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## **'You sometimes get more than you ask for': responses in referential communication between children and adolescents with cochlear implant and hearing peers.**

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‘You sometimes get more than you ask for’ – Responses in referential communication  
between children and adolescents with cochlear implant and hearing peers

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Running head: Responses in referential communication

Keywords: conversation, referential communication, request for clarification, response,  
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## Abstract

*Background:* This study investigates responses to requests for clarification in conversations between children/adolescents with cochlear implant (CI) and normally hearing peers. Earlier studies have interpreted a more frequent use of requests of confirmation (yes/no interrogatives) in the CI group as a conversational strategy used to prevent communication breakdowns and control the development of the conversation. This study provides a continuation of this line of research, now focusing on responses to requests for clarification.

*Aims:* The aim was to examine type and distribution of responses to requests for clarification in a referential communication task. In addition, we analysed the compliance between the type of response and the type of request, as a measure of mutual adaptation.

*Methods & Procedures:* Twenty-six conversational pairs aged 10 to 19 participated: thirteen pairs consisting of a child/adolescent with CI (CI) and a conversational partner (CIP); and thirteen pairs consisting of a normally hearing control (NH) and a conversational partner (NHP). The pairs performed a referential communication task requiring the description of faces. All occurrences of requests for clarification and their responses in the dialogues were identified and categorized. We also analysed how the different types of requests and responses were combined and the type-conformity of the responses to requests for confirmation.

*Outcomes & Results:* The results showed no significant group differences regarding type, distribution or type-conformity of responses. In all four groups (CI, CIP, NH, NHP) a discrepancy between the request and the response was found, indicating that the response

provided information that was not explicitly requested. Requests for confirmation constituted 78 to 90 percent of the requests whereas only 54 to 61 percent of responses were confirmations. Conversely, the proportion of requests for elaboration was 6 to 15 percent whereas the proportion of elaborated responses was 34 to 40 percent.

*Conclusions & Implications:* The children/adolescents with CI contribute equally to the conversation regarding type and distribution of responses to requests for clarification. The frequent use of elaborated responses indicates common ground for the conversational partners and a shared understanding of the objective of the task. The context creates facilitative conditions, with positive interactional consequences. The results have implications for the design of intervention, where tasks such as this can be used to make children with CI more aware of the role of questioning strategies in interaction.

*Keywords:* conversation, referential communication, request for clarification, response, paediatric cochlear implant.

What this paper adds

*What is already known on this subject*

A cochlear implant provides auditory sensation to individuals with severe to profound hearing impairment, to the benefit of their cognitive and linguistic development. This gives them the opportunity to use spoken language as their main communication mode. Many attend mainstream education, which puts high demands on the ability to interact within a speaking community. Previous findings indicate that cochlear implant users, in many respects, act as

competent conversational partners, although there are differences in their use of requests for clarification, in comparison with normally hearing peers.

#### *What this study adds*

Earlier results regarding the use of requests for clarification are confirmed. Analysis of the responses displays similar patterns in cochlear implant users and hearing controls. Results reveal a high degree of compliance between responses and preceding requests, and a tendency to provide more information than explicitly requested. The context used, a referential communication task, creates facilitative conditions, and may be useful in intervention to make children with cochlear implants more aware of the use of request-response strategies.

#### Background

A cochlear implant (CI) provides auditory sensation to individuals with severe to profound hearing impairment (SPHI), granting them the opportunity to use spoken language as their main communication mode. The auditory ability enables a developmental course distinct from that of individuals with SPHI without CI, and reports have shown an advantage in both language (Svirsky *et al.* 2000, Geers *et al.* 2003) and academic skills, such as literacy (Marschark *et al.* 2007), in comparison with non-implanted hearing impaired individuals. The auditory ability is, however, not restored to a normal level and a developmental lag is found in various language measures, e.g. vocabulary comprehension (Fagan *et al.* 2007), phonological processing (Schorr *et al.* 2008), morphology and syntax (Geers *et al.* 2009, Schorr *et al.* 2008), as well as reading and academic skills (Marschark *et al.* 2007) and working memory (Pisoni and Cleary 2003, Pisoni *et al.* 2008) when using individuals with normal hearing as the comparison group. Demographic factors such as age at implantation (Svirsky *et al.* 2004,

Holt and Svirsky 2008) and duration of deafness (Sarant *et al.* 2001) have been shown to influence the outcome of cochlear implantation, and the rationale is that the cognitive and linguistic development benefits from an early implantation. Furthermore, parental involvement (Spencer 2004) and socioeconomic factors (Holt and Svirsky 2008) also contribute to large intersubject variability, making reliable predictions of the benefits of implantation difficult.

In Sweden today, approximately 40 percent of children and adolescents with CI attend mainstream education. This school setting puts high demands on the individual's ability to interact within a speaking community. Whereas several studies have investigated the effects of cochlear implantation on cognitive and linguistic development, few studies have so far explored interactional effects of implantation. However, the time spent in a speaking environment is correlated with speech production and reading outcome (Uchanski and Geers 2003). Research is needed to investigate to what extent an improvement of underlying cognitive and linguistic functions following cochlear implantation influences language use in a conversational context.

To date, the interactional ability in children and adolescents with CI has been studied in controlled experimental settings. By studying requests for clarification produced by both participants in a conversation Ibertsson, Hansson, Mäki-Torkko, Willstedt-Svensson and Sahlén (2009b) created a paradigm that enabled analysis of certain aspects of the co-construction of dialogue, e.g. the mutual adaptations made due to context and individual prerequisites of the listener and the influence of one speaker's contributions on subsequent contributions from the partner. The authors used a referential communication task in which the participants were required to describe faces for the partner to identify and place in the



correct position, and all participants acted as both speaker and listener. Requests for clarification were divided into two main categories; non-specific (e.g. 'What?', 'Huh?') and specific requests. The specific requests were further divided into subcategories; mainly requests for confirmation of new information (e.g. 'Does he have glasses?'), requests for confirmation of already given information (e.g. 'Did you say he had a beard?'), and requests for elaboration (e.g. 'What colour is his beard?'). The authors found that the participants with CI were equally contributing conversational partners as their normally hearing peers as measured in mean number of words and turns. Furthermore, the participants with CI were as competent with regard to the successful completion of the task. There were, however, differences between the conversational pairs comprising a child or adolescent with CI and the matched control pairs regarding the total time needed to solve the task and the total number and distribution of requests for clarification. The participants with CI made significantly more requests for clarification, and a larger proportion of these were requests for confirmation of new information (i.e. confirmation of information suggested by the listener in the task, not previously mentioned by the speaker). The authors propose that the difference may reflect a tendency on the part of the child or adolescent with CI to request clarification more frequently in order to prevent communication breakdowns rather than to repair breakdowns that have already occurred. The larger proportion of requests for confirmation was also interpreted as a strategy used to control the development of the conversation. By requesting confirmations (i.e. yes/no interrogatives) the child or adolescent with CI limits the number of possible responses to 'yes' or 'no', thereby increasing the chance of a correct identification of the response.

Requests for clarification have been studied from different perspectives and in many different populations (Saxton *et al.* 2005, Brinton and Fujiki 1982, Tye-Murray 2003, Jeanes *et al.*

2000, Caissie and Wilson 1995). The present study provides an expansion and an extended analysis of the conversational material collected by Ibertsson et al. (2009b), now shifting the focus from listener skills, i.e. the contributions made by the listener in each conversation (requests for clarification), to speaker skills, i.e. the speaker's responses to the requests. Earlier studies of responses to requests for clarification have described high levels of appropriateness, irrespective of the population studied (Saxton *et al.* 2005). Caissie and Rockwell (1993) describe requests for clarification and subsequent responses as important measures when studying conversation and communication breakdowns in adults with hearing impairment. General characteristics of the response and its agreement with the preceding request can influence the listener's comprehension and ability to make the correct decision. Furthermore, the design of the response can be thought to play an especially important role when following a request from an individual with hearing impairment.

Requests and responses (or questions and answers) together constitute a prototypical adjacency pair. Schegloff and Sacks (1973) describe adjacency pairs as consisting of two utterances that are (1) adjacent, (2) produced by different speakers, (3) ordered as a first pair part (FPP) and a second pair part (SPP), and (4) ordered so that the FPP makes the SPP relevant. In order to constitute an adjacency pair both pair parts must also belong to the same pair type (e.g. question-answer, greeting-greeting). In the referential communication task described above, by requesting clarification the listener provides for the relevance of the speaker to respond. The request for clarification (e.g. 'Does she have blond hair?') constitutes an FPP, making relevant a response (preferably 'Yes' or 'No') as subsequent SPP. The notion that the FPP provides for the relevance of the SPP is often referred to as conditional relevance (Schegloff 2007). The phenomenon is highly context dependent, and a response made conditionally relevant in one situation may not be relevant in another. The response mirrors

the speaker's interpretation of the question in a particular context, and under certain contextual conditions responses can comprise information that was not explicitly requested. However, a specific FPP exerts influence over the SPP through the principles of preference (see e.g. Koshik 2002). Action-type preference promotes the choice of an SPP which completes the action initiated by the FPP (e.g. an answer in response to a question, or an acceptance in response to an invitation). Design-type preference refers to the concept that the design of the FPP prefers a specific SPP. Furthermore, type-conformity preference (Raymond 2003) promotes an SPP which exhibits grammatical agreement with the FPP (e.g. in order to be type-conforming the response to a yes/no interrogative must include a 'yes' or 'no').

In order to complete an adjacency pair with a request for clarification as FPP the SPP must, first of all, constitute an answer (as described by action-type preference), but also comply with the pragmatic demands posited by the request (as determined by design-based preference and type-conformity preference). If the listener requests a confirmation, for example, the SPP must provide a yes/no answer, and if the listener requests an elaboration, the response must comprise the addition of new information to the conversation. Moreover, questions are usually designed to prefer an affirmative response rather than a negative. Any breach of these conditions will normally result in an attempt to repair. The absence, or even delay, of a response can bring about a pursuit of the answer, e.g. by repeating or reformulating the request, or an inference that the answer was not known by the speaker. For the present study, the analysis of the relation between responses and preceding requests for clarification will serve as a measure of communication skill in a referential communication task in children and adolescents with CI. We adopt the terminology and analytical framework of Conversation Analysis. However, in order to allow group comparison, to facilitate comparison with other clinical studies, and to be able to relate the use of requests for clarification to background

factors such as speech recognition and working memory (Ibertsson *et al.* 2009a) we have chosen to focus on quantifications.

### *Purpose*

The main aim of the study is to investigate the types and distribution of responses to requests for clarification and their compliance with the type of request, including possible differences between the participants with CI and the hearing controls. We also want to verify the results with respect to the patterns in the use of requests for clarification reported in Ibertsson *et al.* (2009b) on a larger group of participants.

Following the results from Ibertsson *et al.* (2009b), we predict no or only minor group differences regarding type and distribution of responses. Furthermore, we predict the type of response to agree with the type of request, although contextual characteristics of the task may provide for responses comprising unrequested information.

### Methods

#### *Participants*

Eighteen children and adolescents with CI older than seven years were invited to participate in the initial study on conversational skills reported in Ibertsson *et al.* (2009b). They were all included in a follow-up study at the Department of Audiology, Lund University Hospital. All had Swedish as their first language, had non-verbal IQ within normal limits and wore only one implant. Eight accepted the invitation, and an additional five participants were included in

a subsequent study of conversational skills in relation to working memory by the same research group (Ibertsson *et al.* 2009a). For the present study those thirteen participants were included, and the study thus provides an extension of the data reported in Ibertsson *et al.* (2009b). The CI group consisted of seven boys and six girls, ranging in age from 11;9 to 19;1 years (mean = 15;1). Thirteen children and adolescents with normal hearing were recruited to form a control group, matching the CI users regarding age (within 6 months of the birth date of the participant with CI) and gender. The participants with CI and the controls were instructed to choose a hearing conversational partner who was a close friend of the same age. The conversational partners selected by the CI users ranged in age from 11 to 19 years. Seven were boys and six were girls. The conversational partners selected by the controls also ranged in age from 11 to 19 and the group consisted of five boys and eight girls. All hearing participants were reported to have typical development in all relevant aspects.

All participants with CI have hearing parents and were, following Swedish recommendations, exposed to sign language before implantation. At the time of testing, however, they all used oral communication as their main communication mode at home and at school. The duration of deafness before amplification ranged from 4 to 50 months (mean = 16 months) and the duration of device usage ranged from 4;2 to 13;6 years (mean = 8;10). All subjects wore a Nucleus 22 device. Ten subjects attended mainstream education, one of which had access to sign language in the classroom if needed. Three attended special schools for the hard of hearing but used oral communication.

Due to the small size of the community of children with CI in Sweden, individual information on age at time of diagnosis, age at amplification or aetiology of the hearing impairment cannot be revealed for ethical reasons. According to medical records, the aetiology was; in six

cases unknown; in two, hereditary sensorineural injury; in four, infectious disease; and in one, inner ear anomaly. In seven cases the hearing loss was progressive.

### *Procedure*

A referential communication task was designed. The task was to describe a set of 16 pictures depicting faces. The set of pictures was placed in a predetermined pattern in front of one child (the speaker), while a pile of 24 pictures was placed in front of the other child (the listener). The speaker gave a description of each face and its position so that the listener could identify each face and arrange his/her set of pictures in the same way as the set in front of the speaker. The speaker and the listener were not given identical sets of cards and the listener was forced to request additional information when faced with a description that did not fit any of the pictures in his/her pile. In the first dialogue the participants with CI (CI) and the normally hearing controls (NH) acted as speaker and the CI users' conversational partners (CIP) and the partners of the normally hearing controls (NHP) acted as listener. In the second dialogue the roles were reversed.

The participants were seated in front of each other on each side of a 30 cm tall screen. The height of the screen enabled eye-contact and visual cues, thus creating 'real-life'-like conversational conditions. The dialogues were video-recorded using a single fixed digital video camera capturing both participants from a side view. For audio-recording, the camera's built-in microphone or an external microphone was used depending on surrounding conditions. Recordings were made in quiet rooms in the participants' homes or schools.

### *Analysis*

All conversations were transcribed orthographically following CHAT conventions (MacWhinney 2000). Transcriptions were made by either a doctoral student or a research assistant and checked by a senior researcher. The transcriptions were coded and computed using CLAN (MacWhinney 2000). The codings of requests for clarification made for Ibertsson et al. (2009b) were used and the remaining part of the data was coded in the same way. The requests for clarification were divided into two main categories, non-specific (e.g. ‘What?’, ‘Huh?’) and specific requests. Specific requests were further divided into requests for confirmation of new information, requests for confirmation of already given information, requests for elaboration, requests for repetition and requests for paraphrasing.

Since the three categories requests for confirmation of new information, requests for confirmation of already given information and requests for elaboration (see table 1) together constituted over 90 percent of all requests only these categories were included in the statistical comparisons. The other two types of specific requests were grouped together under the label ‘Other’. A classification system for different types of responses to these requests was created. Two main categories of responses were identified, confirmations and elaborations. Table 1 presents these main categories of requests for clarification and responses. Other types of responses – partial repetitions, exact repetitions, paraphrases and syntactic modifications – in total representing less than ten percent of the total number of responses, were grouped together in an ‘Other’ category.

Insert table 1 here

In order to further explore the agreement between requests and responses, responses to requests for confirmation of new or already given information were coded with respect to whether they were type-conforming (i.e. contained an explicit 'yes' or 'no' or equivalent) or not (i.e. contained a repetition or an elaboration not accompanied by 'yes' or 'no'). Type-conforming responses were further coded for whether they were affirmative or not.

The fourth author coded ten (20%) of the transcriptions independently and reliability was computed as percent identical codings. The reliability was; for type of request 83.4 percent; for type of response 90 percent; for type-conformity 96.8 percent; and, for affirmativeness 97.6 percent.

The following measures were computed:

- Types of requests for clarification: total number and distribution (%).
- Types of responses: total number and distribution (%).
- Proportion of type-conforming responses to both types of requests for confirmation.
- Proportion of affirmative responses out of type-conforming responses.

### *Statistical analysis*

Due to the small sample size and large individual variation, non-parametric statistical methods were used. For comparisons between the two types of conversational pairs (CI/CIP-NH/NHP), between the CI users and the hearing controls (CI-NH) and between the CI users' hearing conversational partners and the conversational partners of the controls (CIP-NHP), the Wilcoxon signed-ranks test was used. The level for statistical significance was set to 0.05.



## Results

### *Types of requests for clarification*

Table 2 presents group comparisons between the participants with CI, the NH controls and their respective conversational partners for total number of requests for. The participants with CI made significantly more requests than the NH controls ( $p = 0.011$ ).

Insert table 2 here

Figure 1 presents the total number and distribution of each type of request for clarification by the listener. Very similar results are found for all four types of participants. In all four types of participants requests for confirmation of new information were more common than other types of requests for clarification. This type of request constituted between 53.95 and 70.33 percent of the total number of requests, whereas the occurrence of the other three types of questions was only between 5.76 and 31.98 percent. The difference was statistically significant in the CI, CIP and NH groups (CI:  $p = 0.02$ ; CIP:  $p = 0.02$ ; NH:  $p = 0.013$ ). For the NHP the difference only approached significance ( $p = 0.053$ ). Minor group differences were found. The conversational partner of the normally hearing control (NHP) requested significantly more confirmation of already given information (mean 31.98%) than the conversational partner of the CI user (CIP: mean 16.47%,  $p = 0.007$ ). Furthermore, the CI users tended to request fewer elaborations (mean 5.76%) than the normally hearing controls (mean 10.11%). This difference, however, did not reach statistical significance ( $p = 0.153$ ).

Insert figure 1 here

### *Types of responses to requests for clarification*

In all groups two predominant types of responses – confirmations (responses comprising only the minimally necessary information, i.e. a ‘yes’ or ‘no’ in response to a request for confirmation, see examples 1 and 2 below) and elaborations (elaborated responses, with or without an accompanying ‘yes’ or ‘no’, see examples 3 to 6 below) – together cover over 90 percent of all responses. In three groups, confirmations were the most common responses (means 53.86-61.53%), significantly more common than elaborations (means 34.00-40.45%; CIP:  $p = 0.0498$ ; NH:  $p = 0.028$ ; NHP:  $p = 0.0495$ ). No statistically significant group differences were found with respect to the percentage of each type of response. Figure 2 presents the distribution of the different types of responses in each type of participant.

Insert figure 2 here

### *Compliance between requests and responses*

All except one request for elaboration received elaborated responses. In total, 80 to 90 percent of the responses to requests for confirmation were type-conforming and included a ‘yes’ or ‘no’ (or equivalent). The results from the analysis of type-conformity of responses are presented in figure 3. Without group differences, the results reveal a strong preference for type-conforming responses. Minor differences regarding type-conformity are found between responses to the two types of requests for confirmation, with slightly lower percentage type-conforming responses following requests for confirmation of already given information in the

CI, CIP and NH groups. This difference, however, does not reach statistical significance. Regarding the proportion of affirmative responses, no group differences are found. In all groups affirmative responses cover approximately two thirds of responses to requests for confirmation. Examples 1 to 3 show the three different types of requests with type-conforming responses. Example 4 shows a non-conforming response. All examples are translated from Swedish to English.

Example 1: Requests for confirmation of new information with type-conforming responses.

CIP:	OK hat?
CI:	No.
CIP:	Mustache?
CI:	Yes.

Example 2: Request for confirmation of already given information with type-conforming response.

CIP:	And he had brown eyes?
CI:	Yes.

Example 3: Request for elaboration with elaborated response.

NHP:	Where is he placed?
NH:	He is next to that guy.

Example 4: Request for confirmation of new information with non-conforming response.

CI: In the same row?

CIP: Only farther away.

Insert figure 3 here

As already described, the most frequent type of request is request for confirmation of new information, and the most frequent type of response is confirmation. However, the total proportion of requests for confirmation (i.e. requests for confirmation of new information and requests for confirmation of already given information) is between 78 and 90 percent, whereas the proportion of confirmation responses (i.e. responses consisting only of a 'yes' or 'no') varies between 54 and 61 percent in the four groups. Conversely, the proportion of requests for elaboration is 6 to 15 percent whereas the proportion of elaborated responses is 34 to 40 percent. It is therefore of relevance to investigate the combinations of requests and responses. Analysis of the combinations of requests and responses is presented in mosaic plots in figure 4. The plots show how often each type of request is followed by each type of response. As clearly demonstrated, the most common request-response combination in all groups is a request for confirmation of new information followed by a confirmation response (see example 2). However, in many cases requests for confirmation from the listener are followed by elaborated responses from the speaker, even though an elaboration is not requested.

In comparison with their conversational partners, the CI and NH groups provide significantly more elaborated responses to requests for confirmation of already given information (means

49.03 and 45.00%; example 5) than to requests for confirmation of new information (means 26.64 and 24.12%; CI:  $p = 0.022$ ; NH:  $p = 0.016$ ; example 6). This difference is not found in the CIP and NHP groups.

Example 5: Request for confirmation of already given information with elaborated response.

CIP:           The nose is quite small and it's like ... and there's not so much  
                  here, it's more down there.

CI:             More down there?

CIP:           Yes, it's more like a bun.

Example 6: Request for confirmation of new information with elaborated response.

CI:             Eh ...beret?

CIP:           A..., yes, askew.

Insert figure 4 here

### *Summary of the results*

To summarize the results, the participants with CI made significantly more requests for clarification than the participants with normal hearing. However, no statistically significant group differences were found regarding the responses to requests for clarification. In all groups, two predominant types of responses were identified – confirmations and elaborations. Analysis of type-conformity showed a preference for type-conforming, as well as for

affirmative, responses. A high proportion of responses conveyed more information than required by the preceding request for clarification. For example, elaborated responses following requests for confirmation, especially requests for confirmation of already given information, were common.

## Discussion

The aim of this study was to investigate conversational skills in children and adolescents with cochlear implants through analysis of responses to requests for clarification. The study provides an expansion and a methodological continuation of Ibertsson et al. (2009b), focusing on the co-construction of dialogue – a necessary approach in order to describe the mutual adaptations made during conversation due to individual prerequisites and limitations of the listener, e.g. hearing impairment, and contextual factors. The rationale is that the progress of the conversation is the shared responsibility of both speakers, and that communication breakdowns are collectively managed (see e.g. Perkins 2007).

The chronological age range of the subjects and the range of duration of device usage in the CI group are very wide, which is important to bear in mind when interpreting the results. However, exploration of the data revealed no correlation between these factors and any of the variables regarding requests and responses.

The results from Ibertsson et al. (2009b) with respect to patterns in the use of requests for clarification could be confirmed with data from a higher number of participants. The CI users produced significantly more requests for confirmation than the NH controls. No group differences were found regarding the distribution of different types of requests for

clarification, and, for all speakers, requests for confirmation of new information were most commonly used.

The main question regarded the analysis of responses to requests for clarification. The analysis revealed two predominant response types – confirmations and elaborations – and no group differences were found regarding their distribution. In all groups confirmation responses were more frequent than elaborated responses. This result is expected given that a majority of the questions were requests for confirmation. The lack of group differences for responses further supports the indications that children and adolescents with CI participate on equal terms in a structured conversational task.

The question concerning the relation between the requests for clarification and the subsequent responses is more intricate. The results revealed, again without significant group differences, a clear preference for type-conformity of responses. Most requests for confirmation, which are designed as yes/no questions, receive a response including ‘yes’ or ‘no’ (or equivalent). In addition, there is a clear tendency to include more information in the response than requested. This may appear to go against implicit conversational rules. However, in certain contexts this conversational behavior can be appropriate. The referential communication task adopted for this study provides a fixed context. The purpose and objective of the task are clearly defined and both participants are determined to reach the goal of completing the task. In this sense, the addition of unrequested information to the response can be viewed as a way of predicting, and thereby rendering unnecessary, subsequent questions.

The elaborated responses can also be viewed from a different perspective. The action of requesting confirmation, although expressed as a question, does not necessarily serve as

information seeking. In many cases, a request for confirmation could rather be seen to seek acknowledgement that what is suggested is correct, i.e. by requesting confirmation the listener suggests a solution and by responding the speaker either confirms or rejects this solution. The high proportion of affirmative type-confirming responses supports this notion, and shows that the questioner was, indeed, not unaware of the response when posing the question. The elaborated responses can, thus, be viewed as an acknowledgement that the solution suggested by the listener was correct and that the participants, therefore, can proceed to the next item. This is also supported by the fact that in the CI and NH groups elaborated responses are more common following requests for confirmation of already given information, i.e. the speaker more frequently elaborates the response after a request for confirmation of information that has already been mentioned earlier in the conversation. In this sense, it is clear that an elaborated response to a request for confirmation is not a breach of conversational rules. On the contrary, a single 'yes' or 'no' would not serve as a pragmatically sufficient response in this context. Thus, our interpretation is that the elaborated response indicates common ground for the conversational partners.

One of the findings reported by Ibertsson et al. (2009b) was that the participants with CI made significantly more requests for confirmation than the NH controls. This could be interpreted as a way to prevent communication breakdowns. Another possibility is that the child or adolescent with CI used requests for confirmation to a higher extent as a strategy to limit the number of possible responses to 'yes' or 'no'. They thereby decrease the risk of misinterpreting the response. This might serve as a strategy to maintain control of the dialogue. However, in order to function as an effective strategy the behavior must be recognized as such by the conversational partner. The large proportion of elaborated



responses indicates that this might not be the case. Very often the partner provided an elaboration in addition to the type-conforming 'yes' or 'no' response.

The first hypothesis was that there would be no or only minor group differences regarding type and distribution of responses to requests for clarification. The hypothesis was confirmed by the results, which indicate that the children and adolescents with CI contribute equally, at least in a strictly quantitative sense, to the conversation, both regarding requests (as shown by Ibertsson et al. (2009b)) and responses. Furthermore, all groups display similar patterns regarding type-conformity, and a large proportion of the responses provide more information than requested. These findings confirm our second hypothesis, stating that contextual characteristics of the task may provide for responses comprising unrequested information. We interpret the finding as an understanding of the objective of the task and a well-tuned ability to foresee which information must be provided to the listener for efficient and successful completion of the task. The results were, at least in part, expected given the findings of Ibertsson et al. (2009b) who found a sample of the same population of participants to contribute equally with regard to listener skills such as the total number of words and turns, and with only slight differences regarding the distribution of requests for clarification. The results differ, however, from previous studies describing difficulties in conversational fluency in children with CI. Tye-Murray (2003) found that children with CI spent significantly more time than children with normal hearing in communication breakdown and silence when speaking to an adult. There are, however, important differences between the methods adopted for the different studies, both regarding the task and the conversational partner, and the referential communication task adopted for this study may provide a more supporting interactional context for children and adolescents with CI.

The referential communication task regulates the topic and context, and the conversation is exclusively focused on 'here-and-now'. This local orientation facilitates understanding and decision making by, for example, limiting the possible use of reference to objects outside the immediate context. Furthermore, the task is performed without time limits, and the participants interact without direct supervision of the test leader. Finally, the conversational partner has been selected by the participant with CI, and is therefore a close friend, well aware of the partner's hearing impairment. However, the task resembles 'real life'-like conditions, with similarities to problem solving in an educational setting. Furthermore, adaptation to special interactional requirements of the conversational partner is often achieved within minutes (Perkins 2007) and the influence of a known conversational partner should, therefore, not be exaggerated. However, it remains to be explored in this specific population whether known vs. un-known conversational partners make a difference for the co-creation of dialogue.

Another way to explain the seemingly unproblematic performance of the participants with CI is the role of visual presence of the referents in the task. Psycholinguistic research has found that both speakers and listeners show a tight link between eye-movements and linguistic contents. Listeners use the visual environment to actively predict and disambiguate possible referents (Tanenhaus *et al.* 1995). For speakers, however, the issue is currently more complex. This would mean that the CI users will experience less difficulty in an environment, such as the referential communication task adopted in this study, where they can use visual information to disambiguate the target referents.

The well-functioning conversational ability in the participants with CI shown in this study may be a contributing factor in recently reported similar ratings of quality of life in children

and adolescents with CI and NH controls (Loy *et al.* 2010). Higher ratings in the CI group may also stem from high levels of research and educational interest in the development of individuals with CI. In future studies we will therefore compare the results with those from children and adolescents with hearing impairment and conventional hearing aid, a clinical group which has attracted less research and educational attention. Future studies should also include investigation of the conversational ability in less structured and natural settings. This is currently being prepared by the present authors. Furthermore, future investigations will involve analysis of gaze during conversation and study the use of visual cues in communication between children and adolescents with hearing impairment and peers with normal hearing.

To conclude, a well-functioning interactional ability is seen in children and adolescents with CI engaged in a referential communication task with a normally hearing peer. Implications include the use of structured conversational tasks with clear objectives administered without time limits. The fact that the referential communication task adopted for this study may provide a supporting interactional context suggests that it may lend itself for use in intervention to make children with CI more aware of the role of questioning and response strategies in managing interaction.

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## Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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**Table 1. Main categories of requests for clarification and responses.**

<i>Response</i>	<i>Request for clarification</i>	Request for confirmation of new information	Request for confirmation of already given information	Request for elaboration
		<i>(Has she got blue eyes?)</i>	<i>(Did you say she had blue eyes?)</i>	<i>(What colour are her eyes?)</i>
Confirmation		Yes(, she has blue eyes).	No(, she hadn't).	-
Elaboration		Yes, and glasses and blond hair.	Yes, and a black beret.	She has blue eyes.



**Table 2. Group comparison for total number of requests for clarification.**

		<b>CI</b>	<b>CIP</b>	<b>NH</b>	<b>NHP</b>
<b>Requests for</b>					
<b>clarification</b>	Total number	28.46	23.31	15.38	17.08
	SD	11.5	15.2	10.0	9.8
	Range	13-47	1-49	2-32	4-37

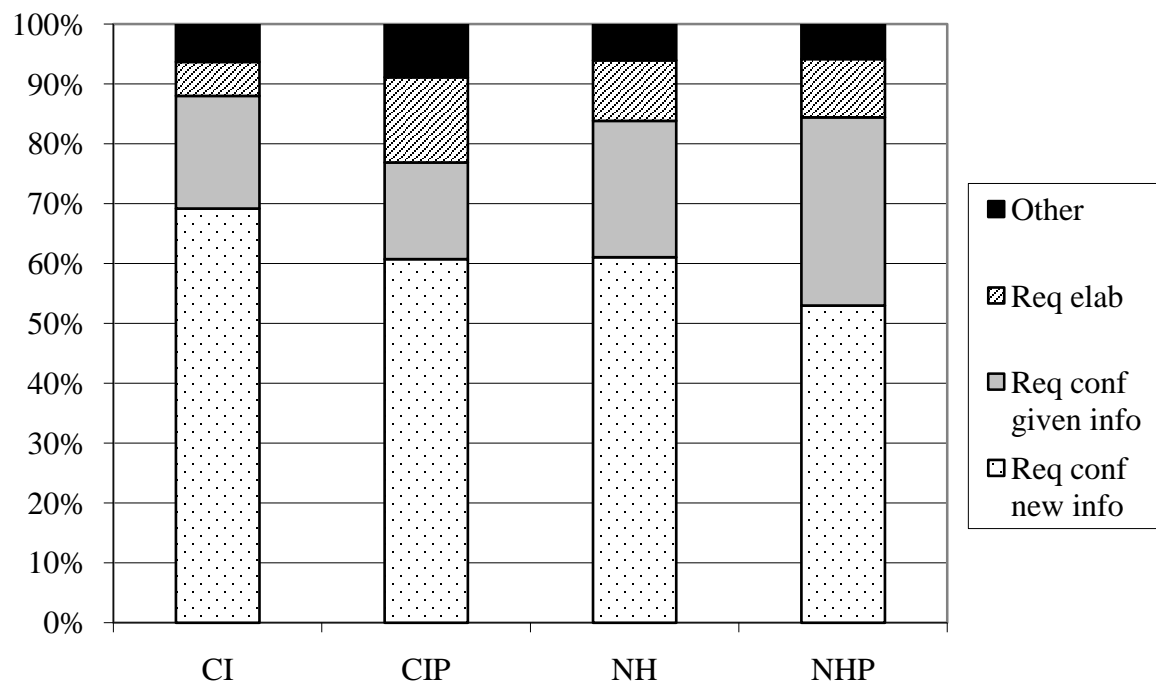


Figure 1. Distribution of different types of requests for clarification in the four types of participants.

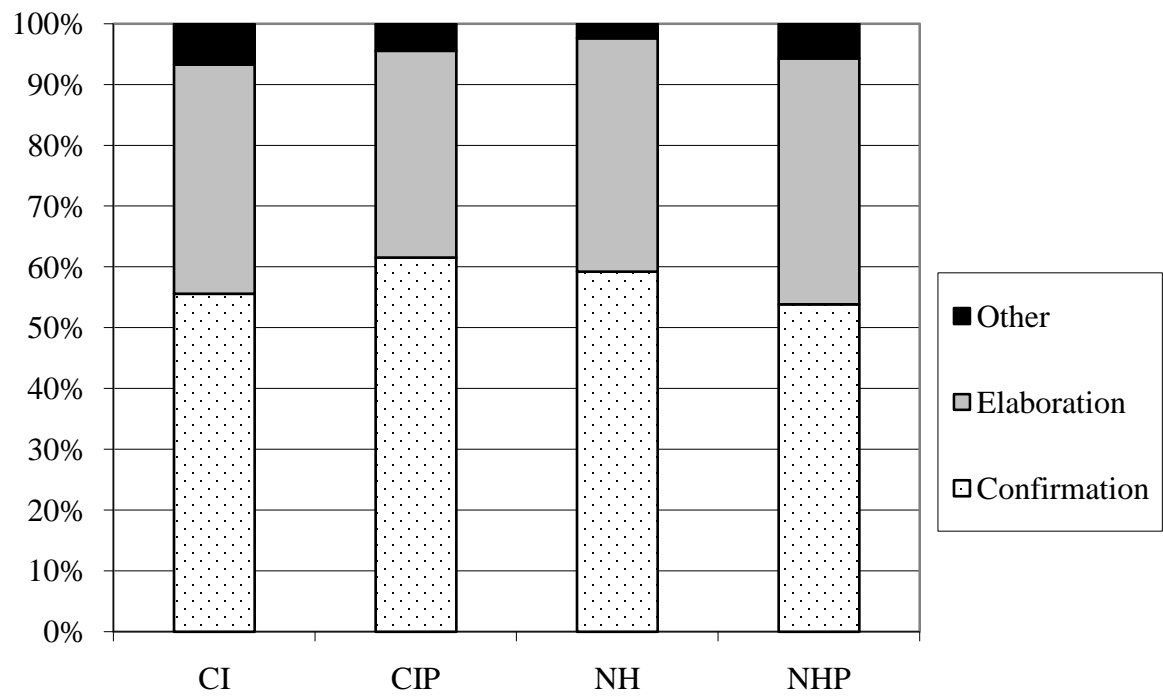


Figure 2. Distribution of responses in each type of participant.

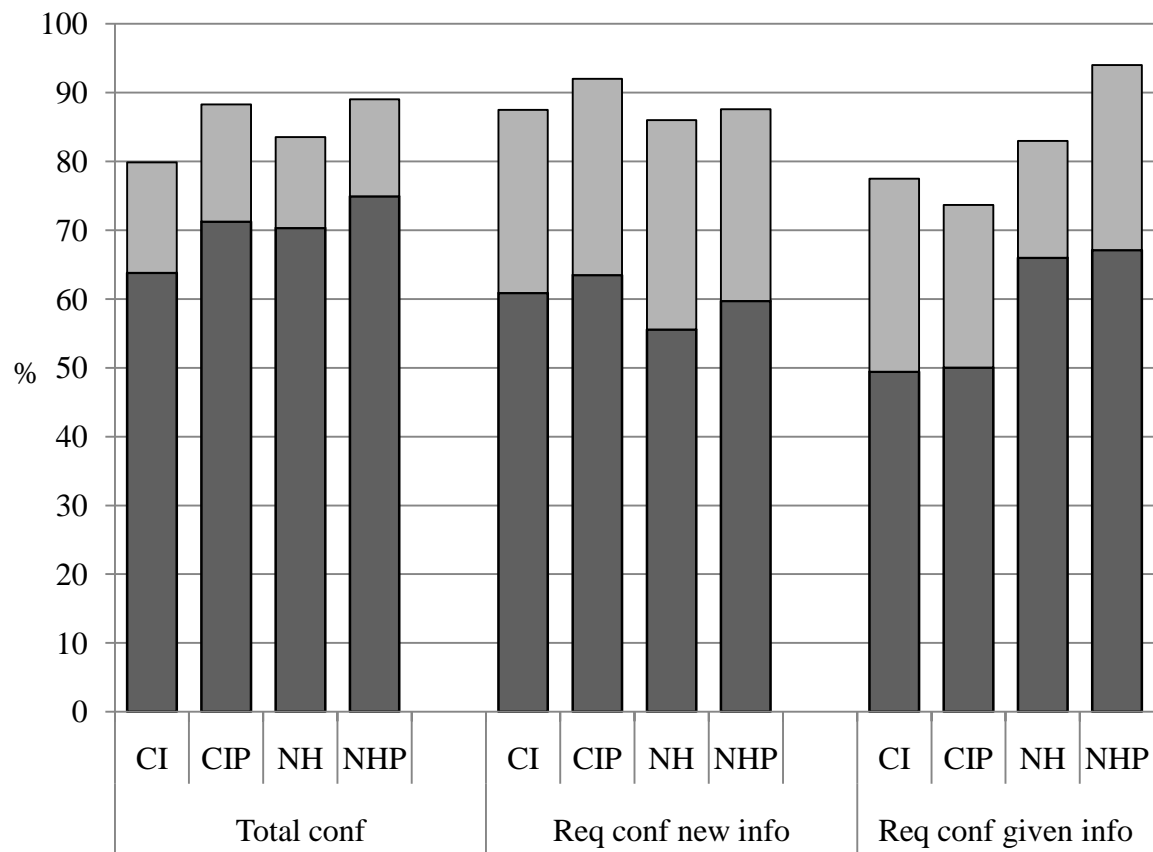


Figure 3. Percentages of type-conforming responses ('yes' or 'no') in total and in response to requests for confirmation of new and already given information. The bars display affirmative (lower, darker part of the bars) and negative responses (upper, brighter part of the bars).

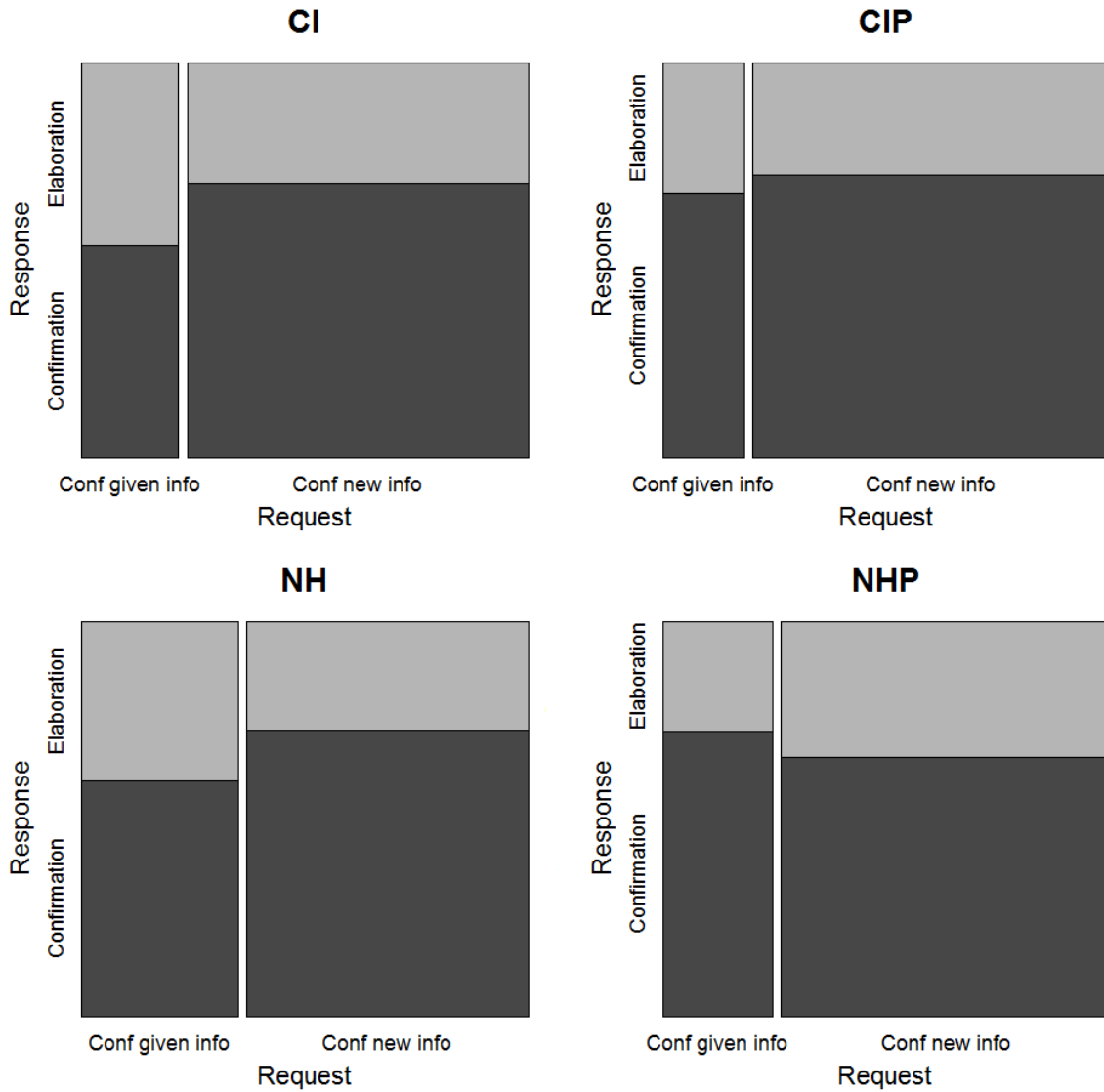


Figure 4. Combinations of request and responses. The horizontal axis shows type of request for confirmation (i.e. requests for confirmation of new information are more frequent than requests for already given information). The vertical axis shows type of response (i.e. confirmations are more frequent than elaborations). The size of the field represents the frequency of the request-response combination.