This study characterized the profile of pragmatic abilities among 24 children with hearing loss (HL) aged 6.3–9.4 years, 13 using hearing aids (HAs) and 11 using cochlear implants (CIs), in comparison to those of 13 hearing children with similar chronological and language ages. All the children with HL used spoken language, attended regular schools, and received communication therapy twice a week. They had no disabilities other than the HL. We assessed pragmatic abilities using the pragmatic protocol of C. A. Prutting & D. M. Kirchner (1987. A clinical appraisal of the pragmatic aspects of language. Journal of Speech and Hearing Disorders, 52, 105–119), which includes verbal, nonverbal, and paralinguistic aspects. Findings showed that children with HL used varied pragmatic functions but revealed more incidents of inappropriate use of the different abilities, compared to hearing children. Intergroup differences were significant only for verbal parameters. No differences emerged between children who used CIs vs. HAs. It seems that the CI group had the same pragmatic abilities as severe HA children. The different or less effective pragmatic abilities of children with HL may be explained by less flexible use of language structures, difficulties in theory of mind, difficulties in auditory perception of spoken language, and less exposure to varied pragmatic situations and strategies. Results indicated the need to incorporate pragmatic communication abilities into rehabilitation programs.

Appropriate pragmatic communication behaviors are important for everyday interactions. Pragmatic behavior relates to the assortment of rules needed to use language appropriately and effectively, to create interaction and transfer meaning in different conversational contexts such as taking turns in conversation, continuing a topic, adding information, or asking questions (Adams, 2002; Bates 1976 as cited in Duncan & Perozzi, 1987; Ninio & Snow, 1996). Brinton and Fujiki (1989) claimed that language structures (syntax and semantics) become meaningful for functional communication only when used in conversation. Levinson (1983) defined pragmatics as the aspect of meaning that is not covered by semantics and syntax, and relates to the context in which the language is being used (like the time, place, circumstances, speaker, and listener) to complete the meaning of the text.

As a result of their hearing loss (HL), many children with hearing impairment who use spoken language experience communication failures in their everyday interactions, whether as listeners in the perception of speech or as speakers if their speech is unintelligible (Caissie & Wilson, 1995; Tye-Murray, 1994), which may affect their pragmatic communication. Although much research has documented the delaying effects of HL on the development of semantic and syntactic aspects of spoken language, only little research has examined this population’s development of pragmatic aspects (Ciocci & Baran, 1998; Jeanes, Nienhuys, & Rickards, 2000; Tye-Murray, 2003). Researchers assumed that because children with HL are not exposed to natural communication interactions like children with normal hearing (NH), they are likely to have fewer opportunities to acquire the range of pragmatic skills required for such interactions (Clarck, 1989; Gallaway & Woll, 1994). This posited delay in
acquiring the pragmatic ability to interact successfully with others may impair socioemotional development in children with HL. In fact, Tye-Murray (2003) reported that children with HL, aged 8–9 years old, who had good pragmatic abilities, were judged more positively with regard to their self-confidence, motivation, and social adjustment than their peers who had poor pragmatic abilities.

To more fully address the communication abilities of children with HL during natural discourse interactions, this study sought to uncover a typical pragmatic profile of difficulties and abilities in this population, to enable effective intervention design while emphasizing communication during natural discourse interactions.

Pragmatic Abilities of Children With HL

Knowledge on the development of pragmatic abilities among children with HL is lacking relative to that of children with NH (Lederberg & Everhart, 2000). Skarakis and Prutting (1977) claimed that young children with HL in the preverbal and one-word stages of language acquisition (2.1–4.2 years) acquired preverbal communication intentions as a basis for spoken language acquisition and progressed in acquiring those intentions in the same manner as children with NH. In contrast, more recent research on pragmatic abilities demonstrated differences in the development of children with HL versus those without HL. Lederberg and Everhart’s study of mother–child communication patterns reported that between 22 and 36 months of age, the communication skills of children in the two groups (HL and NH) developed similarly in terms of overall amount of communication, child’s response to the mother’s communication, joint attention with the mother, and initiation of interactions. However, children with HL were less skilled at maintaining a conversation topic, used more instructions and fewer questions, and showed less clear pragmatic communication functions. The researchers claimed that these intergroup differences in dyadic communication patterns resulted from the language delay of the children with HL. Nicholas, Geers, and Kozak (1994) likewise attributed the deficits in communication among young children with HL to their language delay. They examined the development of communication acts such as remark, request, response to a question, protest, and request for information among children with HL over the ages of 14–40 months, in comparison to children with NH matched for chronological age and to younger children with NH with matched linguistic age. Nicholas et al. found that children with NH acquired all the examined acts by age 30 months, whereas children with HL did not fully acquire some communication acts like responding to a question or asking for information even at the oldest age studied (40 months). In comparison to younger children with NH who were matched on linguistic level, the children with HL showed more advanced development in using the different communication acts.

Beyond studying the developmental process characterizing pragmatic abilities among children with HL, researchers also examined specific pragmatic abilities as expressed in discourse interactions, such as turn taking, repair strategies, and preserving conversational flow. Regarding the pragmatic ability to take turns during conversation, Duchan (1988) reviewed several studies and reported that children with HL evidence difficulties, especially when a number of individuals are participating in the interaction. Brackett (1983) attributed the difficulty in multtalker conversations to the additional effort that individuals with HL must invest, not only to follow the content but also to decide who is talking; thus, many times they miss parts of the content while searching for the speaker.

The pragmatic ability of effectively using repair strategies in cases of communication breakdown is necessary for individuals with HL both as listeners and as speakers due to lower speech intelligibility. Ciocci and Baran (1998) reported that children with HL aged 4–7 years used revision as a repair strategy more often than children with NH. The researchers assumed that they used this strategy because they were unsure about their original utterance and were not able to evaluate how clear it was from the listener’s perspective. Jeanes et al. (2000) compared the ability to deal with communication breakdowns among children with HL who used sign language, those with HL who used spoken language, and those with NH. By 8 years of age, the children with NH already showed more
effective abilities to preserve and progress in discourse than the two groups of children with HL. The HL groups’ interactions showed a delay in pragmatic behavior but the same developmental progression, resembling younger children with NH who were at a similar linguistic level. These results, together with other research studies (Bebko, Calderon, & Treder, 2003; Lederberg & Everhart, 2000; Nicholas et al., 1994), suggested that children’s linguistic delay had an effect on their pragmatic abilities. Most (2003) also showed that bilingual children with HL aged 9–14 years (who used both sign and spoken language) employed more advanced repair strategies and did so more flexibly while signing than while speaking. The author attributed her findings for these native signers to the children’s higher linguistic level in sign language than in spoken language.

Regarding the pragmatic ability to preserve the flow of conversation, Tye-Murray (2003) reported that children with HL at the age of 8–9 years who used cochlear implants (CIs) were engaged in communication breakdowns and silence for significantly longer durations during communication in comparison to children with NH. Tye-Murray also found that those children who were rehabilitated in aural–oral programs and thus had better spoken language skills experienced fewer communication breakdowns in comparison to those who were in total communication programs.

Duchan (1988) claimed that it is problematic to compare the communication strategies used by children with HL to those of children with NH. She objected to the statement that the strategies demonstrated by children with HL are not within norms based solely on variations from the strategies of children with NH. She recommended examining the typical pragmatic behaviors of children with HL and observing which function each behavior serves to evaluate its effectiveness from the child’s perspective rather than in comparison to children with NH. For example, Duchan suggested that children with HL may express difficulties in turn taking during conversation because they miss relevant auditory cues. In other words, the children’s difficulty results from the inaudibility of necessary cues and does not reflect an inability to take turns.

In line with Duchan’s (1988) recommendation and in light of the vast importance of pragmatic abilities in everyday communication and the difficulties experienced by children with HL in this domain, the present study aimed to obtain a typical profile of the pragmatic abilities of young children with HL who communicate through spoken language, in comparison with that of children with NH. Due to the common current usage of CIs as well as implanted children’s better performance in many aspects of spoken language in comparison to children of similar HL level who use hearing aids (HAs; Blamey et al., 2001; Waltzman & Hochberg, 1990), we compared the pragmatic profile of children with NH to two groups of children with HL: CI users and HA users.

The present study used Prutting and Kirchner’s (1987) pragmatic protocol as the method of analysis for attaining a general profile of pragmatic abilities among the population of children with HL. This protocol was used previously to describe the conversational abilities of children with language disorders, articulation disorders, or normal language and of adults with aphasia, right hemisphere damage, or normal language (Avent & Wertz, 1996; Avent, Wertz, & Auther, 1998; Goldblum, 1985; Meilijson, Kasher, & Elizur, 2004; Roberts & Wertz, 1993). The protocol was found useful for describing differences among disorders, distinguishing differences among subtypes of disorders, and documenting changes over time. However, the pragmatic protocol as applied in these studies was not intended as a diagnostic tool for individual participants. Rather, this tool aimed to uncover pragmatic behavior profiles of particular subpopulations. For example, the protocol disclosed that individuals with left hemispheric brain damage tend to display inappropriate lexical use, those with right hemispheric brain damage tend to display inappropriate paralinguistic use, and those with schizophrenia show severe inappropriateness with topic.

The pragmatic protocol was designed (i.e., judgment calibrated) in such a way that (a) for each parameter, a small but nonnegligible percentage of participants with normally developed language show inappropriate behavior in that parameter, and (b) most participants with normally developed language show inappropriate behavior in a small but nonnegligible
percentage of parameters. Furthermore, the inappropriateness displayed by participants with normally developed language reveals no discernible pattern. The sensitivity achieved by this calibration design makes it plausible that participants with impairment will show higher percentages of inappropriateness, affording recognition of specific patterns for different population groups.

We hypothesized that children with HL would demonstrate a variety of pragmatic communication abilities but that children with NH would show better abilities. Finally, we questioned whether children with CIs would show better pragmatic abilities than those with HAs.

Method

Participants

Participants included 24 children with HL (11 CI users and 13 HA users) and 13 with NH from middle–high socioeconomic families according to parent education, occupation, and place of residence.

The 24 children with HL (13 girls and 11 boys) had a mean age of 7.7 years ($SD = 0.10$). Their HL was detected at a mean age of 1.8 years ($SD = 1.1$). All the children were recruited via the Tel-Aviv branch of SHEMA, an Israeli nonprofit association furnishing rehabilitation, welfare, and support services to school-age children with HL and their families. All children used spoken language; studied in regular classes with hearing children; had no disabilities other than the HL; and received communication rehabilitation twice per week from a speech, hearing, and language pathologist.

Of the 11 children who used CIs, 10 used unilateral CI and 1 used bilateral CI. Two of the children who used CI on one ear also used HA on the other. Mean unaided degree of HL (pure-tone average of 500, 1000, and 2000 Hz) was 92.3 dBHL ($SD = 11.04$). Mean age of implantation was 2.6 years ($SD = 1.01$), and mean duration of CI usage was 5.1 years ($SD = 1.04$). All the children had used HAs before implantation.

All 13 children with HAs used bilateral HAs. Their mean unaided degree of HL was 73.5 dBHL ($SD = 13.3$) in the better ear.

The 13 children with NH had a mean age of 7.4 years ($SD = 1.02$) and had no speech, language, or hearing difficulties or any other developmental disability according to parental report. This group was matched on chronological age as well as linguistic age to the children with HL. The control group was recruited through personal acquaintance (relatives and friends) after examining all the children with HL and assigning each a linguistic age (according to the three subtests of the standard “MAASE” linguistic test; Rom, Morag, & Peleg, 2007; see Procedure section). Thus, the control group was created after all the children with HL were recruited and assessed. The distribution of chronological and linguistic ages of this group was similar to that of all the children with HL. The mean linguistic level of the children with HL was 1.33 ($SD = 0.81$). The mean linguistic level of the children with NH was 1.46 ($SD = 0.78$). The children with and without HL could be matched on linguistic age because all the children with HL used age-appropriate spoken language sufficiently to qualify for study in regular classes with hearing children, without sign language support; therefore, their language abilities were within the normal range. Table 1 presents the details on the participants’ demographic characteristics, language scores, and HL variables.

Instruments

Language abilities. To match the NH group to the groups with HL, children’s language level was assessed by three subtests of the MAASE linguistic test (Rom et al., 2007): categories, resemblance, and difference. The MAASE was developed in Hebrew to assess complex semantic language abilities of school-age children. The categories subtest (Cronbach $\alpha = .69$) presented children verbally with 10 categories (e.g., jewelry, holidays) and asked the children to name three different objects belonging to each category. A correct full answer (e.g., ring, bracelet, and earrings for jewelry) was scored 2, a partial answer (e.g., diamond and gold) 1, and an incorrect answer (e.g., glasses) or no answer at all 0. In the resemblance subtest (Cronbach $\alpha = .79$), children were verbally presented with 10 object pairs (e.g., car and bus, cat and dog) and were asked to name a similarity between the
objects in each pair. A correct full answer (e.g., “they are both animals” for the resemblance between cat and dog) was scored 2, a partial answer or one that did not specify a fundamental similarity (e.g., “they both have fleas”) 1, and no answer or an answer that was not clear or specific (e.g., “the eyes”) 0. In the difference subtest (Cronbach $\alpha = .68$), children were introduced to the same 10 object pairs and were asked to name a difference between the objects in each pair. A correct full answer (e.g., “the dog barks and the cat meows”) was scored 2, a partial answer or one that did not specify a fundamental difference (e.g., “the dog makes

Table 1  Participants’ demographic data and scores on study variables

<table>
<thead>
<tr>
<th></th>
<th>Sex</th>
<th>Chronological age (years)</th>
<th>Linguistic age (grades pre-K through 3)</th>
<th>Unaided pure-tone average (dB)</th>
<th>Age of hearing aid fitting (years)</th>
<th>Age of implantation (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F</td>
<td>7.9</td>
<td>Below first grade</td>
<td>Rt = 90, Lt = 90</td>
<td>1.0</td>
<td>5.0</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>8.2</td>
<td>2</td>
<td>Rt = 100, Lt = 85</td>
<td>0.11</td>
<td>2.9</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>8.2</td>
<td>2</td>
<td>Rt = 85–90, Lt = 105</td>
<td>0.11</td>
<td>2.9</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>9.3</td>
<td>1</td>
<td>Rt = 95–100, Lt = 110</td>
<td>1.0</td>
<td>2.6</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>7.1</td>
<td>1</td>
<td>Rt = 100, Lt = 100</td>
<td>1.6</td>
<td>2.0</td>
</tr>
<tr>
<td>6</td>
<td>M</td>
<td>7.10</td>
<td>2</td>
<td>Rt = 110, Lt = 110</td>
<td>1.0</td>
<td>Rt 6.0, Lt 2.0</td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>6.7</td>
<td>2</td>
<td>Rt = 105, Lt = 85</td>
<td>1.3</td>
<td>1.9</td>
</tr>
<tr>
<td>8</td>
<td>M</td>
<td>8.7</td>
<td>2</td>
<td>Rt = 95, Lt = 95</td>
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<td>2.2</td>
</tr>
<tr>
<td>9</td>
<td>M</td>
<td>6.7</td>
<td>1</td>
<td>Rt = 110, Lt = 90</td>
<td>1.8</td>
<td>3.10</td>
</tr>
<tr>
<td>10</td>
<td>M</td>
<td>6.11</td>
<td>1</td>
<td>Rt = 110, Lt = 110</td>
<td>0.9</td>
<td>1.2</td>
</tr>
<tr>
<td>11</td>
<td>F</td>
<td>7.4</td>
<td>Below first grade</td>
<td>Rt = 85, Lt = 95–100</td>
<td>0.10</td>
<td>2.0</td>
</tr>
<tr>
<td>12</td>
<td>M</td>
<td>9.4</td>
<td>2</td>
<td>Rt = 65–70, Lt = 65–70</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>F</td>
<td>7.0</td>
<td>2</td>
<td>Rt = 60, Lt = 60</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>M</td>
<td>8.4</td>
<td>3</td>
<td>Rt = 80–85, Lt = 80–85</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>M</td>
<td>8.0</td>
<td>1</td>
<td>Rt = 105, Lt = 90</td>
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<td></td>
</tr>
<tr>
<td>16</td>
<td>F</td>
<td>7.5</td>
<td>1</td>
<td>Rt = 70–75, Lt = 70–75</td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>F</td>
<td>7.3</td>
<td>Below first grade</td>
<td>Rt = 95–100, Lt = 100</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>M</td>
<td>7.3</td>
<td>1</td>
<td>Rt = 115, Lt = 60–65</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>F</td>
<td>7.2</td>
<td>1</td>
<td>Rt = 60–65, Lt = 60–65</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>F</td>
<td>6.11</td>
<td>1</td>
<td>Rt = 80, Lt = 85</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>M</td>
<td>6.5</td>
<td>3</td>
<td>Rt = 65, Lt = 80</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>M</td>
<td>6.3</td>
<td>1</td>
<td>Rt = 60, Lt = 60</td>
<td>3.10</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>F</td>
<td>8.0</td>
<td>1</td>
<td>Rt = 110, Lt = 100</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>F</td>
<td>8.4</td>
<td>1</td>
<td>Rt = 70, Lt = 60</td>
<td>3.4</td>
<td></td>
</tr>
</tbody>
</table>

Note. Lt = left; Rt = right.

*a*Used bilateral implants.

*b*Used cochlear implant on one ear and hearing aid on the other.
the cat run away") 1, and no answer or an unclear
answer (e.g., “they dislike each other") 0. Scores for
each of the three subtests of the MAASE thus ranged
from 0 to 20, with higher scores reflecting a higher
linguistic level. For each child, the average of these
tree scores was then converted to a language age
(according to grade level). The norms were based on
376 Hebrew-speaking, 5- to 12-year-old children with
normal language development (Rom et al., 2007).

Pragmatic abilities

The pragmatic protocol (Prutting & Kirchner, 1987)
was developed to describe pragmatic behaviors among
populations with and without disabilities, emphasizing
interactive aspects of language use. This tool was used
here to assess children’s pragmatic profile during
spontaneous communication with a familiar adult as
the communication partner. The original protocol was
a descriptive taxonomy comprising 30 parameters rep-
resenting a wide range of communication abilities, but
in the present study, one parameter (“varying of com-
munication style”) was excluded because it requires
comparing communication interactions with different
partners; thus, 29 parameters were used here. The
Appendix presents definitions and examples for these
29 communicative parameters. The parameters cover
three aspects of communication: verbal, paralinguistic,
and nonverbal. Verbal aspects include pragmatic
behaviors that are expressed by words, like response
to the partner, cohesion, and choosing the conversa-
tion topic. Paralinguistic aspects relate to how words
are used, like clarity of speech, prosody, voice inten-
tion, and fluency. Nonverbal behaviors do not include
use of words, like eye gaze, facial expression, and
physical contact.

The protocol was completed for each participant
based on 15 videotaped minutes of spontaneous con-
versation. The analysis examined usage of the 29 dif-
ferent pragmatic abilities as expressed in the specific
interaction, thus providing a profile of pragmatic com-
petencies and deficits during discourse behavior across
29 parameters. This study marks the first time the
protocol was used for children with HL.

For the children with HL, the adult partner was
their speech and language therapist; for the children
with NH, the adult partner was either a relative or
a neighbor. Meilijson et al. (2004) applied the prag-
ic protocol to analyze two conversations of indivi-
duals diagnosed with schizophrenia with different
partners (one familiar and one unfamiliar). Although
they hypothesized that conversations with familiar
partners would show higher pragmatic appropriaten-
ess, no statistical evidence was found in this direc-
tion, thus supporting the protocol’s high retest
reliability in addition to its well-reported interrater
reliability.

To score the pragmatic protocol, the videotaped
spontaneous child–adult conversations were analyzed
by two trained judges. For each of the 29 parameters,
each judge separately watched each videotape a few
times, identified all instances where that parameter
was used by the child, and coded its overall use as
either “appropriate” or “inappropriate” based on an
examination of the adult partner’s reactions. Judges
assessed the adult’s responses to determine whether
each parameter contributed to, impaired, or had no
effect on the interaction and its continuation. A child’s
use of a given parameter was coded appropriate when
it was consistently judged as neutral or as contributing
to the conversation, across the entire 15-min conver-
sation. A child’s use of a given parameter was coded as
inappropriate when in at least one instance during the
15-min observation, the child’s parameter-related be-
havior was judged as impairing the conversation or its
continuation, through the partner’s penalizing behav-
iors. For example, following the child’s use of a param-
eter at any time during the interaction, if the partner
stopped the conversation, showed a misunderstanding,
or facially expressed that the child’s pragmatic behav-
ior had interrupted him/her, that parameter’s usage
was coded as inappropriate to the specific interaction
with that specific partner. Analysis was based on the
specific context at hand, of the interaction between the
particular child examinee and his/her familiar adult
communication partner, in their particular environ-
ment when the conversation took place. For example,
a specific behavior like interrupting a speaker might
hypothetically be judged as inappropriate between a
boy and his adult neighbor, but if the videotape
showed that the child’s interruption did not hamper
the specific communication between the partners, and
did not disturb the adult partner, then that interruption was coded as appropriately used.

Prutting and Kirchner (1987) developed this 2-point yes/no coding system for the pragmatic protocol (rather than a scaled coding system for checking the frequency of each behavior) because the protocol is a descriptive tool giving an overall communication index for a wide range of parameters and can provide clinicians with information about further diagnosis they should make. The protocol’s developers emphasized that in observing an entire 15-min conversation, any instance where the child’s behavior appears to penalize the interaction should be marked inappropriate and should be diagnosed further in other contexts and more specifically (Prutting & Kirchner, 1987).

The two speech and language pathologists who served as judges underwent training in using the protocol by an experienced protocol user. The training period lasted 8 h and included discussing and clarifying all 29 parameters, watching video examples of appropriate and inappropriate discourse behaviors that were not part of the present experiment, and learning how to assess them. After the training period, interobserver reliability data were calculated for the two judges’ independent observation of the same 20% of the current participants’ videotaped conversational interactions (i.e., seven participants: three children with NH and four children with HL). Interobserver reliability data for judgments of both appropriate and inappropriate categories were above 90%. For each parameter that the judges did not agree on, they watched the tape together, discussed it, and reached agreement.

Procedure

Permission to conduct the study was obtained from the SHEMA center, schools, and Israeli Ministry of Education. After procuring informed consent from the parents, speech and language therapists, and familiar adults, one of the experimenters (ES-A) met with each of the children for one session that lasted 30–45 min. The session took place in a quiet room after school hours at the child’s school, at the SHEMA center, or at home. At the beginning of the session, the children were administered the three MAASE language subtests to evaluate their linguistic level. Next, the child and a familiar adult were given a box of games and materials to induce conversation. The box included a magician kit with instructions, a coloring book, crayons, blank pages, a pick-up-sticks game, a card game, a puzzle, and an art kit. The child–adult dyad was instructed to converse freely for 15 min. This 15-min spontaneous conversation was videotaped with a Sony digital 8 video camera that was set up on a tripod in the room, but during the conversation the experimenter exited the room.

Results

To compare the profile of pragmatic competencies and difficulties obtained for the three groups, HL-CI, HL-HA, and NH, we calculated the percentage of appropriate behaviors (of 29) for each child and the mean percentage for each group. Table 2 presents the mean percentage of appropriate behaviors in each group along with the standard deviations and ranges. As can be seen, the children with NH revealed a significantly higher percentage of appropriate behaviors compared to the two groups of children with HL, Kruskal–Wallis $F(2, 34) = 37.84, p < .0001$. Mann–Whitney tests revealed that the children with NH scored better than the children with CIs, $F(1, 22) = 60.61, p < .0001$, and also better than the children with HAs, $F(1, 24) = 47.95, p < .0001$. No significant difference emerged between the two groups with HL (CI vs. HA); therefore, all ensuing analyses were performed for all participants with HL as one group.

For the group of children with HL who used CIs, we examined (a) the relations between age at implantation and the percentage of appropriate pragmatic behaviors for each of the parameters and (b) the relations between duration of CI use and the percentage of appropriate pragmatic behaviors for each of the parameters. Pearson correlations revealed no significant correlations for either analysis ($p > .05$).

The profile of pragmatic difficulties obtained for the children with HL (with CIs or HAs) is presented in Table 3. For each of the examined pragmatic behaviors, the table presents the $n$ and the percentage of children with HL who were evaluated as showing inappropriate use. As can be seen, only one parameter,
contingency, was assessed as inappropriate among all the children with HL, and two other parameters, response and adjacency, were assessed as inappropriate for all but 1 of the 24 children with HL. These three parameters (8, 13, and 14) all referred to verbal turn-taking aspects of pragmatic ability. Contingency involves continuing the same topic as a preceding utterance and adding information to the prior communicative act, whereas response involves responding as a listener to speech acts and adjacency involves

<table>
<thead>
<tr>
<th>Pragmatic behavior parameter rated as used inappropriately</th>
<th>Hearing loss (n = 24)</th>
<th>Normal hearing (n = 13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Speech acts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Speech act pair analysis</td>
<td>20</td>
<td>83</td>
</tr>
<tr>
<td>2. Variety of speech acts</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B. Topic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Topic selection</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4. Topic introduction</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>5. Topic maintenance</td>
<td>11</td>
<td>46</td>
</tr>
<tr>
<td>6. Topic change</td>
<td>8</td>
<td>33</td>
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<tr>
<td>C. Turn taking</td>
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<tr>
<td>7. Initiation</td>
<td>1</td>
<td>4</td>
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<tr>
<td>8. Response</td>
<td>23</td>
<td>96</td>
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<tr>
<td>9. Repair/revision</td>
<td>2</td>
<td>8</td>
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<tr>
<td>10. Pause time</td>
<td>10</td>
<td>42</td>
</tr>
<tr>
<td>11. Interruption/overlap</td>
<td>16</td>
<td>67</td>
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<tr>
<td>12. Feedback to speakers</td>
<td>19</td>
<td>79</td>
</tr>
<tr>
<td>13. Adjacency</td>
<td>23</td>
<td>96</td>
</tr>
<tr>
<td>14. Contingency</td>
<td>24</td>
<td>100</td>
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<tr>
<td>15. Quantity/conciseness</td>
<td>14</td>
<td>58</td>
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<tr>
<td>D. Lexical selection/use across speech acts</td>
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<tr>
<td>16. Specificity/accuracy</td>
<td>22</td>
<td>92</td>
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<tr>
<td>17. Cohesion</td>
<td>15</td>
<td>62</td>
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<tr>
<td>E. Intelligibility and prosodies:</td>
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<tr>
<td>18. Intelligibility</td>
<td>15</td>
<td>62</td>
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<td>19. Vocal intensity</td>
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<td>17</td>
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<tr>
<td>20. Vocal quality</td>
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<td>21. Prosody</td>
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<td>22. Fluency</td>
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<tr>
<td>F. Kinesics and proxemics</td>
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<td>23. Physical proximity</td>
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<td>4</td>
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<tr>
<td>24. Physical contacts</td>
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<tr>
<td>25. Body posture</td>
<td>2</td>
<td>8</td>
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<tr>
<td>26. Foot/leg and hand/arm movements</td>
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<td>4</td>
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<tr>
<td>27. Gestures</td>
<td>0</td>
<td>0</td>
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<td>28. Facial expression</td>
<td>0</td>
<td>0</td>
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<td>29. Eye gaze</td>
<td>1</td>
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continuing the same topic as a preceding utterance, immediately after the partner’s utterance.

Regarding pragmatic competencies, it should be noted that 28 of the 29 behaviors were coded as used appropriately by at least one child with HL (96% of children or fewer were rated as inappropriate), and for many parameters, more than one child with HL showed appropriate use of the behavior (<92% inappropriate).

It should be noted, however, that a behavior was coded as inappropriate even if the child evidenced only one inappropriate use of this behavior during the 15-min interaction. Thus, some behaviors were assessed as inappropriate for many children, although they were used appropriately in other cases during the interaction. In other words, children revealed inconsistency in how they used some of the pragmatic behaviors. For example, all the children with HL showed at least one inappropriate use of contingency behavior, although most of them also showed some appropriate use of this behavior in other cases during the same discourse.

Table 3 compares also the percentage of children with HL who used pragmatic behaviors inappropriate versus the percentage of children with NH who used pragmatic behaviors inappropriately. As can be seen, in each behavior, children with HL showed higher percentages of inappropriate use of the behavior than those with NH. Furthermore, regarding parameters that were used appropriately across the board, on six parameters all the children in the HL group showed appropriate pragmatic behavior, similar to the NH children. These parameters include two verbal aspects—the variety of speech acts and the use of topic selection—and two paralinguistic aspects: prosody and fluency. However, all the NH children demonstrated appropriate behaviors for more than double the amount of parameters—the 6 parameters that were appropriate for the HL children and additional 7 parameters (13 in all).

Regarding the three communicative aspects of pragmatic behavior—verbal, paralinguistic, and nonverbal—$\chi^2$ analysis revealed no significant difference between the HL and NH groups’ distribution of inappropriate behaviors across the three categories. Both groups showed the most cases of inappropriate behavior in the verbal category (HL: 51.23%; NH: 21.72%), followed by the paralinguistic aspects (HL: 16.67%; NH: 10.77%), and the least cases of inappropriate behavior in the nonverbal aspects (HL: 3.57%; NH: 1.10%). Kruskal–Wallis analyses revealed that the differences between the three categories (verbal, paralinguistic, and nonverbal) were significant in both groups: $F(2, 69) = 112.95, p < .0001$, for the HL group and $F(2, 36) = 14.30, p < .0001$, for the NH group. Kruskal–Wallis analyses were also used to compare the two groups’ scores for each category separately, yielding a significant difference only for the verbal aspects, $F(1, 35) = 116.52, p < .0001$, but not for the paralinguistic or nonverbal aspect.

Discussion

The purpose of the present study was to obtain a pragmatic profile of individually integrated school-age children with HL in comparison to children with NH who were matched on both chronological and linguistic ages. Results indicated that children with HL around age 7 who used spoken language as their primary communication mode had already developed a wide variety of pragmatic communication functions. In fact, for 28 of the 29 behaviors assessed by the protocol, at least one child with HL (4%) was able to use that pragmatic behavior appropriately throughout the entire 15-min interaction. There were some verbal aspects, like topic selection and introduction, conversation initiation, and other paralinguistic aspects, such as prosody, fluency and vocal quality, that were rated similarly for the HL and the NH groups. This finding supports past research that reported on similarities between younger children with HL and with NH. For example, Skarakis and Prutting (1977) reported that children with HL in the preverbal and one-word stages of language acquisition acquired basic communication intentions the same manner as children with NH.

The one behavior that no child with HL in the present sample could consistently use appropriately—contingency—referred to the child’s ability to continue sharing the same topic as the adult’s preceding utterance and to add information to the prior communicative act. For example, if the adult partner said “It’s cold outside today,” an inappropriate use of
contingency behavior would be to merely say “Yes” without adding any information, whereas an appropriate use of the behavior could be “Yes, I’m glad I have my coat here.”

Two other behaviors—response and adjacency—were coded as consistently used appropriately by only one child each in the present study. However, it should be noted that even if a child showed only one inappropriate incident for a certain behavior in the child–adult interaction, that behavior was coded as inappropriately used by the child. Thus, pragmatic behaviors that were coded as inappropriate could have been also used appropriately by the children at other times in the interaction but not consistently.

Based on the present study’s findings, one can conclude that although the children with HL were able to express a variety of appropriate pragmatic behaviors during discourse, they were unable to fully or precisely use many of the various behaviors. In other words, they had not yet mastered the consistent appropriate usage of pragmatic abilities that their age-mates with NH exhibited.

The present study uniquely contributed to the literature by extending previous research on pragmatics among young children with HL to the current sample of older children with HL. Previous studies showed that young children with HL at the beginning stages of language development are able to develop pragmatic skills despite their language delay (Lederberg & Everhart, 2000; Nicholas et al., 1994). The present examination revealed that older children with HL around age 7 can use a wider variety of pragmatic skills than found for the younger children with HL, highlighting skills that develop at later stages. In addition, the results support previous findings indicating that children with HL show either a delayed or a different acquisition of pragmatic abilities in comparison to NH children (Bebko et al., 2003; Lederberg & Everhart, 2000; Nicholas et al., 1994).

The use of the pragmatic protocol developed by Prutting and Kirchner (1987) for the first time with children with HL enabled a separate examination of their verbal, paralinguistic, and nonverbal pragmatic behaviors. The results showed that children with HL were able to appropriately use various behaviors in each of the categories, and their peers with NH significantly surpassed their pragmatic ability only regarding verbal competencies. In the other two categories, paralinguistic and nonverbal pragmatics, no significant differences emerged between the two groups of children.

There may be several explanations for either the delayed or the different pragmatic profile of children with HL:

*Children’s delayed language acquisition, which may have affected their verbal pragmatic abilities.* The lower pragmatic performance of the children with HL may possibly stem from a slower rate or a delay of development and maturation for verbal abilities among children with HL than among those with NH. Such an explanation suggests that because these 7-year-old children with HL appeared to still be undergoing the process of acquiring these verbal abilities and had not yet reached a level of mastery, they demonstrated inappropriate behavior more frequently. This explanation supports Nicholas’ (2000) claim that one sign of maturation in children’s language use is a growing variety and number of more complicated verbal speech acts. It should be noted that the mean age of HL detection of the children in the present study was around 1.8 years. In fact, only one child with HL started wearing an HA before 6 months. This relatively late identification of the HL and consequently later beginning of rehabilitation might have affected the children’s development of pragmatic abilities. Future research examining the pragmatic profile of children with HL whose HL was detected earlier as well as comparing the abilities of children with HL to that of children with NH at a younger age might provide evidence to support the above explanation.

Regarding the language matching, it should be noted that although the children with HL and those with NH were matched for linguistic level, the matching procedure was conducted based on simple standard language tests that mainly examined vocabulary. The results demonstrated that this matching was not relevant for natural discourse interactions, which require other and more flexible linguistic abilities like taking turns in conversation, maintaining the conversational topic, continuing the speaker’s speech acts, adding information, and so forth. Likewise, in a previous study, Most (2002) reported that children with
HL differed from those with NH on their use of repair strategies, even though their linguistic levels were matched based on standard tests. The results of both studies emphasize the importance of using more comprehensive language tests during matching procedures.

Limited exposure to various communication strategies and partners. An alternative explanation for the different use of pragmatic behaviors in the verbal category between the children with HL and those with NH may be a result of these two groups’ different manner of acquiring such behaviors. In general, communicative interactions between people change as a function of partners and contents. Thus, children with NH are exposed to a wide repertoire of behaviors and communication strategies and thereby can choose the most relevant behaviors in different situations. Children with HL may possibly be exposed to a smaller variety of partners and strategies, which may limit their ability to adjust their behavior to the demands of different situations. They may have fewer opportunities for incidental learning, where they can observe an appropriate model of communication and practice implementing communicative behaviors in diverse meaningful situations.

Lower exposure may result either from the nature of communication interactions between people with NH and children with HL or from an avoidance of communication failures by children with HL. With regard to the nature of the interaction, previous research has reported (Meadow, Greenberg, Erting, & Carmichael, 1981) that persons with NH who interact with children with HL on an everyday basis often tend to be less demanding and to provide more support and mediation in the discourse interaction. Therefore, children with HL are often not responsible for preserving the fluency of the conversation and thus have less experience in this competency. Possibly, exposure to less tolerant partners such as children with NH may expose children with HL to more difficulties necessitating further learning. Future research would do well to examine the pragmatic behaviors of these children with different partners.

The lower exposure of children to various communication interactions may also result from their avoidance of failures. Children with HL develop specific strategies for coping with the difficulties they confront during communication. For example, Tye-Murray (2003) suggested that children with HL may tend to control the conversation or avoid turn taking. Jeanes et al. (2000) reported that young children with HL tried to guess what was said or changed the linguistic input to avoid communication failures. In the present study, some children were observed who did not respond to the partner, even in good listening conditions. It is possible that they did not understand what was said and thus preferred to behave as if they did not hear than to ask for clarification.

Extent of audibility during the interaction. In the communication interaction, many acoustic cues mark important information such as when the partner should take the next turn (Duchan, 1988). Duchan suggested that children with HL may behave inappropriately in communication interactions because they fail to hear such important cues and therefore cannot behave appropriately, not because they did not acquire pragmatic behaviors. Tye-Murray (2003) also emphasized that auditory training may facilitate spoken language interaction and improve the ability to preserve the fluency of conversation.

Possible difficulties in the domain of theory of mind. Prior research reported that children with HL who used spoken language showed a delay in their ability to succeed in false belief tasks, to understand complex mental conditions, and to relate to another person’s point of view during social interactions, throughout the elementary school years (Ziv, Malchi, & Meir, 2007). Thus, a difficulty in relating to the communication partner’s point of view during discourse may impair the child’s ability to respond appropriately according to the partner’s needs.

Another important finding, was the insignificant differences in the pragmatic protocols of the two groups of children with HL using different sensory devices—CI users and HA users. This finding may be due to the two groups’ similar mean aided hearing threshold and similar onset of intervention from a young age. In other words, the children with CI, who had unaided profound HL, performed similarly to the children with HA, who had better hearing (only severe HL). These findings corroborate prior outcomes showing that implanted children manifest the superior auditory information that is accessed through the CI, which leads to better performance in various
areas such as speech perception, speech production, and language performance, similarly to children with severe HL who use HA (Blamey et al., 2001; Most, Levin, & Sarsour, 2008).

Another possible explanation for the similar performance of the two groups with HL is the relatively early stage of pragmatic development examined here. According to Jeanes et al. (2000), children with NH start learning the range of pragmatic abilities from very early childhood and reach maturation of these abilities around age 8–10 years, when adult abilities appear. In the current study, these 7-year-olds with HL were younger than the age of expected pragmatic maturation, and the abilities for which they showed difficulties were those learned later in development. Future research should continue to follow these children at later stages and examine whether the CI provides better acquisition of pragmatic skills when adult abilities are expected.

As mentioned above, the present study was the first to use the pragmatic protocol with children with HL. The protocol was selected in light of its sensitivity to differentiations between populations with normal pragmatic abilities and those with difficulties in the pragmatic domain. In addition, it taps a wider profile of pragmatic abilities with separate assessment of verbal, paralinguistic, and nonverbal pragmatic behaviors. The results showed that, in fact, the protocol made it possible to obtain information on the specific difficulties of children with HL. For example, the children with HL often did not respond to their partner’s speech acts. Awareness of this tendency and its influence on these children’s ability to manage conversational interactions can help professionals bring into focus the causes of difficulties for each child and the optimal tools for coping better in such situations. Nevertheless, it is important to interpret the pragmatic protocol results with caution because this instrument was not developed specifically for the HL population. Future studies would do well to investigate the possibility that the observed difficulties in this specific population may stem from language or auditory difficulties and not necessarily pragmatic difficulties.

Also, the pragmatic protocol is a descriptive tool related to a specific interaction, and it serves as a screening tool only. As Prutting and Kirchner (1987) suggested, the parameters that were coded as inappropriate should be reassessed quantitatively in different situations to determine the difficulties and strengths of the specific child and plan intervention accordingly. Furthermore, alternative coding procedures should be explored to elicit a fuller picture of the pragmatic behavior patterns, like calculating percentages of inappropriate versus appropriate incidents for each parameter instead of screening for even one incidence of inappropriate use. Future research should further examine the inappropriate behaviors reported in the present study to quantify them more precisely.

Finally, it should be noted that in the present study, the NH children interacted with a relative or neighbor, whereas those with HL interacted with their speech and language therapist, suggesting the possibility of a confounding variable. One could speculate that the children with HL showed more difficulties because the therapists may have been less liberal and/or more demanding. However, it appeared that the therapists were more aware of the children’s difficulties during interaction, and were more forgiving and provided more mediation to ease the interaction for the children. This type of behavior was not seen among the adults who interacted with the NH children. And yet, the children with HL performed more poorly, thus validating the results despite the different partners. Meilijson et al. (2004) also found no statistical evidence of differences due to partners’ familiarity level; nevertheless, future studies should continue to compare children’s interactions with various partners.

The results of the present study, which yielded a pragmatic profile differentiating verbal, paralinguistic, and nonverbal behaviors for children with HL who are exposed to and acquire spoken language, emphasize the need to incorporate pragmatic behaviors into interventions. The benefit from training children to cope with communication breakdowns, exposing them to various repair strategies, was previously reported (Caisse & Wilson, 1995; Tye-Murray, 2003). Children with HL should be trained to listen for and attend to various acoustic cues in the conversation, and they should be exposed to advanced linguistic activities. They should be trained to relate to the partner’s point of view during discourse. Finally, the results suggest...
that children with HL may be able to initiate a conversation but may misunderstand much and experience communication breakdowns with peers and teachers. Professionals, such as teachers and clinicians, should be aware of the difficulties that the children might be facing in the regular classroom as a result of their poorer pragmatic abilities.

Conflicts of Interest
No conflicts of interest were reported.

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References


Appendix

Definitions and Examples for Communicative Parameters (Prutting & Kirchner, 1987)

Verbal Aspects

A. Speech Acts

1. Speech act pair analysis: The ability to take both speaker and listener roles appropriate to the context. Types: Directives/compliance—personal need, imperatives, permissions, directives, question directives, and hints. Query/response—request for confirmation, neutral requests for repetition, requests for specific constituent repetition. Request/response—direct requests, inferred requests, requests for clarification, acknowledgment of request for action. Comment/acknowledgment—description of ongoing activities; of immediate subsequent activity; of state or condition of objects or person; naming; acknowledgments that are positive, negative, expletive, or indicative. Examples—Appropriate behaviors: Initiates directives, queries, and comments; responds to directives by complying; responds to queries, responds appropriately to requests; and acknowledges comments made by the speaker. Appropriate behavior can be verbal or nonverbal as in the case of taking appropriate action to a directive or request. Inappropriate behaviors: Does not initiate directives, queries, and comments; does not respond to directives, requests, or queries by the speaker; and does not use acknowledgments made by the speaker either nonverbally or verbally.

2. Variety of speech acts: The variety of acts one can perform with language such as comments, assertions, requests, promises, and so forth. Examples—Appropriate behaviors: The partner shows both appropriate use and diversity in the number of different speech acts he or she can accomplish. Inappropriate behaviors: The partner shows inappropriate use or a reduced range of different speech acts he or she can use (e.g., a particular child whose productive repertoire is restricted to requests for objects with no other observed speech act types).

B. Topic

3. Selection: The selection of a topic appropriate to the multidimensional aspects of context.


5. Maintenance: Coherent maintenance of topic across the discourse.

6. Change: Change of topic in the discourse. Examples—Appropriate behaviors: The speaker/listener is able to make relevant contributions to a topic, is able to make smooth changes in topic at appropriate times in the discourse, is able to select appropriate topics for discussion given the context and participants, and is able to end discussion of a topic at an appropriate place in the discourse. Inappropriate behaviors: The introduction of too many topics within a specified time limit, the inability to initiate new topics for discussion, the inability to select appropriate topics for discussion given the context and participants, and the inability to make relevant contributions to a topic. Inability to maintain topic may frequently co-occur with high frequency of new topic introductions.

C. Turn Taking

(Smooth interchanges between speaker and listener)


8. Response: Responding as listener to speech acts.

9. Repair/revision: The ability to repair a conversation when a breakdown occurs, and the ability to ask for a repair when misunderstanding or ambiguity has occurred.
10. Pause time: Pause time that is too short or too long between words, in response to a question, or between sentences.

11. Interruption/overlap: Interruption between speaker and listener; overlap refers to two people talking at once.

12. Feedback to listener: Verbal behavior to give the listener feedback such as “yeah” and “really”; non-verbal behavior such as nodding to show positive reactions or moving head side to side to express negative affects or disbelief.

13. Adjacency: An utterance that occurs immediately after the partner’s utterance.

14. Contingency: An utterance that shares the same topic with a preceding utterance and that adds information to the prior communication act.

15. Quantity/conciseness: The contribution should be as informative as required but not too informative.

   Examples—In all turn-taking categories, appropriate and inappropriate behavior is judged in relation to both speaker and listener in the dyad. **Appropriate behaviors**: Initiating conversation and responding to comments made by the speaker, asking for clarification when a portion of the message is misunderstood, revising one’s own message to facilitate understanding, avoiding interrupting or talking before the other partner is finished, giving feedback to the speaker as a way of moving the conversation forward, appropriate length of pauses in the conversation to support timing relationship in the conversation, and making relevant and informative comments. **Inappropriate behaviors**: Little initiation in the conversation, forcing one partner to take the burden of moving the conversation forward, no response or inappropriate response to requests for clarification by the partner, no attempt to ask for repair, long pauses that interrupt timing relationship in the conversation, pause time that is too short and results in overlap or interruptions, little or no feedback to the speaker, and inability to produce relevant and informative comments.

D. Lexical Selection/Use Across Speech Acts

   (Specifying relationships between and across speech acts)

16. Specificity/Accuracy: Lexical items of best fit considering text.

   Examples—**Appropriate behaviors**: The ability to be specific and make appropriate lexical choices to clearly convey information in the discourse. **Inappropriate behaviors**: Overuse of unspecified referents, which results in message ambiguity. Also includes choice of inappropriate lexical items that do not facilitate understanding.

17. Cohesion: The recognizable unity or connectedness of text.

   Types: Reference = semantic relation whereby the information needed for interpretation of some item is found elsewhere in the text. Substitution = cohesive bond established by the use of substitute item of the same grammatical class. Ellipsis = substitution by zero, referring to sentences or clauses whose structure is such as to presuppose the missing information. Conjunction = logical relation between clauses. **Lexical cohesion** = achieved through vocabulary selection.

   Examples—**Appropriate behaviors**: Relatedness and unity in the discourse. One is able to follow the conversation, and the ideas are expressed logically and sequentially. **Inappropriate behaviors**: Conversation is disjointed, and utterances do not appear to be logically and sequentially related. One is unable to follow the line of thinking expressed by the speaker, frequently resulting in misinterpretation and ambiguity.

Paralinguistic Aspects

E. Intelligibility and Prosodies

18. Intelligibility: The extent to which the message is understood.

19. Vocal Intensity: The loudness or softness of the message.

20. Vocal quality: The resonance and/or laryngeal characteristics of the vocal tract.


22. Fluency: The smoothness, consistency, and rate of the message.

   Examples—**Appropriate behaviors**: Speech that is clear; not too loud or too soft; appropriate in quality;
and shows appropriate use of intonation, stress, and pitch to support the communicative/linguistic intention of the message. Inappropriate behaviors: Speech that is so unclear as to result in frequent misinterpretations of the message, speech that is too loud or too soft, a quality of speech that is inappropriate to the speaker’s age or sex and interferes with communication, and lack of prosodic variation that supports affect and the linguistic aspects of the message.

Nonverbal Aspects

F. Kinesics and Proxemics

23. Physical proximity: The distance that the speaker and listener sit or stand from one another.

24. Physical contact: The number of times and placements of contacts between speaker and listener.

25. Body posture: Forward lean is when the speaker or listener moves away from a 90-degree angle toward the other person; recline is slouching down from waist and moving away from the partner; side to side is when a person moves to the right or left.

26. Foot/leg and hand/arm movements: Any movement of the foot/leg or hand/arm (touching self or touching part of the body, clothing, or self).

27. Gestures: Any movements that support, complement, or replace verbal behavior.

28. Facial expression: A positive expression as in the corners of the mouth turned upward; a negative expression as in a downward turn of the mouth; a neutral expression is the face in resting position.

29. Eye gaze: One looks directly at the other’s face; mutual gaze is when both members of the dyad look at the other.

Examples:—Appropriate behaviors: Use of nonverbal aspects of communication that demonstrate level of affiliation between partners, aid in regulating discourse turns, and may supplement or support linguistic aspects of the message. Inappropriate behaviors: Use of nonverbal aspects that interfere with interpersonal/social aspects of communication; behaviors that detract from the content of the message rather than support and regulate discourse.