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Original Article

Assessing the Pragmatic Competence of Four Spanish Adults with Congenital Hearing Loss through Protocolo Rápido de Evaluación Pragmática – Revisado

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ABSTRACT

Numerous studies reveal the oral language difficulties that people with hearing loss may present throughout their development. However, little is known about the level of pragmatic competence they achieve and how this area evolves (Madrid Cánovas & Bleda García, 2011). This research aims to address the pragmatic characteristics of four Spanish adults with congenital hearing loss through *Protocolo Rápido de Evaluación Pragmática - Revisado* (PREP-R, which can be translated as Quick Protocol for Pragmatic Evaluation - Revised). This test assesses different levels of pragmatics: textual, enunciative, and interactional, and also provides an indicator for general, specific, and grammatically-based pragmatic ability. The participants were assessed by videotaping spontaneous speech samples in conversation with a family member. The results indicate that, in general, the four subjects present an adequate level of pragmatic competence, which is manifested in their adjustment of speech acts. Nevertheless, they show a tendency to use compensatory behaviors to regulate their speech, such as verbal strategies that allow them to gain extra time to construct their utterances, compensatory verbal and/or paraverbal acts, and gestures that complement their verbal productions. These data indicate that, although the participants of this study show good pragmatic skills, it is necessary to continue developing intervention strategies that allow them to communicate without difficulties in different contexts and with different communication partners.

Keywords:
Evaluation; Hearing; Language; Pragmatics; QPAP-R

Evaluación de la competencia pragmática de cuatro adultos españoles con discapacidad auditiva congénita a través del Protocolo Rápido de Evaluación Pragmática – Revisado

RESUMEN

Numerosos estudios apuntan a las dificultades del lenguaje oral que pueden presentar las personas con discapacidad auditiva a lo largo de su desarrollo. No obstante, poco es conocido acerca del nivel de competencia pragmática que alcanzan y cómo esta área se desarrolla (Madrid Cánovas & Bleda García, 2011). En esta investigación se pretenden abordar las características pragmáticas de cuatro adultos españoles con discapacidad auditiva congénita a través del Protocolo Rápido de Evaluación Pragmática Revisado (PREP-R), que evalúa diferentes niveles de pragmática: textual, enunciativa e interactiva y, además, aporta un índice de habilidad pragmática general, específica y de base gramatical. Los participantes fueron evaluados mediante videograbaciones de muestras de lenguaje espontáneo en conversación con un familiar. Los resultados indican que, en general, los cuatro sujetos presentan un buen nivel de competencia pragmática, que se manifiesta a la hora de ajustar los actos de habla. Sin embargo, para regular su lenguaje, tienden a utilizar conductas compensatorias como: estrategias verbales que les permiten ganar tiempo extra para la construcción de sus emisiones, empleo de actos verbales y/o paraverbales compensatorios y el uso de gestos que completan su producción verbal. Estos datos indican que, aunque los participantes de este estudio presentan buenas habilidades pragmáticas, es necesario seguir desarrollando estrategias a nivel de intervención que les permitan comunicarse sin dificultades en diferentes contextos y con distintos interlocutores.

Palabras clave:
Audición; Evaluación; Lenguaje; Pragmática; PREP-R

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INTRODUCTION

Concept of hearing impairment and data on its prevalence

According to Law 27/2007 of *Boletín Oficial del Estado Español* (Official Gazette of the Spanish State, or BOE), deaf people or people with a hearing disability are those who have a degree of hearing loss equal to or greater than 33%. They face barriers to communication in their daily life or, if they have overcome them, they require means and aids to support their communication.

Hearing loss or deafness is defined as a chronic hearing disability that affects around 5% of the world population (Díaz et al., 2016). The prevalence of hearing loss by area is 7.6% in Central Europe, Eastern Europe, and Central Asia, 6.4% in South Asia, 6.1% in Asia-Pacific, 5.5% in East Asia, 4.5% in Sub-Saharan Africa, 4.5% in Latin America and the Caribbean, 4.5% in the Middle East and North Africa, 3.9% in and developed countries. In Latin America, the prevalence of hearing difficulties in children under 14 years of age is 1.6%; in individuals 15 years of age it is 8%, and 38.62% in people over 65 years of age.

In Spain, according to the latest Survey on Disability, Personal Autonomy, and Dependency Situations (EDAD) (*Instituto Nacional de Estadística* [National Statistics Institute], 2008), 1,064,000 people over the age of 6 are affected by different types and degrees of hearing disabilities.

According to data from the same survey, more than 95% of the population with hearing disabilities uses oral language as a means of communication. In addition, the Committee for the Early Detection of Hearing Loss (*Comisión para la Detección Precoz de la Hipoacusia* or CODEPECH, 2000) estimates that 500 new cases of profound deafness are diagnosed per year in Spain, which corresponds to 1/1000 of newborns.

Linguistic difficulties arising in the language acquisition of people with hearing loss

Hearing loss affects the acquisition of all components or levels of language (phonetic-phonological, morphological, syntactic, lexical-semantic, and pragmatic) (Convertino et al., 2009). Additionally, it impacts speech (Madrid Cánovas & Bleda García, 2011) and reading (Mayer & Leigh, 2010).

Deaf adults show various linguistic particularities that can be observed from childhood. Regarding the different components of language, the main difficulties in oral language acquisition are found in phonetic-phonological skills, followed by difficulties in lexicon or pragmatics (Barroso Castillo, 2017). Similarly, disturbances at the grammatical or semantic levels derive from problems found at the phonetic-phonological level. Thus, phoneme acquisition does not follow what is expected according to chronological age, due to the absence of input caused by the hearing loss (Fitzpatrick et al., 2016). In turn, the lack of an adequate language structure is due to the aforementioned grammatical and semantic problems (Barroso Castillo, 2017), a consequence of a lack of coherence and cohesion between the different elements that comprise oral language (Kates & Arehart, 2005).

At the phonetic-phonological level, and due to the lack of auditory feedback, people with hearing loss are unable to produce and correct their vocalizations or inflections (Alvo et al., 2010). Regarding lexicon, Herrera (2005) states that deaf people's vocabulary is significantly reduced when compared to that of individuals with normative hearing, limiting their comprehension of most words. However, their lexicon increases over time, until a wider and more varied vocabulary is achieved. Cervera (2012) mentions that deaf people's lexicon is limited and should be increased to achieve adequate oral and written competence, since expanding the vocabulary helps broaden concepts, facilitating the communication exchange. Finally, Alegría & Domínguez (2009) show that people with hearing loss have serious difficulties in the comprehension and production of morphosyntax, showing notoriously deficient management of syntactic structures, especially the most complex ones. Their partial perception of speech limits their ability to identify major words in sentences, those with proper semantic content like verbs and nouns and, to a lesser extent, functional words (for example, prepositions, articles, and pronouns). As a consequence, their morphosyntactic competence is particularly deficient (Niederberger, 2007). Even though most readers with prelingual deafness manifest problems in developing reading skills, Miller (2000) suggests that it is the knowledge and acquisition of syntax that significantly separates them from their peers with normal hearing.

Pragmatic difficulties in the deaf population

The concept of pragmatic difficulties is based on Grice's (1991) cooperative principle, which is essential for the success of any communication exchange. Four maxims support this principle: Quantity (deliver the necessary amount of information), Quality (try to make a truthful contribution), Relevance (be relevant), and Manner (be clear, brief, orderly, and without ambiguity). Moreover, different studies have shown that specific pragmatic skills expressed in discursive interactions, such as taking turns, reparation strategies, and preserving the conversational flow, are significantly compromised in people with hearing disabilities (Most et al., 2010; Shoeib et al., 2016; Szarkowski et al., 2020).

When the Maxim of Quality is violated by people with hearing loss, it is due more to age than to their hearing problem. The foregoing occurs because this maxim requires that the speaker sticks to the truth, offering facts that they know to be accurate and of which they have evidence, avoiding –for instance– suppositions, hyperboles, metaphors, or ironies –modes of expression that are used by adults more than by children (Yoshinaga-Itano et al., 2020). On the other hand, the Maxim of Quantity is often infringed upon because, not being able to hear what they are saying, deaf people repeat their statements excessively until they are sure the other person has understood them (Madrid Cánovas & Bleda García, 2011). The Maxim of Relevance is also affected since, having to explain thoroughly what they mean, it is common for them to digress from the central topic of the conversation (Galeote Moreno, 2002). As for the Maxim of Manner, its fulfillment depends on the person who is communicating with the individual with hearing loss. Due to their hearing difficulties, it is necessary, in addition to making linguistic adaptations, to make sure that ambiguous expressions do not cause confusion (Barroso Castillo, 2017).

This case analysis aims to provide new information on the pragmatic level of the subjects of study, analyze their linguistic disturbances, and link them to their corresponding effects on communication. This is because, although it is recognized that this population faces difficulties at the pragmatic level, it is an area that has been scarcely studied (Hoff, 2008).

The general objective of this research is to assess the pragmatic competence of adults with congenital hearing impairment, who present different degrees of hearing loss. The specific objectives are: a) to analyze the different pragmatic-discursive skills of the participants with congenital hearing impairment, b) to identify their linguistic disturbances, and c) to determine if these linguistic disturbances affect communication.

METHOD

Case study characteristics

Case studies are characterized by a process of search and inquiry, as well as a systematic analysis of one or several cases. This methodology focuses on the thorough study of a phenomenon and not on statistical analysis, thus admitting both qualitative and quantitative data. This study was carried out during the years 2020 and 2021 in Spain. Additionally, it was approved in 2021 by the Ethics Committee of the Faculty of Health Sciences of Universidad de Castilla-La Mancha.

Participant selection and characteristics

Firstly, a search was carried out to find possible subjects that would comprise the sample. To be included, the subjects had to be over 18 years of age and have prelingual congenital hearing impairment; that is, hearing loss starting from birth and prior to the acquisition of language. In addition, they had to master the oral language at the level of communication, this being a requirement to assess their pragmatic competence using *Protocolo Rápido de Evaluación Pragmática-Revisado* (PREP-R, which can be translated as Quick Protocol for Pragmatic Evaluation - Revised). Finally, none of the subjects had to have been previously evaluated using this pragmatic assessment test.

An informational document was written for the subjects detailing the procedures that would be carried out during the study, and what their participation would consist in. This was shared with five potential participants who met the selection criteria, using the social network WhatsApp.

Table 1 shows the auditory characteristics of the four participants.

Table 1. Description of the participants.

Subjects	Age	Type of Hearing Loss	Degree of Hearing Loss (dB HL)	Type of Hearing Device	Age (in Years) at which the Hearing Device was Implanted
Subject 1 (F.E.A.)	54	AD: Moderate hearing loss AS: Severe hearing loss	AD: 40-70 AS: 70-90	AS: In-the-ear hearing aid (ITE) AD: None	44
Subject 2 (I.E.A.)	48	AD: Severe hearing loss AS: Profound hearing loss	AD: 70-90 AS: + 90	AD and AS: In-the-ear hearing aids	38
Subject 3 (A.V.C.)	33	AD: Severe hearing loss AS: Anacusis	AD: 70-90 AS: + 120	AD: Behind-the-ear hearing aid (BTE) AS: Cochlear implant	Implanted at 21 years old, but using BTE since the age of 4
Subject 4 (J.V.C.)	31	AD: Moderate hearing loss AS: Severe hearing loss	AD: 40-70 AS: 70-90	AD and AS: Behind-the-ear hearing aids	5

Pragmatic evaluation procedures

Subsequently, video recordings were made of the subjects and their key conversation partners (people with whom they interact most in their daily life), which had a length of between six and eleven minutes. For this research, key conversation partners were close relatives such as siblings, parents, children, or cousins. The reason why video recordings were chosen is that this was the recommended format in the protocol. Measures were taken so that the camera did not intimidate the participants. In addition, the recordings were made in their homes since this was the place where the participants felt most comfortable completing the conversational activity. The subjects maintained a conversation as natural as possible with their key conversation partner, which implied choosing the topic of each conversation, without intervening in the conversational process, to allow the subject to use their pragmatic abilities spontaneously. Once all the recordings had been obtained, the data collection protocol was completed by two different evaluators, who had the proper training and knowledge of the instrument.

Finally, the results were analyzed and an interjudge evaluation was carried out, which consists of comparing both evaluators' scores. Therefore, the application of the same criterion on the same record, by two different evaluators, was compared. All of the above was done to avoid bias.

Instrument

PREP-R (Gallardo Paúls, 2008), modified by Fernández-Urquiza et al., (2015), was used to study the pragmatic component of language. This protocol is aimed at clinical practice and its design makes it possible to differentiate between communication problems deriving from deficits in the phonological, morphological, syntactic, and semantic components (called grammatically-based pragmatic deficits) and those caused by specific pragmatic deficits. In other words, those that are present in a speaker without there being disturbances in other components of language. Furthermore, it makes it possible to determine to what extent the person's communication problems are due to one type of deficit or another. Consequently, the global assessment of PREP-R evaluates the subject's general pragmatic abilities, but also allows the percentages of preserved specific pragmatic abilities and grammatically-based pragmatic abilities to be calculated separately.

This protocol is organized into 18 items distributed in three levels of pragmatic analysis: enunciative, textual, and interactional. These levels are based on the three basic elements of all communication exchanges (sender, message, and receiver), and are distributed as follows:

- Six items that evaluate enunciative pragmatics (enunciative level).

- Five items that evaluate textual pragmatics (textual level).

- Seven items that evaluate interactional pragmatics (interactional level).

The items from the enunciative and textual levels are divided into sublevels, with the enunciative level having three sublevels and the textual level having two. The interactional level does not have sublevels. Additionally, when several aspects are examined by the same item, these are organized into sub-items, with each one including a brief explanation to help the evaluator remember the behaviors that should be observed.

It should be noted that the instrument does not require a transcribed sample, as the categories can be assessed through direct observation or relying on the clinician's memory and capacity for observation. In addition, it is necessary to consider the conversation partners chosen, the type of sample, the type of information, and how the evaluation and interpretation of the data are carried out (inter or intra-judge evaluation). Finally, the contexts in which the data are collected and the setting where the evaluation takes place should be considered as well. In other words, the place where recordings are performed should be habitual and suitable for both the subject and the key conversation partners, in order to favor the process of communication.

RESULTS

The following results are the product of the analysis of PREP-R. However, it is important to highlight that certain items could not be evaluated in every communicative situation. This is because the characteristics of the conversation did not allow for obtaining the specific aspect that was sought to be evaluated.

The analysis of the answers obtained from the evaluation of the different items of PREP-R allows for observing the following:

Regarding the production of speech acts, 100% of the subjects showed adequate performance. Additionally, all of the participants understood and produced direct, indirect, and conventionalized indirect speech acts.

Concerning compensatory behaviors, 75% of the sample used compensatory verbal and/or paraverbal acts (locutionary acts).

Example 1

- J: So / where do you have to take them?

- O: To a stationery store that accepts returns

- J: Oh! The one that is by by / by the center?

- O: No / it's on the outskirts

J: Oh! On the outskirts / Oh that one! I know which one it is

It is observed that 75% of the participants use verbal strategies that allow them to gain time while they form their utterances (filler acts).

Example 2

- J: Umm Olga / uuuuh / changing the subject / uuuuh / do you remember the invisible friend's slippers?

- O: Yes

Regarding the use of gestures to replace, complete, or regulate verbal production (compensatory gestures), 75% of them used them appropriately.

Example 3

- F: What we were talking about / that that the good thing about Christmas is these family games (regulator: taps pencil on the table) that are very cool.

- M: Yes / and even more if you can't go out (LAUGHS)

One hundred percent of the participants were aware of their difficulty and attempted to correct their statements when they presented problems, so the item of correction and metapragmatic awareness was fulfilled.

On the other hand, all participants appropriately fulfilled the cooperative principle: generalized and particularized implicatures. This means that the information they provided was truthful and sufficient. Moreover, it was clear, orderly, and unambiguous.

Additionally, their interventions followed the topic of the conversation and everyone comprehended the implicit contents when one of the conversational maxims was intentionally transgressed.

Seventy-five percent of the subjects scored highly in the item that addresses conversational implicatures and lexicalized tropic inferences. It is noteworthy that it was not possible to evaluate this aspect in the remaining 25% of the sample.

It was not possible to evaluate textual superstructures in 50% of the participants, with the other 50% using them adequately.

On the other hand, only 75% of the participants were able to defend and justify their arguments adequately and without repetitions.

Regarding topic management, all the subjects recognized when their conversation partner introduced a new topic, and 75% introduced new conversation topics fluently. Difficulties in this area were observed in 25% of the participants.

Example 4

- C: We can now play the virus

- I: The virus, I don't remember anymore

- C: We've been playing before. I don't know which ones there are // the Hedbanz and…

- I: (→ F) Have you seen the king's message or what? (an abrupt change of topic is observed)

All the participants know how to use appropriate words to explain what they want to convey, and have enough vocabulary to develop their speeches without relying on repetitions or empty words.

On the other hand, 75% of the subjects did not form their words completely, that is, they omitted endings or did not respect gender and number agreement.

Example 5

- I: *Nosotros hemos jugao bien // los hemos dejao un poquito de ventaja / y luego para rematar* [use of dialect in which some words are shortened, translated as "We have played well // we have given them a bit of advantage / and then to finish off"]

- M: Okaay, okay

The construction of phrases and sentences was correct in 100% of the cases, all of them uttering statements with complete structures. The conversational interaction occurred at an agile and fast rhythm in all the subjects.

Adequate turn-taking was observed in 50% of the participants, without notable interruptions or delays. The other half of the sample showed difficulties with conversational turns, creating interruptions or delays.

Example 6

- M: Also, look

- F: [interrupting M] When Miguel is here

- C: The virus is cool, if we don't play…

- F: [interrupting C] We play another one of these / another one of these, board games

Concerning the proper use of predictive turns, 25% of the subjects showed difficulties, 50% made correct use of turns, and it was not possible to evaluate the remaining 25%.

Example 7

- J: …where I ran into a teacher / not a teacher / a nurse from my hospital / do you remember?

- O: Yes

On the other hand, 75% of the subjects were capable of designing their turns, according to the principles of conversational priority. The remaining percentage showed difficulties in this area.

Example 8

- J: Where were they? In Zalando, right?

- O: In Zalando

- J: Shall we look for them?

- O: Okay

Fifty percent of the subjects showed a degree of verbal participation in the conversation proportional to that of the other conversation participants. The remaining 50% had a lower level of participation compared to other participants in the conversation.

Regarding the use of natural gestures in conversation, all the participants relied on gestures, facial expressions, and non-verbal communication to complement and add nuance to their language, without substituting it.

Lastly, it should be noted that all the subjects used their gaze as a form of communication, both to confirm they were listening and understanding and to concede or request a turn.

As a summary, the pragmatic characteristics of the sample can be found in Table 2.

Table 3 shows the percentage of the different pragmatic abilities achieved by each subject.

According to the information in Table 3, there is some variability among the participants regarding the development of different pragmatic skills. It is noteworthy, however, that subject 1 shows a much lower percentage than the other participants in grammatically-based pragmatic abilities.

Table 2. Pragmatic characteristics according to PREP-R items.

Items	Participant 1	Participant 2	Participant 3	Participant 4
Enunciative Pragmatics				
Declarative Acts	YES	YES	YES	YES
Propositional Acts	YES	YES	YES	YES
Pauses and intra-turn silences	YES	YES	YES	YES
Direct Speech Acts	YES	YES	YES	YES
Indirect Speech Acts	YES	YES	YES	YES
Locutionary Acts	YES	NO	YES	YES
Filler Acts	NO	YES	YES	YES
Compensatory Gestures	YES	YES	YES	NO
Correction and Metapragmatic Awareness	YES	YES	YES	YES
Quality Implicature	YES	YES	YES	YES
Quantity Implicature	YES	YES	YES	YES
Manner Implicature	YES	YES	YES	YES
Relevance Implicature	YES	YES	YES	YES
Particularized Implicatures	YES	YES	YES	YES
Conventional Implicatures	YES	YES	YES	NOT EV.
Textual Pragmatics				
Narrative Superstructure	NOT EV.	NOT EV.	YES	YES
Argumentative Superstructure	YES	NOT EV.	YES	YES
Thematization	YES	YES	YES	YES
Topic Changes	YES	NO	YES	YES
Lexical Efficiency	YES	YES	YES	YES
Morphology and Word Formation	NO	NO	YES	NO
Syntax and Grammatical Construction	YES	YES	YES	YES
Interactional Pragmatics				
Turn Agility	YES	YES	YES	YES
Turn-Taking	NO	NO	YES	YES
Conversational Participation	NO	NO	YES	YES
Predictability	NO	NOT EV.	YES	YES
Prioritization	NO	YES	YES	YES
Natural Gestures	YES	YES	YES	YES
Communicative use of the Gaze	YES	YES	YES	YES

Table 3. Results of the pragmatic evaluation in percentages.

Subjects	General Pragmatic Ability	Specific Pragmatic Ability	Grammatically-based Pragmatic Ability
Subject 1	78.57	70.00	25.00
Subject 2	80.76	77.77	87.50
Subject 3	100.00	100.00	100.00
Subject 4	82.14	95.13	85.71

DISCUSSION

Pragmatic language skills are used in social situations to achieve goals in different contexts and with diverse audiences. Children acquire pragmatic skills through exposure to both linguistically and communicatively competent users. This allows them to become members of a culture and enables them to express desires and needs, conduct themselves appropriately in a variety of situations, converse effectively, and show empathy (Phelps-Terasaki & Phelps-Gunn, 2007).

Both deaf people and those with hearing loss show difficulties in developing pragmatic language that is competent and facilitates

communication (Thagard et al., 2011). Their pragmatic difficulties are a result of insufficient exposure to common everyday conversations and, consequently, to the speech that underlies it, resulting in a lack of semantic, morphosyntactic, and metalinguistic support to help them understand and develop pragmatic processes (Contrera et al., 2016). Therefore, it is necessary to have instruments that allow for a thorough evaluation of the pragmatic component of language. In this regard, the present study confirms the usefulness of PREP-R for the analysis of this level of language in people with hearing disabilities. This is because the instrument allowed, at least in this case, to analyze the communicative behaviors of the subjects and pragmatically characterize them. This complements the evaluation proposed by Toe et al., (2019), who suggest that most of the pragmatic evaluations for people with hearing impairments are carried out through checklists. Similarly, Fernández-Urquiza et al. (2020) propose a pragmatic-functional evaluation that integrates the qualitative nature of pioneering studies in the field of Clinical Linguistics, present in instruments such as the PREP-R, since it would allow us to assess not only the subject's structural language deficits but also their pragmatic dysfunctions.

The overall results of this study do not seem to support other research that suggests the speech acts usually constructed by deaf people are brief and simple, because they lack solid linguistic structures (Madrid Cánovas & Bleda García, 2011). The evidence obtained through this study shows that most of the participants demonstrate an adequate level of pragmatic competence, although showing specific difficulties in some cases. Said difficulties can be explained by the lack of communicative initiative in these subjects. Thus, their conversation partner might have required more time and effort to understand them, leading the subjects to have a passive role in the communication process.

It is important to note that significant individual variability can occur in a case study. Therefore, it is not possible to generalize these results to all people with hearing loss.

When analyzing the results obtained specifically at the enunciative, textual, and interactional levels, it is observed that the participants' performances tend to diverge.

Thus, all participants have adequate performance in enunciative pragmatics, reflected in the fact that they do not show notable difficulties in locutionary and illocutionary speech acts. On the other hand, the main difficulty in textual pragmatics is observed in uttering complete words, which is consistent with studies that indicate that deaf people have a tendency to omit certain intervocalic consonants or consonant codas (López Hernández, 2017; Río Millar et al., 2010). The suppression of codas may be attributed to the dialectal characteristics of the participants, something that can be observed in this study. However, these factors did not hinder the effectiveness of the communicative exchange and, therefore, did not undermine the pragmatic competence of the participants. Regarding interactional pragmatics, greater difficulties are observed in turn-taking during conversations, noting less participation of subjects with hearing disabilities in conversations. This could sometimes cause the interaction between the speaker and their communication partner to be diminished. This phenomenon is particularly evident in larger groups of people, where turn-taking and sustaining the conversation becomes more difficult (Pearson, 2021). Due to the above, individuals with hearing loss interact less with the rest of the speakers *(Confederación Estatal de Personas Sordas*, 2010).

In summary, the participants show a good overall performance, which may be attributed to timely diagnosis, early intervention, and the use of different hearing aids. Moreover, the environment in which the participants are immersed, characterized by optimizing their communicative experiences, may have influenced the results (Toe et al., 2016).

CONCLUSION

Although the levels of pragmatic competence of the participants are acceptable, we should remember that linguistic intervention is essential throughout the development of people with hearing disabilities, even in adulthood, since it helps them improve their language skills and to better interact with their environment. It is necessary to insist on the need for this population to continue receiving language therapy that allows them to improve their level of communication, and therefore, their quality of life (Turkstra et al., 2017).

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