Acta Scientific Otolaryngology (ISSN: 2582-5550)

Volume 7 Issue 7 July 2025

Research Article

Understanding Conversational Success in Hearing Loss: A Group Mapping Study

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Received: May 12, 2025

Published: June 09, 2025

Abstract

Importance: This study investigates factors that influence conversation success for adults with cochlear implants (CI) and hearing impairment (IH), focusing on both individual and group conversational contexts. Understanding these factors can inform strategies to enhance communication outcomes.

Methods: A Group Concept Mapping (GCM) approach was used with 20 participants aged 50–75 years who have experience using CI or IH aids. Participants generated statements about what makes a conversation successful, sorted them into conceptually similar groups, and rated their importance. Multidimensional scaling and hierarchical cluster analysis were applied to produce a conceptual framework.

Results: Seven thematic clusters were identified: (1) Being able to listen easily, (2) Being spoken to in a helpful way, (3) Being engaged and accepted, (4) Sharing information as desired, (5) Perceiving flowing and balanced interaction, (6) Feeling positive emotions, and (7) Not having to engage coping mechanisms. Ratings indicated that these factors were viewed as more critical in group conversations than in 1-to-1 settings, with CI users particularly highlighting the difficulties of group interactions.

Outcomes: The study's outcomes provide a structured understanding of what makes conversations successful from the perspective of adults with hearing loss. These insights can guide the development of targeted communication training, inform best practices for conversational partners, and shape clinical interventions aimed at improving social participation and quality of life for CI and IH users.

Conclusions: The findings underscore the multifaceted nature of conversation success, pointing to the need for both technological solutions and communication partner strategies to foster effective and satisfying conversations for adults with hearing loss.

Keywords: Conversation; Group Mapping Concept; Cochlear Implants; Clusters; Hearing Loss

Abbreviation

GCM: Group Mapping Concept; CI: Cochlear Implant; HI: Hearing Impaired

Introduction

Over 118,100 individuals have been implanted with cochlear implants and the prevalence of hearing loss is estimated to be 1.57 billion and one of the major difficulties with any hearing-impaired individuals is conversation which is one of the most common forms of human interaction and is of focus for most of researchers and even though conversation is hard to define but usually involve an alteration of spoken turns that can be focused on a range of topics and have a range of goals (from information sharing to rapport building) [1]. Rubin, Perse, and Barbato (1988) found six different motives to underlie social interpersonal communication: inclusion, pleasure, affection, escape, relaxation, and control. If we understand success as the accomplishment of a certain purpose, this wide variety of motives makes the concept of conversation success almost impossible to compress into a universally valid definition. The present study attempts to fill this knowledge gap by using Group Concept Mapping (GCM), a mixed-method participatory research process (Trochim 1989) [6] to gather perspectives from adults with impaired hearing and cochlear implantees on (1) What are the factors that drive conversation success (2) What are the important factors in 1-to-1 and group conversation? and GCM method combines different research process into a sequential process with the aid of its strength in which it engages participants during the entire process. Besides expressing their thoughts on the topic of interest, participants are also involved in grouping these ideas and rating them on different scales (e.g., importance in 1-to-1 conversation and importance in group conversation), thereby minimizing the risk of researchers' bias and presumptions. The concept usually involves two prompts to probe the concept of conversation success. This strategy has been successfully used previously to conceptualize "good health" (McCaffrey., *et al*. 2019).

Materials and Methods

Participants

People with cochlear implantees (CI) and hearing impaired (IH) were invited to participate. Invited participants were 50–75 years old and were fluent in English. The IH group had a better-ear four-frequency pure-tone average hearing threshold < 20 dB HL (with no threshold > 40 dB HL), and an asymmetry of average thresholds < 10 dB HL. The CI group had a four-frequency pure-tone average hearing threshold of above 40 dB HL and an asymmetry of average thresholds < 15 dB HL and SIS greater than 40%. Hearing aid users were excluded from the study as well as individuals with comorbidities because CI is artificial hearing and hearing impaired are with natural hearing.

Group concept mapping steps

The concept was implemented with the outline below and includes the statements coming from all participants with both CI and HI were processed, sorted and rated together and order to obtain only one concept map covered the views from both groups.

Participants	Brainstorming	Sorting	Rating
Gender			
Male	14	13	14
Female	6	5	5
Population			
Hearing Impaired	11	9	9
Cochlear Implantees	9	9	9

Table 1: Demographics and participation rates.

- **Brainstorming:** Participants were prompted to generate statements by answering the following questions: "What does 'successful conversation' appear as?" and "Think about successful conversation that you know. What are some of the aspects of conversation contributed to success?". The first question aims to be more generalized and elicits participant's imagination and the second question is more specific and explores the perception of successful conversation in participant's memory and the statements were refined by various methods such as removing duplicates, splitting items into two topics and editing jargon and personal information.
- **Sorting the statements:** Participants that took part in this activity were given a set of cards to write their names. A refined statement from the brainstorming step was written on each card. Three participants did not follow instructions and created less than five groups (n ¼ 2) or created random group names A, B, C (n ¼ 1). These participants were excluded from the analysis; therefore, they are excluded from Table 1.

- **Rating the statements:** In the rating activity, participants were asked to rate how important each statement was to them. Participants rated the statements on a five-point Likert scale (1 being not important at all and 5 being extremely important) in both 1-to-1 conversation and group conversation. Four statements referred to device use [5] (e.g.: Not needing to constantly adjust the volume on my hearing aid/ implant) therefore a N/A (not applicable) response option was added. This step concluded the participants' involvement.
- **Data analysis and interpretation:** The data were analyzed using R-Cmap Software, an open-source tool implemented in R (Bar and Mentch 2017) [1]. The software follows the steps developed by Trochim (1989) and the data is sorted and a similarity matrix is obtained and data analyzed using multidimensional scaling (MDS) analysis producing x and y coordinates for clusters and a set of clusters, where clusters that are maximally distinct from each separated from clusters that are minimal to one another. Therefore, additional two-way mixed ANOVA analysis to compare means between CI versus IH groups in 1-to-1 and group conversations was computed using JASP.
- **Interpreting the maps**: Once the concept map was obtained, the researchers analyzed, interpreted, and named the clusters. The names were given based on the common idea and content of the cluster and were asked for the titles in the sorting step.

Results

Participants created on average 6.3 groups (Min ¼ 5; Max ¼ 11; SD ¼ 1.62). Multidimensional Scaling Analysis results are shown in table 2 with the clusters and their description with each point on the map representing one statement and the smaller distance between points found to be more corresponding to the statement by the participants. E.g.: Statement 1 (Speaker has a loud and clear speaking voice) was more often group with statement 13 (speaker makes their points concise without rambling) than being grouped with statement 30 (Feeling useful and appreciated) and this map has a stress index of 0.325 which is considered to be within the acceptable range as a criteria of stress value below 0.369 (Trochim,1989) [5].

Clusters of conversation success

For identifying the most interpretable division of data into clusters, we stared from the minimum number created by participants (five), then increased the number of clusters with all clusters have internally consistent while being distinct from each other and a map of six clusters contained vert dissimilar statements and map of eight clusters.

Seven clusters related to conversation success are: (1) Being able to listen easily; (2) Being spoken to in a helpful way; (3) Being engaged and accepted; (4) Sharing desired information; (5) Having positive emotions; (6) Perceiving and balanced and flowing interaction; (7) Not having coping mechanism.

Ratings of importance (cluster level)

The average rating of statements ranged from 4.4 for Being able to listen easily (most important) to 3.3 for Not having engaging coping mechanisms (the least important).

Comparisons of cluster importance in group and 1-to-1 conversation

The data obtained brainstorming and sorting activities were not specific to conversation and the rating activity captured the importance perceived by participants to 1 to 1 conversation and group conversations. Split-half reliability tests found a Spearman-Brown correction was above 0.90 for both types of conversation and consistent with the average correlation being consistent with the average correlation in prior GCM work (Rosas and Kane 2012).

Seven two-way mixed ANOVA were performed, one for each cluster, to analyze the effect of hearing ability (CI and IH) and type of conversation (1-to-1 and group conversation) on the importance given to each cluster. Main effects shows the following here clusters to be more important in group conversation than in 1-to-1 conversation: Being able to listen easily $F(1,27) = 23.67$, $p < .001$, Being spoken to in a helpful way $F(1, 27) = 13.52$, $p < .05$ and Sharing information as desired $F(1, 27) = 4.408$, $p > .05$.

Exploratory analysis by hearing group:

A marginal effect was found between participants with CI and IH for the cluster 'Being able to listen easily' (p¼.059) in one-to-one

Cluster (number of statements)	Short description	Examples of statements
Being able to listen easily (14)	Elements that can affect the listening process: background noise, working hearing aids	Not having to strain to hear the other person(s). Hearing aids or Cochlear Implants functioning. No distractions in the background.
Being spoken to in a helpful way (9)	Different attributes and responsibilities expected from the speaker	The speaker talks fluently. The speaker has a clear voice. The speaker is concise in making statement.
Being engaged and accepted (6)	Creating a connection between participants	The listener shows interest in what I'm talking about. Feeling that you have learned something new at the end of the conversation. Positive Body Engagement e.g.: nodding, smiling.
Sharing information as desired (7)	Information exchange in task-oriented conversations, achieving outcomes	Passing and receiving information. Communicating a want or task. Achieving a desired outcome.
Perceiving flowing and balanced interaction (16)	Mutual engagement and maintaining conversational dynamic	Participants don't interrupt or talk over the top of each other. A balance between asking questions and answering them. All participants contribute equally.
Feeling positive emotions (14)	Feeling pleasant during and after conversation	Feeling pleasant in talking with another human being. Participants are laughing and being funny. Leaving a conversation feeling inspired.
Not having to engage coping mechanisms (7)	Avoidance of negative feelings; finding comfort in the surroundings	Not feeling anxious. Providing minimal effort on their part. Being engaged in a conversation.

Table 2: Seven clusters representing factors that can lead to conversation success, a brief description, and examples of statements for each cluster.

conversations, with higher scores of importance given by people with hearing impairment. Furthermore, while for CI participants only two clusters (Being spoken to in a helpful way and being able to listen easily) were rated to be significantly more important in group conversation than in one-to-one conversation, for participants with IH four clusters registered a significant increase in group conversation (Being spoken to in a helpful way, being able to listen easily, being accepted, having desired information being shared) and this is consistent with the notion that relative to people with normal hearing, people with normal hearing and those of hearing impaired with hearing loss experience a greater contrast in difficulty between 2-to-1 and group conversations.

Discussion

The study aims to find the factors that relate to conversation success by people with cochlear implants and impaired hearing, and to investigate their importance in 1-to-1 conversations vs group conversations. There is a distinction here where hearing aid users were excluded since the use of hearing devices would impact the natural flow of a conversation and could produce disturbances of their own. Seven clusters related to conversation success are: (1) Being able to listen easily; (2) Being spoken to in a helpful way; (3) Being engaged and accepted; (4) Sharing desired information; (5) Having positive emotions; (6) Perceiving and balanced and flowing interaction; (7) Not having coping mechanism and even though they have different importance, they have the equal importance.

Content of clusters

Interestingly, some of the clusters identified in our study align well with previous research by Rubin, Perse and Barbato (1988) while others appear to be novel and the motives for engaging in communication outlined in their work-inclusion, pleasure, affection, escape, relaxation and control are clearly reflected in several of our clusters and inclusion involves sharing emotions and overcoming loneliness, while "affection" reflects the desire to express care and appreciation.

The cluster rated most important by normal hearing- and hearing-impaired participants was "Being able to listen easily" and cluster included items related to low listening effort such as "not being strain to hear" and "being in a quiet place without background noise" as well as the importance of functional hearing aids. Listening effort increased in noisy environments or when hearing loss is present, making these elements critical for conversational success. Previous search supports this, noting that properly functioning hearing aids reduce listening effort (Ohlenforst., *et al*. 2017; Picou, Ricketts and Hornsby, 2013).

The "perceiving flowing and balanced interaction" cluster highlights the dynamic nature of conversation which relies on active participation and adherence to conversational norms like turn taking (Grice, 1975). Successful conversation resembles a coordinated dance, where participants maintain rhythm and balance.

Next cluster, "feeling positive emotions" includes sentiments experienced during and after a conversation such as joy and a sense of inspiration emphasing that the emotional impact of conversation can extend beyond the interaction itself and this reflects earlier findings that people often converse for enjoyment and stimulation (Rubin., *et al*. 1988).

The cluster "Not having to engage coping mechanisms" points to the emotional challenges of conversation, particularly for those with hearing loss and participants highlighted experiences of anxiety or withdrawal, underscoring the importance of reducing negative emotional responses during communication (Holman, Ali and Naylor, 2021).

These findings reinforce that conversational success is a shared responsibility and while clusters like "Being able to listen easily" supporting the use of devices and other such as "Being spoken to in a helpful way" and these call for a more holistic approach that includes emotional and environmental support.

Important to note is that although each cluster is unique, there are overlapping ideas between them. For example, the cluster Perceiving flowing, and balanced interaction contains a statement (9. A balance between seriousness and humor) that is very close to the cluster Feeling positive emotions. (Figure) between statement 9 and the cluster Feeling positive emotions. These overlaps are common in GCM studies since participants are encouraged to sort the statements in a way that makes sense to them, without being guided to think about a certain logic. Also, even if participants answer the same brainstorming promptly, contradictory ideas can appear, e.g.: 67. Not having any pressure regarding the outcomes of the conversation. and 72. Achieving a desired outcome.

Importance of the clusters

The analysis revealed that six out of seven conversations relayed clusters received higher average importance ratings in group conversations compared to 1-to1 interactions and this pattern suggests that the complexity of communication and potentially the effort required for successful engagement, increases with the number of participants involved. One plausible explanation for these findings is that the more challenging an aspect of communication is, the more value participants place on it. Clusters such as "Being able to listen easily", "Being spoken to in a helpful way" were consistently rated as more critical in group contexts and these elements become increasingly difficult to manage in environments where attention must be divided, background noise may be higher and conversational cues are harder to follow [10]. This supports the idea that individuals with cochlear implants tends to perform better in 1-to-1 conversations, where auditory input is clearer and easier to manage, than in group interactions where auditory demands are elevated.

Furthermore, the contrast between group and individual conversation ratings was more pronounced for participants with hearing loss, particularly those using cochlear implants and this suggests that individuals with hearing impairments may experience a significantly higher cognitive load or listening effort during group conversations, possibly due to challenge of managing simultaneous auditory inputs and maintaining conversational flow in more complex social settings.

Conclusion

These findings emphasize that conversation success is a multidimensional construct, encompassing both practical and emotional components and successful communication is not solely dependent on auditory capacity or speech intelligibility but is also shaped by the emotional experience of the interaction, the context in which it occurs, and the cognitive resources required to sustain it. Children and individuals using cochlear implants face greater challenges in achieving these outcomes particularly in group settings, where higher listening effort is often required. Interestingly, even though cochlear implant users reported greater difficulty, the overall importance ratings for each cluster did not significantly differ between those with normal hearing and those with hearing impairment and this indicates a shared understanding of what makes a conversation successful, regardless of hearing ability.

Ultimately, by exploring both objective and subjective perceptions of conversational success, this research brings us a step closer to understanding the complex interplay between communication and human experience and the study suggests that rehabilitation and clinical programming for cochlear implant users should not solely focus on speech recognition and auditory training in quiet settings and instead, there is a clear need for a more comprehensive, person-centered approach and these findings can help guide audiologists, speech-language pathologists and educators in refining their therapeutic and educational interventions.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

Funding

No funding was obtained by the authors for the process of writing and publication.

Bibliography

1. Bennett R., *et al*. "Investigating the Knowledge, Skills, and Tasks Required for Hearing Aid Management: Perspectives of Clinicians and Hearing Aid Owners". *American Journal of Audiology* 27.1 (2018): 67-84.

2. Ronnberg J., *et al*. "Cognitive Hearing Science and Ease of Language Understanding". *International Journal of Audiology* 58.5 (2019): 247-261.

3. Holman J., *et al*. "A Qualitative Investigation of the Hearing and Hearing-aid Related Emotional States Experienced by People with Hearing Loss". (2021).

4. Holman JA., *et al*. "Hearing Impairment and Daily-life Fatigue: A Qualitative Study". *International Journal of Audiology* 58.7 (2019): 408-416.

5. Garrod S and M J Pickering. "Why is Conversation So Easy?" *Trends in Cognitive Sciences* 8.1 (2004): 8-11.

6. Trochim W., *et al*. "Using Concept Mapping to Develop a Conceptual Framework of Staff's Views of a Supported Employment Program for Individuals with Severe Mental Illness". *Journal of Consulting and Clinical Psychology* 62.4 (1994): 766-775.

7. Trochim W. "An Introduction to Concept Mapping for Planning and Evaluation". *Evaluation and Program Planning* 12.1 (1989): 1-16.

8. Tye-Murray N. "Conversational Fluency of Children Who Use Cochlear Implants". *Ear and Hearing* 24.1 (2003): 82-89.

9. Holler J and K Wilkin. "Co-Speech Gesture Mimicry in the Process of Collaborative Referring during Face-to-Face Dialogue". *Journal of Nonverbal Behaviour* 35 (2011): 133-153.

10. Lind C., *et al*. "Conversation Repair and Adult Cochlear Implantation: A Qualitative Case Study". *Cochlear Implants International* 7.1 (2006): 33-48.

11. Picou E., *et al*. "How Hearing Aids, Background Noise, and Visual Cues Influence Objective Listening Effort". *Ear and Hearing* 34.5 (2013): e52-e64.

12. Rosas S and M Kane. "Quality and Rigor of the Concept Mapping Methodology: A Pooled Study Analysis". *Evaluation and Program Planning* 35.2 (2012): 236-245.

13. Rubin R B., *et al*. "Conceptualization and Measurement of Interpersonal Communication Motives I Shape and Nurture Their Self-concepts, Make Decisions About". *Human Communication Research* 14.4 (1988): 602-628.

14. Scarborough R and G Zellou. "Clarity in Communication: "Clear" Speech Authenticity and Lexical Neighborhood Density Effects in Speech Production and Perception". *The Journal of the Acoustical Society of America* 134.5 (2013): 3793-3807.

15. Stephens GJ., *et al*. "Speaker-listener Neural Coupling Underlies Successful Communication". *Proceedings of the National Academy of Sciences of the United States of America* 107.32 (2010): 14425-14430.

16. Strawbridge WJ., *et al*. "Negative Consequences of Hearing Impairment in Old Age a Longitudinal Analysis". *The Gerontologist* 40.3 (2000): 320-326.

17. Nicoras R., *et al*. "Conversation success in one-to-one and group conversation: A group concept mapping study of adults with normal and impaired hearing". *International Journal of Audiology* 62.9 (2023): 868-876.