during interaction with an adult during a structured task; (b) during interaction with an adult during informal spontaneous conversation, and (c) during interaction with hearing peers during a structured task. Typically, the structured tasks involve referential communication
tasks that are often regarded as analogous to the problem-solving tasks commonly used in educational settings (Lloyd, Lieven, & Arnold, 2005). Such tasks involve a speaker describing someone or something so that the listener can identify, and in turn act on, what is being described. This task is more structured than a spontaneous conversation but provides a clear context to investigate the communication skills used during interaction (Toe & Paatsch, 2013). There is, however, a lack of research that has investigated the pragmatic skills of school-aged children with hearing loss during informal conversations with their hearing peers. More specifically, there is a lack of research that has compared these particular pragmatic skills with those of hearing peers who attend the same mainstream schools where spoken language is the main mode of communication and where teaching practices involve high levels of shared student-to-student dialogue.

Pragmatic Abilities During Structured Tasks

School-aged students with hearing loss show an ability to use some appropriate pragmatic behaviors during interactions with adults and hearing peers during structured tasks (Most, 2002). However, many studies have also shown that there are significant differences in the appropriate use of pragmatic skills between students with hearing loss and their age-matched peers, particularly in relation to the following: number and type of requests for clarifications, conversational balance as measured by number and length of turns, and conversational turn types (Ibertsson et al., 2009a, 2009b; Jeanes, Nienhuys, & Rickards, 2000; Lloyd et al., 2001).

Lloyd et al. (2001) investigated the pragmatic skills of 12 children with hearing loss (ages ranging from 6 years 2 months to 11 years 0 months) during two tasks involving the construction of Lego models, one with a hearing peer and the other with their teacher. The teachers in their study included qualified teachers of the deaf, other support teachers, and classroom assistants. The pragmatic skills of these children were compared between child–peer and child–teacher interactions. Teachers and peers were also compared as communication partners of the children with hearing loss. Specifically, conversational balance was measured by the mean length of utterance (MLU) in morphemes and words, mean length of turns (MLT), number of nonverbal turns, and the number of unintelligible utterances. Conversational turn type was coded according to seven conversational categories: (a) questions, (b) personal contributions, (c) conversational devices, (d) minimal answers, (e) extended answers, (f) directives, and (g) tagged contributions. Results showed that the frequency of total turns (including verbal and nonverbal turns) was significantly higher when the deaf children were conversing with teachers than when conversing with peers. In addition, when comparing communication partners, the frequency of total turns, spoken turns, and utterances were higher for teachers than for peers. These findings suggest that the teachers were more successful at encouraging communication with deaf students than were their hearing peers. However, when communicating with their hearing peers, the deaf children’s turns and utterances tended to be longer in relation to words and morphemes, suggesting that these children talked less when conversing with an adult. In terms of types of conversational turns, results showed that the child–teacher conversations contained a much higher proportion of question–answer sequences compared with child–peer conversations. In contrast, child–peer conversations contained a higher proportion of conversational devices and personal contributions than did the child–teacher conversations. Further results showed that the deaf children asked more questions when in conversation with their peers but used a higher proportion of minimal answers and extended answers when communicating with their teachers. Lloyd et al. suggest that the teachers in their study tended to place more linguistic demands on the students with hearing loss and expected the children to respond, resulting in a much higher proportion of question–answer sequences.

In a later study by Lloyd et al. (2005), pragmatic skills of 20 children with hearing loss (mean age of 10 years 2 months) were compared with those of a group of 20 younger children with normal hearing (mean age of 6 years 9 months) during a referential communication task with an adult. Specifically, strategies used to repair conversational breakdown were examined. Results showed that the children with
hearing loss performed at a similar level to that of the younger group with normal hearing in responding to unambiguous instructions, requests for clarifications to ambiguous instructions, and giving accurate instructions. Similar findings regarding difficulties with responding to communication breakdown was reported in an earlier study by Most (2002). Findings from this study showed that the 16 children with hearing loss (aged 11–17 years), who participated in a structured adult-led task, used repetition as a repair strategy more often than any other of the nine measured repair categories (including rephrasing, simplifying, and adding more specific information).

Ibertsson et al. (2009b) also investigated conversational balance by measuring the number of words and number of turns used by eight teenagers with hearing loss during a referential communication task with their hearing peers. However, these interactions were compared with dyads comprising of pairs of age-matched hearing children. Results showed that the mean number of words and turns produced in each dialogue were similar for both types of conversational pairs, suggesting a more balanced conversation between partners. In addition, significantly more words were produced by both deaf and hearing teenagers when in the role of the speaker (describer) compared with when in the role of listener.

In contrast with these findings between children with hearing loss and adults, Jeanes et al. (2000) found that students aged 8, 11, 14, and 17 years using spoken language and signed communication were able to seek general clarification and respond to their age-matched peers’ requests during a referential task. However, participants with hearing loss were found to use fewer specific requests and fewer appropriate responses to their partners’ requests for clarification when compared with dyads of age-matched hearing peers. Similarly, Ibertsson et al. (2009a) found that the 13 children/teenagers aged 11–19 years in their study were also able to seek clarification during a referential communication task with their hearing peers. However, unlike the findings reported by the earlier study by Jeanes et al., this group of students showed little evidence of communication breakdown and used very few non-specific requests for clarification. Results showed that the majority of specific clarifications were used to seek confirmation of new information (70%), with very few requests seeking clarification of information already given (16%). The differences in the findings between these two studies may be due to the fact that the teenagers in the study of Ibertsson et al. were all CI users, suggesting that improved sensory devices lead to better access to spoken language and, as a result, improve children’s language skills and may improve outcomes in this area of pragmatic skill development. For example, these children appear to have the appropriate language skills to ask for clarification to avoid communication breakdown.

Overall, it appears from these findings that the conversational skills of students with hearing loss differ significantly when compared with those of age-matched peers and child–teacher interactions during structured tasks. One of the limitations of measuring students’ skills in these contexts is related to the structure of the task. A referential communication task does not replicate conditions in which spontaneous free conversation occurs. Further research that investigates the pragmatic skills of children with hearing loss during spontaneous conversation is warranted.

### Pragmatic Abilities During Informal Spontaneous Conversations

Research that has investigated the pragmatic skills of students with hearing loss during conversation has predominantly assessed these skills either through the use of semistructured interviews or in conversation with adults. Results from these studies show that many of these students are active communicators and use effective pragmatic behaviors during conversation. However, there also appears to be a wide variety of pragmatic skills evident when compared with their hearing peers. In particular, there are reported differences in conversational balance, types of turns, and strategies used to repair conversational breakdown (Most et al., 2010; Toe et al., 2007; Toe & Paatsch, 2013; Tye-Murray, 2003; Wood et al., 1982).

In a recent study, Most et al. (2010) investigated the pragmatic abilities of 24 children (aged 6–9 years) with hearing loss during conversation with a familiar adult. Specifically, verbal and nonverbal pragmatic skills were rated as either appropriate or inappropriate and then
compared with the skills of their hearing peers. Results showed that the students with hearing loss displayed a wide variety of conversational skills, with many behaviors rated similarly to their hearing peers (including many of the nonverbal and paralinguistic behaviors). However, the pragmatic profiles of these children were reported as either delayed or significantly different from those of their hearing peers. For example, many of these children gave inappropriate responses and were not able to demonstrate conversational contingency (an ability to share the same topic by adding information to the prior utterance) or adjacency (inappropriate or no response occurring after the partner’s utterance). These findings suggest that although these children were able to use a variety of pragmatic behaviors during conversation, they were not used precisely or consistently.

Similar differences in pragmatic skills between deaf and hearing children during conversation with adults were also reported by Tye-Murray (2003). Results showed that the group of 181 children aged 8 or 9 years spent more time engaged in repairing communication breakdown and more time in silence than their hearing peers. However, one subgroup of these participants, an “oral” group of students with better speech intelligibility, performed similarly to their hearing peers in terms of the levels of conversational balance. Both the oral children with hearing loss and the children with normal hearing tended to take longer speaking turns than did their adult partners. However, the dominance of talk by these children during interactions with the adult may have been attributed to the type of task employed in this study. Adults in this study were given a set of open-ended questions to ask the children, resulting in more of an interview style rather than a spontaneous conversation. In contrast with these findings, other studies have reported the dominance of adults during spontaneous conversations with children with hearing loss (Toe et al., 2007; Wood et al., 1982; Wood & Wood, 1984). For example, Wood et al. (1982) reported that teachers displayed certain conversational moves not usually apparent in conversations with hearing children and asked a high proportion of questions of the group of children with hearing loss aged 6–10 years. Similarly, Toe et al. (2007) reported that teachers were the dominant partners in conversations with children with hearing loss (aged 6–16 years) in terms of the percentage of words spoken. However, differences in conversational balance were also reported according to the age of the children, with the older children more likely to share the balance equally. Clearly, further research is needed to investigate whether this type of conversational balance is evident in less-structured conversations between children who are deaf and their hearing peers.

The purpose of this present study was to investigate the pragmatic skills of a group of primary-school-age children (Year 3–Year 6 of study; aged 8–12 years) during spontaneous conversation with their peers. This type of unstructured communication task is more representative of the interactions that occur between friends and during classroom activities. Specifically, this study will investigate the pragmatic skills of children with hearing loss while they converse with a familiar hearing peer. Pragmatic skills evident in these deaf/hearing (D/H) dyads will be compared with the pragmatic skills of the hearing/hearing (H/H) dyads. The experimental design allowed for the investigation of the following research questions:

1. What are the similarities and differences in conversational balance between D/H and H/H dyads?
2. What are the similarities and differences in conversational turn types between D/H and H/H dyads?
3. What are the similarities and differences in conversational maintenance between D/H and H/H dyads?

Method

Participants

Ninety-three children (57 girls and 36 boys), aged between 7 years 7 months and 12 years 9 months, participated in this study. Thirty-one children had hearing loss ranging from mild to profound (hearing loss of 90 dB and more). Sixty-two children had normal hearing. Participants were organized into sets of pairs, with 31 dyads comprising one child with hearing loss and one child with normal hearing (D/H dyad) and 31 dyads comprising two children with normal hearing (H/H dyad).
SIR consists of five categories, from Category 1 (speech consisting of prerecognizable words) to Category 5 (connected speech is intelligible to all listeners). The listener does not need to concentrate unduly, and the child is understood in everyday contexts. Three independent judges, experienced with listening to the speech of children with hearing loss, rated the speech of the 31 children who participated in this study. Ratings between judges differed for two of the 31 children, resulting in an interrater agreement of 97%. The two judges sat together to rate these two children again until an agreement was reached. Twenty-two of the children were rated as belonging to Category 5 (connected speech is intelligible to all listeners). Two children were rated as of Category 4 (connected speech is intelligible to a listener who has little experience of a deaf person’s speech). The listener does not need to concentrate unduly, and the child is understood in everyday contexts.)

Hearing levels were calculated using pure-tone thresholds averaged across the three frequencies 500, 1,000, and 2,000 Hz in the better ear. Pure-tone average figures for children using CIs were taken from the most recent preoperative audiogram. Two of the children had a mild hearing loss, five had a moderate hearing loss (between 40 and 70 dB), six had a severe hearing loss, and 18 had a profound hearing loss. Preoperative audiograms were not available for two of the children (Child 2 and Child 18) using CIs because they had been implanted in countries other than Australia. It was assumed considering their year of implantation that these children would have had hearing levels with hearing loss of 90 dB and more. Twenty children were CI users and 11 children were fitted binaurally with behind-the-ear hearing aids.

All children were selected from three primary schools in Melbourne, Australia, ranging from Year 3 to Year 6 of study (aged 8–12 years). The 31 children with hearing loss were fully mainstreamed in these schools with the support of teachers of the deaf from a specialized unit for children with hearing loss. Many of the teaching practices employed in these three primary schools incorporate inquiry-based learning involving small-group cooperative learning situations and high levels of student-to-student interaction. All children used spoken language for communication. Some of these students may have been the only student with hearing loss in the class, whereas others may have been in a class with a small number of students with hearing loss. In general, the majority of these students would have been enrolled in these schools from the first year of schooling (aged 5 years) and would have attended an early intervention center prior to school. Individual details of the participants are presented in Table 1.

Spoken-language skills of the 31 children with hearing loss were measured using formal language tests, administered by either speech-language pathologists or teachers at the school as part of the children’s annual language assessments. These tests included the Clinical Evaluation of Language Fundamentals 4 (CELF-4; Semel, Wiig, & Secord, 2003) or the Comprehensive Assessment of Spoken Language (CASL; Carrow-Woolfolk, 1999). For children where no formal spoken language measures were available, the researchers administered the Clinical Evaluation of Language Fundamentals 4—Screening Test (CELF 4-ST; Semel, Wiig, & Secord, 2004). General language levels of each of the 31 children with hearing loss are presented in Table 1. Twenty-two of the children had language levels below the criterion, whereas nine children had language levels at, or above, the criterion for their age level. All 62 children with normal hearing were reported by their classroom teachers to have age-appropriate language skills.

Language scores for participants with hearing loss were obtained from a variety of sources, including the CELF screening tool. Results from these assessments were useful in providing a broad measure of participant language levels as to whether they were above or below the criterion. However, this measure was insufficiently sensitive to be used for statistical analysis. Consequently, the relationships between language levels and pragmatic behaviors were not investigated in this study.

Speech intelligibility levels for each of the 31 children with hearing loss were measured using the Speech Intelligibility Rating Scale (SIR; Wilkinson & Brinton, 2003). The SIR consists of five categories ranging from speech consisting of prerecognizable words (Category 1) to connected speech that is intelligible to all listeners (Category 5). Two independent judges, experienced with listening to the speech of children with hearing loss, rated the speech of the 31 children who participated in this study. Ratings between judges differed for two of the 31 children, resulting in an interrater agreement of 97%. The two judges sat together to rate these two children again until an agreement was reached. Ten children were rated as belonging to Category 5 (connected speech is intelligible to all listeners). The child is understood in everyday contexts. The listener does not need to concentrate unduly, and four children were rated as of Category 3 (connected speech is intelligible to a listener who concentrates...
and lipreads within a known context). No children were rated as producing unintelligible speech. These speech intelligibility ratings were used to establish that all participants in the study had intelligible speech and that issues with speech intelligibility were unlikely to cause conversational breakdown.

Procedure and Materials

**Selection of dyads.** Participants with hearing loss were sought through three regular primary schools with units/facilities for children who are D/HH. A total of 34 children who met the criteria were identified by unit coordinators. After child and parental consent was obtained for each participant with hearing loss, the child was asked to nominate a friend from their class who had normal hearing to also participate in the study. This hearing friend was then also asked to nominate another hearing friend to participate in the study. Consent was then sought from each of the children with normal hearing and their parents. Conversational data were collected on 31 full sets of D/H and 31 H/H dyads.

A quiet room in the school was provided for data collection. The D/H dyad was invited to come to the room for a chat. The following week, the child with normal hearing was invited to come to the same room for a chat with their self-selected hearing friend (H/H

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Table 1  Details of the 31 participants who were deaf/HH according to age, device, pure-tone average thresholds (at 500, 1,000, and 2,000 Hz), and gender

<table>
<thead>
<tr>
<th>Child</th>
<th>Age of deaf child (year: month)</th>
<th>Age of hearing child (year: month)</th>
<th>Gender within dyad</th>
<th>Device used by deaf child in each dyad</th>
<th>PTA (dB HL)</th>
<th>Language level of deaf child in each dyad</th>
</tr>
</thead>
<tbody>
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<td>10:4</td>
<td>10:11</td>
<td>M</td>
<td>CI</td>
<td>97</td>
<td>At/Above</td>
</tr>
<tr>
<td>2</td>
<td>10:10</td>
<td>9:8</td>
<td>M</td>
<td>CI</td>
<td>ND*</td>
<td>Below</td>
</tr>
<tr>
<td>3</td>
<td>7:7</td>
<td>7:4</td>
<td>F</td>
<td>HA</td>
<td>35</td>
<td>Below</td>
</tr>
<tr>
<td>4</td>
<td>10:11</td>
<td>9:1</td>
<td>F</td>
<td>CI</td>
<td>105</td>
<td>Below</td>
</tr>
<tr>
<td>5</td>
<td>11:1</td>
<td>9:6</td>
<td>F</td>
<td>CI</td>
<td>120</td>
<td>Below</td>
</tr>
<tr>
<td>6</td>
<td>12:4</td>
<td>12:1</td>
<td>F</td>
<td>CI</td>
<td>117</td>
<td>Below</td>
</tr>
<tr>
<td>7</td>
<td>9:6</td>
<td>9:0</td>
<td>F</td>
<td>HA</td>
<td>57</td>
<td>At/Above</td>
</tr>
<tr>
<td>8</td>
<td>11:7</td>
<td>11:6</td>
<td>F</td>
<td>HA</td>
<td>65</td>
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</tr>
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<td>10:0</td>
<td>F</td>
<td>CI</td>
<td>117</td>
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</tr>
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<td>9:0</td>
<td>M</td>
<td>CI</td>
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<td>Below</td>
</tr>
<tr>
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<td>9:7</td>
<td>F</td>
<td>CI</td>
<td>98</td>
<td>Below</td>
</tr>
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<td>12:1</td>
<td>F</td>
<td>HA</td>
<td>72</td>
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</tr>
<tr>
<td>13</td>
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<td>9:9</td>
<td>F</td>
<td>CI</td>
<td>120</td>
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</tr>
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<td>14</td>
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<td>M</td>
<td>HA</td>
<td>53</td>
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</tr>
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<td>16</td>
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<td>CI</td>
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</tr>
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<td>17</td>
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<td>9:3</td>
<td>F</td>
<td>CI</td>
<td>107</td>
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<td>18</td>
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<td>CI</td>
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<td>CI</td>
<td>120</td>
<td>At/Above</td>
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<td>11:3</td>
<td>F</td>
<td>CI</td>
<td>113</td>
<td>At/Above</td>
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<tr>
<td>26</td>
<td>9:11</td>
<td>9:1</td>
<td>F</td>
<td>CI</td>
<td>105</td>
<td>Below</td>
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<tr>
<td>27</td>
<td>12:2</td>
<td>11:1</td>
<td>F</td>
<td>CI</td>
<td>107</td>
<td>At/Above</td>
</tr>
<tr>
<td>28</td>
<td>11:11</td>
<td>12:4</td>
<td>F</td>
<td>HA</td>
<td>51</td>
<td>At/Above</td>
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<tr>
<td>29</td>
<td>11:3</td>
<td>11:3</td>
<td>M</td>
<td>HA</td>
<td>75</td>
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<tr>
<td>30</td>
<td>12:2</td>
<td>12:3</td>
<td>F</td>
<td>HA</td>
<td>89</td>
<td>At/Above</td>
</tr>
<tr>
<td>31</td>
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<td>10:11</td>
<td>F</td>
<td>CI</td>
<td>110</td>
<td>Below</td>
</tr>
</tbody>
</table>

*Note.* CI, cochlear implant; HA, hearing aids; HL, hearing loss; HH, hard of hearing; PTA, pure-tone average.

*Denotes participants with no data (ND) available.
dyad). Students from both the D/H and H/H dyads were seated at the corner of the table so that they could easily hear and see each other and so that they could be videotaped. A digital video camcorder on a tripod was used to videotape each conversation. Each dyad was invited to converse about any topic of interest. The following instructions were provided by the researchers.

Thanks for being part of our study. What we’d like you to do is to have a talk with each other about anything you like. You might want to talk about the weekend, the holidays, things you like to do, or anything that’s happening at school. There will be a video recorder switched on so that we can have a look at your conversations later. We will be busy doing our own work while you talk with each other, so just ignore us. We may even work in the next room. If you don’t know what to talk about then there are some pictures here that may help you. These pictures include favourite movies, favourite sports, pets etc.

Conversations were approximately 10 minutes in duration. If conversations continued for longer than 10 minutes, participants were interrupted by the researchers and were asked to return to their class. If students became stuck and could not think of anything to talk about, then some visual topic suggestions were provided in the form of a page with words and pictures relating to sport, favorite television shows, and pets. These visual prompts were very rarely required. In order to create as comfortable and naturalistic an environment as possible, the researchers “appeared” to be busy with paperwork and sat some distance from the dyad. All conversations were videotaped and transcribed into the SALT (Systematic Analysis of Language Transcripts) program. This process was facilitated by the intelligible speech of all participants.

Coding Conversations

Conversation turns. In this study, the definition of conversational turn is derived from the work of Caissie and Rockwell (1993). They define a turn as one or more utterances or nonverbal communicative acts preceded, and followed by, a change of speaker or a pause of 2 s or more.

Conversational balance. Balanced conversations provide both conversational partners with the opportunity to share in the interaction and feel equally valued. One-sided conversation may be reported as dissatisfying and discourage further interaction (Erber, 1996). In this study, three measures of conversational balance were used.

1. Number of turns per partner (see definition of turns above).
2. Number of topic initiations per conversational partner. An initiation was defined as any introduction of a new topic. A new topic was defined as any change of topic that was unrelated to the topic discussed in the previous turn or turns (Caissie, 2000).
3. Mean length of turns (MLT) in words per conversational partner. MLT has been used in previous studies (Ibertsson et al., 2009b; Lloyd et al., 2001). It was calculated using SALT. Revisions and self-repetitions (Mazes) were excluded from the analysis, as were unintelligible utterances, singing, random vocalizations with no apparent purpose, and speech addressed to the investigators.

Conversational turn type. A system for coding conversational turn types was developed from previous work (Wood et al., 1982; Wood & Wood, 1984) and from that used by Lloyd et al. (2001). This system uses the turn as the unit of analysis. Each turn is coded according to turn type. When a turn includes more than one turn type or “move,” only the turn ending or final move is coded. For example, “I really love watching Spiderman movies. What is your favourite movie?”

This example is one turn because there is no change of speaker and no pause of 2 s or more between utterances. There are two “moves.” The first is a personal contribution followed by a question. In this coding system, only the final move (i.e., the question) is coded as the turn type for this turn.

Table 2 describes the six turn types used in this study. Five of the six categories were drawn from the seven conversational categories for coding turn endings used in the study by Lloyd et al. (2001). The two remaining categories from their study (Directives and
Tagged Contributions) were not included as these were not used by the group of children in the current study. A sixth category, “Other,” was included in this study to code utterances that did not fit within any of the other categories.

Conversational maintenance. In order to maintain a conversation, it is important for both speakers and listeners to use a number of pragmatic skills to ensure coherency, including the following: smooth introduction and changes of topics; appropriate number of topics within a specified time; and pausing between words, sentences, and topics (Prutting & Kirchner, 1987). Conversations that involve a smaller number of topics suggest that conversation partners are able to sustain a topic for longer than conversations that involve many new topics. Long pauses between turns suggest that conversational fluency is low and conversational partners may be struggling to maintain the flow of conversation and having difficulty thinking of what to say.

Consequently, four broad measures of conversational maintenance were used in this study.

1. The number of topics per conversation
2. The number of turns per topic
3. The number of pauses between turns. Specifically, pauses of 2 s or more that occurred between turns were calculated for each dyad.
4. The average pause time between turns. Specifically, any pauses of 2 s or more were tallied and an average pause time (between turns) was also calculated for each dyad conversation.

Results

Conversational Balance

Each conversation transcript was analyzed according to the mean number of turns per partner, the mean number of topic initiations, and the MLT. Group data are presented in Figure 1. The dark bars in both graphs represent the same hearing children (Hearing 1) in each set of conversations, who participated in both D/H and H/H conversations.

Visual inspection of the D/H dyads indicates that, within these dyads, the deaf children appeared to initiate more topics and take longer turns than their hearing partners. In contrast, the H/H dyads appear remarkably well balanced, with very similar turns per partner, similar topic initiations, and similar mean turn lengths in words.

Conversations are interactive phenomena where one partner’s behavior directly affects the other partner. For example, if one conversational partner asks many questions, the other conversational partner is likely to be expected to provide a lot of responses. Each partner does not operate in a vacuum. In addition, one individual will have different conversations with different partners, and each conversation is a unique event. In this study, the same person conversed with both a deaf partner and a hearing partner. Although the individual child (Hearing 1) as a conversation partner was consistent, the conversations differ and, as such, they are independent events. This poses some challenges for statistical analysis in determining how to
Figure 1  Conversation balance for (a) hearing/deaf dyads and (b) hearing/hearing dyads: (a) conversations between students who are deaf/hard of hearing (HH) and their hearing peers (N = 31); (b) conversations between hearing students (Hearing 1 and Hearing 2, N = 31).
compare mean scores on the measures of conversational balance. While acknowledging that the conversational partners and their behaviors within a conversation are not strictly independent, it is of interest to explore the differences in the pattern of behaviors (if any) between the two sets of conversational partners. Does one group of conversational partners tend to dominate the conversations by initiating more topics or by taking longer turns? When conversing with a deaf partner does the hearing child do most of the conversational work (e.g., by asking questions and making comments) or is the deaf child an equally active partner? While acknowledging that conversational behavior cannot be completely independent, the best fit in terms of a comparison of means appears to be to compare conversational behaviors between conversation partners within each conversation, using \( t \) tests for independent samples. The results are shown in Table 3.

A Bonferroni adjustment has been applied to the alpha level to protect against the risk of Type 1 error when multiple \( t \) tests are used. No significant differences were found between the dyads of hearing children conversing together in terms of the three measures of conversational balance: (a) turns, (b) topic initiations, or (c) MLT. In contrast, deaf children were found to initiate a significantly higher percentage of conversation topics than their hearing conversational partners and also took significantly longer turns as measured by the mean number of words per turn.

In this study, deaf children conversed with a hearing friend, who then went on to conduct a second conversation (on another day) with a hearing child. Consequently, it is possible to compare the first hearing child (Hearing 1) in conversation with a deaf partner and also with a hearing partner. This analysis can be used to explore the question of how much of the differences observed in Figure 1 can be accounted for by the hearing child (Hearing 1) and how much is due to the hearing status of the conversational partner. A paired \( t \) test was used to compare the means on the three measures of conversational balance. This analysis is shown in Table 4.

Inspection of Table 4 indicates that there were no significant group differences between Hearing 1 when conversing with partners of different hearing statuses on the three measures of conversational balance: (a)

### Table 3  Conversational balance: results of \( t \) tests for independent samples for D/H and H/H dyads

<table>
<thead>
<tr>
<th>Measure of conversational balance</th>
<th>Deaf/hearing dyad</th>
<th>Hearing /hearing dyad</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deaf, mean (SD)</td>
<td>Hearing 1, mean (SD)</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Mean percentage of total turns</td>
<td>49.97 (3.4)</td>
<td>49.11 (3.3)</td>
</tr>
<tr>
<td>Mean percentage of topic initiations</td>
<td>59.2 (25.3)</td>
<td>42.1 (26.0)</td>
</tr>
<tr>
<td>Mean length of turn, in words</td>
<td>10.07 (5.2)</td>
<td>6.9 (3.8)</td>
</tr>
</tbody>
</table>

Note. D/H, deaf/hearing dyads; H/H, hearing/hearing dyads. **\( p < .01 \).

### Table 4  Conversational balance: comparison of Hearing 1 in conversation with deaf peer and also with a hearing peer

<table>
<thead>
<tr>
<th>Measure of conversational balance</th>
<th>Hearing 1 conversing with deaf child (( N = 31 )), mean (SD)</th>
<th>Hearing 1 conversing with hearing child (( N = 31 )), mean (SD)</th>
<th>( t )</th>
<th>( p ) (two-tailed)</th>
<th>( df )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean percentage of total turns</td>
<td>49.11 (3.3)</td>
<td>50.34 (1.8)</td>
<td>−1.92</td>
<td>.07</td>
<td>30</td>
</tr>
<tr>
<td>Mean percentage of topic initiations</td>
<td>42.13 (26.0)</td>
<td>50.71 (24.4)</td>
<td>−1.45</td>
<td>.18</td>
<td>30</td>
</tr>
<tr>
<td>Mean length of turn, in words</td>
<td>6.9 (3.8)</td>
<td>7.9 (3.9)</td>
<td>−1.11</td>
<td>.28</td>
<td>30</td>
</tr>
</tbody>
</table>

Note. Results of paired \( t \) tests.
percentage of total turns, (b) percentage of topic initiations, and (c) MLT. This suggests that as a group, Hearing 1 partners were consistent in their conversational behaviors despite the change in partner. It also suggests that the significant differences observed in the D/H dyads compared with the H/H dyads in terms of percentage of topics initiated and MLT can be attributed to the hearing status of the conversational partner (i.e., children who were D/HH tended to initiate more conversational topics and take longer turns independently of their partners’ conversational behavior).

Conversational Turn Type

The transcripts of each dyad’s conversation were coded according to turn type. Results are presented in Figure 2. The dark bars in both graphs represent the same hearing children (Hearing 1) who participated in both D/H and H/H conversations.

Inspection of Figure 2 suggests that when the children who were D/HH were conversing with a hearing peer, they tended to ask more questions and make more personal contributions than their hearing partner. In addition, their partners tended to use more conversational devices and respond with more minimal answers.

As mentioned earlier, conversational behaviors between conversational partners, particularly turn types, are not fully independent events. If one partner asks more questions, it may be that they are taking a more active role in the conversation while the other partner adopts a more passive role. Turn types were quite similar in the H/H dyads with both conversational partners using similar percentages of the different turn types. Statistical analysis of these data was undertaken using t-tests for independent samples. A Bonferroni adjustment has been applied to the alpha level to reduce the risk of Type 1 errors. Results are shown in Table 5.

Table 5 shows that although deaf children did ask more questions than their hearing partners, the difference did not quite reach significance once the Bonferroni correction was applied. There was also a trend toward more personal contributions by participants who were D/HH, but this did not reach significance. Hearing partners used significantly more conversational devices (e.g., ahh, really, cool) than their deaf partners and there was a strong trend toward hearing partners responding with more minimal answers. There was no difference between deaf and hearing partners for extended answers.

In contrast, the partners in the H/H dyads were much more similar to each other, with no significant differences on any of the turn types (Figure 3). This can be interpreted as H/H dyads engaging in more balanced conversations, where neither partner took a more dominant or more passive role but rather made very similar contributions in terms of questions, personal comments, and responses. While acknowledging that each conversational partner depends upon each other to keep a conversation going, what is of greatest interest here is the different patterns of conversational behavior.

Discussion

This study compared conversations between deaf and hard-of-hearing children aged between 7 years 7 months and 12 years 9 months and their hearing peers. D/H dyads were compared with H/H dyads. Conversational balance was compared, which showed that children who were deaf took longer conversational turns and initiated more conversational topics than their hearing partners. In contrast, the H/H dyads were very balanced, with similar length of turns and number of topic initiations. This suggests that deaf children took greater control of their conversations and appeared to prefer to “hold the floor,” while pairs of their age-matched peers divided their conversational time and effort more evenly. It is possible that children who are D/HH have developed some strategies to help them follow conversations more easily. They may be actively reducing the risk of communication breakdown by taking more control of the conversation through longer turns and greater initiation of conversational topics.

Turn type was also investigated and a similar pattern emerged (Figure 3). In the D/H dyads, the deaf children asked more questions and made more personal comments than their hearing partners, although neither difference reached significance. In turn, their hearing partners used significantly more conversational devices and provided more minimal answers, suggesting that they were the more passive conversational
partners. In contrast, the pairs of hearing children were very balanced in terms of questions, personal comments, conversational devices, and minimal answers.

To explore the area of conversational maintenance, the two sets of dyads were compared in terms of the total number of turns (indicating how the conversation was sustained), the mean number of turns per partner, and the total number of topics covered. No differences were observed between the 31 D/H and 31 H/H dyads on any of these measures. Use of pausing was also explored...
by examining the average length of pauses between turns and the overall pause time (excluding pauses of less than 2 s) within the conversation (Figure 4). This second measure of conversational maintenance also showed no differences between D/H and H/H dyads. Younger children were more likely to exhibit longer and more frequent pauses. This developmental pattern was the same for deaf children conversing with hearing children and hearing children conversing together.

These findings suggest that the children with significant degrees of hearing loss, many of whom have profound hearing loss, have many productive conversational skills. Consistent with a number of previous studies, the deaf participants were able to use a wide range of pragmatic skills (Ibertsson et al., 2009a, 2009b; Lloyd et al., 2001; Most et al., 2010). These children appear to be competent turn takers who are very capable of initiating new conversational topics. They can use a range of turn types, including questions, and provide appropriate extended responses. They use conversational devices such as phatics to encourage their partners to keep speaking and can introduce new topics using personal comments. In this study, there were no differences between the D/H and H/H dyads in terms

Table 5  Conversational turn type: results of $t$ tests for independent samples for D/H and H/H dyads

<table>
<thead>
<tr>
<th>Conversational turn types</th>
<th>Deaf, mean (SD)</th>
<th>Hearing 1, mean (SD)</th>
<th>$t$</th>
<th>$p$</th>
<th>df</th>
<th>Hearing 2, mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questions</td>
<td>34.1</td>
<td>25.9</td>
<td>2.38</td>
<td>.02*</td>
<td>60</td>
<td>31.4</td>
</tr>
<tr>
<td>Personal contributions</td>
<td>32.4</td>
<td>25.4</td>
<td>1.81</td>
<td>.08</td>
<td>60</td>
<td>31.3</td>
</tr>
<tr>
<td>Conversational devices</td>
<td>12.4</td>
<td>19.4</td>
<td>−2.50</td>
<td>.015*</td>
<td>60</td>
<td>14.7</td>
</tr>
<tr>
<td>Minimal answers</td>
<td>12</td>
<td>19.7</td>
<td>−2.32</td>
<td>.02*</td>
<td>60</td>
<td>13.9</td>
</tr>
<tr>
<td>Extended answers</td>
<td>7.9</td>
<td>7.2</td>
<td>0.390</td>
<td>.698</td>
<td>60</td>
<td>7.2</td>
</tr>
</tbody>
</table>


*p < .05.
of conversational maintenance. They used a similar number and duration of pauses, and most pairs were able to sustain a conversation for at least 10 min with an equal number of turns for each partner. Unlike some earlier studies (Jeanes et al., 2000; Tye-Murray, 2003), conversational breakdowns were not strongly evident in any of the conversations that were examined in this study. Both D/H and H/H dyads were able to understand each other sufficiently to maintain conversational flow and take turns very smoothly. The participants in this study may have significantly better language skills and pragmatic skills than the children who took part in the earlier studies of Jeanes et al. (2000) and Tye-Murray (2003). The participants in the present research were all educated in mainstream settings, with substantial opportunity to interact with hearing peers. They were often long-term CI users or children with more moderate losses who wore modern bilateral hearing aids. The 10- to 12-year gap between studies has seen significant technological development in sensory devices and it would appear that both factors may have affected conversational fluency for the participants in the present study.

These findings suggest that these peer-to-peer conversations are significantly different from the conversations that occur between adults and children who are D/HH. Teachers have been found to be more dominant in their interactions with children who are deaf. They ask more questions and use longer utterances, whereas the children have been found to use shorter utterances and are more likely to provide brief responses (Wood et al., 1982; Wood & Wood, 1984). Toe et al. (2007) found that younger children, similar in age to those in the present study, tended to take fewer turns and produce shorter utterances than their adult partners. It appears that this style of teacher talk is aimed at eliciting more language from children with hearing loss. Lloyd et al. (2001) describe it as teachers placing more linguistic demands on children with hearing loss with an expectation that this may build their language skills. These adult–child conversations provide a stark contrast to the findings in the present study.

The children with hearing loss in this study displayed a wide range of well-developed pragmatic skills, but the D/H dyads did differ from the H/H dyads. Rather than being more passive conversational partners,
it appears that the children with hearing loss in this study were very active conversational partners. They asked more questions and initiated more topics than their hearing conversational partners. They dominated the conversation with longer utterances and, perhaps as a consequence, their hearing peers appeared to become more passive conversation partners, with shorter turns and more conversational devices and minimal answers. There are several possible explanations for these pragmatic behaviors. It is possible that children with hearing loss in this study were modeling their conversation behavior based on their own teachers of the deaf. Perhaps these children had engaged in many conversations with teachers of the deaf, where their teachers had asked many questions, initiated most of the topics, and talked for most of the time. Consequently, when given the opportunity for a one-to-one conversation, these deaf students may have adopted similar strategies.

Alternatively, the children who are D/HH in this study may have developed useful strategies that help them to avoid conversational breakdowns. Perhaps by initiating more topics, speaking for longer duration, and asking more questions, they can maintain just enough conversational control to keep the conversations flowing. In this way, they display many similar skills to their hearing peers but also use their skills strategically to ensure they can follow the topic and manage the interaction so there is less risk of conversational breakdown.

A third explanation for differences observed between H/D and H/H dyads may relate to differences in familiarity between the dyads and the depth of friendship. In this study, the deaf children were asked to choose a friend from their class to come and chat with them. That hearing friend was then also asked to nominate a hearing friend for the H/H conversation. It is possible that the D/H pairs did not share as deep a friendship as the hearing pairs and this may explain some of the differences in the conversations. All of the participants in this study were learning in mainstream schools with the support of a unit for children with hearing loss; hence, there were other deaf children in the school who may well have been closer friends than the hearing children they chose as friends for this study. One of the motivations for undertaking this study came from conversations with teachers of the deaf who reported that the deaf children in these settings were having some difficulty forming true friendships with their hearing peers. Perhaps some of the passive behavior by the hearing partners observed in the D/H conversations resulted from the hearing children having lower motivation to participate equally in their conversations with their deaf friends and higher motivation to share the conversational space with their hearing partners? The impact of friendship and familiarity on the pragmatic skills used in peer-to-peer conversation deserves further investigation. Research suggests that children use their conversational skills in order to develop friendships (Berndt, 1982; Cutting & Dunn, 2006). Studies undertaken with young adolescents suggest that friends spend considerable time talking with each other and describe themselves as most happy when talking with peers (Berndt, 1982). In turn, and possibly in a rather circular way, deeper friendships may foster the development of more sophisticated conversational skills. Although the children who are D/HH in the present study had many good pragmatic skills, it is possible that the differences in conversational balance between D/H and H/H dyads may suggest that the D/H dyads were less attuned and contingent upon each other than the H/H dyads. More time spent talking with friends may help to fine-tune conversational skills in deaf and hard of hearing upper primary students. Schools and teachers might foster opportunities for conversation and friendship building by providing both inter- and extracurricular activities that scaffold interaction and help deaf children build common interests with their hearing peers.

The findings of the present study support those of Lloyd et al. (2001), who found that deaf children used similar numbers of questions as their hearing partners when they conversed with a hearing peer. Their study used a referential communication task that is much more structured than the free conversation that was analyzed in the present study. In both structured and unstructured conversations, deaf children appear to be very capable of asking questions when their conversational partner is a same-aged peer. Studies of conversations between teachers and students who are deaf have suggested that children who are deaf ask few questions and can be passive conversational partners (Toe et al., 2007; Wood et al., 1982; Wood & Wood, 1984). In contrast, when they conduct a conversation with a friend,
children who are deaf are very capable questioners, who appear to take active productive roles in co-constructing a satisfying interchange that either informs (Erber, 1996) or potentially builds friendship (Stinson & Foster, 2000).

The unstructured free conversations that were videotaped in the present study vary significantly from the referential communication tasks that have been used in several earlier studies investigating pragmatic skills in deaf children (Ibertsson et al., 2009a; Jeanes et al., 2000). Referential communication tasks demand a particular interaction pattern whereby the listener is required to seek clarification, which can easily result in communication breakdown. In contrast, free conversation is much more fluid. Conversational breakdowns might be masked by a change of topic or a new question, but these strategies require a certain level of pragmatic sophistication. Free conversation also provides opportunities for deeper and more refined analysis of pragmatic skills. Ibertsson et al. (2009a, 2009b) and Most (2010) found that although the deaf children in their studies used many effective pragmatic skills, they differed from hearing children in a number of significant ways. They were not able to demonstrate conversational contingency (an ability to share the topic by adding information to the prior utterance) in the way that hearing children could. Anecdotally, this lack of contingency was also observed in the present study, with deaf children struggling to follow up on the third turn in a conversation and frequently ignoring non-verbal and verbal listener cues or ‘tokens.’ These conversations need further analysis to explore these more subtle differences between D/H and H/H dyads. This will provide teachers and therapists with information that will help them to support the further refinement of pragmatic skills in children who are D/HH.

This study found that school-aged children (Years 3–6 of study; aged 8–12 years) who are D/HH have a wide range of pragmatic skills that they use very effectively when conversing with hearing peers from their own inclusive classrooms. It seems highly likely that the extended placement of these students in inclusive settings, combined with good spoken-language skills and intelligible speech, has supported the development of good turn-taking skills, the capacity to maintain conversations, and a strong grasp of different conversational turn types, such as questions, making personal comments, and using conversational devices. This study has built a very positive profile of the conversation skills used by this group of primary school–aged students with significant hearing loss; however, there were also some interesting differences between the conversations in D/H dyads and those observed in H/H dyads. This study found that children who are D/HH asked more questions, made more personal comments, initiated more topics, and took longer turns in their conversations with a hearing friend. In contrast, their hearing friends had more evenly balanced conversations when chatting with another hearing peer. In this study, the deaf participants tended to be the more dominant partner, perhaps because they were keen to maintain control of the conversation and avoid conversational breakdown, or possibly because they did not have as close a connection with their conversational partner as some of the hearing pairs of participants. In order to make recommendations to teachers about how to further enhance pragmatic skills in children who are D/HH, further analysis of these conversations is required to explore issues of contingency and how children who are D/HH follow up with the third turn in a conversation. This information will help teachers to support students to further refine their social interactions and possibly help to build closer connections between children who are D/HH and their hearing peers learning together in inclusive classroom environments.

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Conflicts of Interest
No conflicts of interest were reported.

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