

Original articles

Characterization of communicative interaction between parent of hearing impaired children and adolescents that use oral communication

Caracterização da interação comunicativa entre pais de crianças e adolescentes deficientes auditivos que utilizam comunicação oral

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ABSTRACT

Purpose: to characterize the communicative interaction among hearing parents and children or adolescents with hearing loss who use oral communication through the video analysis.

Methods: this study included parents of nine children and nine adolescents with bilateral sensorineural pre-lingual hearing impairment, from moderate to profound degree, who attend or attended an aural rehabilitation program with emphasis on the development of hearing and oral communication. Among the nine children, four are aided by cochlear implant and five are aided by hearing aid. Regarding the adolescents, six are aided by cochlear implant and three are aided by hearing aids. The procedure used was a checklist composed by 22 behaviors that analyze the interaction on the stimulation of hearing and language. These behaviors were scored from a Likert scale and classified as “rarely”, “occasionally” and “frequently”. The interaction among the hearing impaired children or adolescents and their parents was recorded for later analysis by three judges with experience in aural rehabilitation.

Results: there were 18 interactions recorded, in which it was possible to establish a relation of 97.8% among the judges. The occurrence of behavior “frequently” was statistically significant.

Conclusion: the results showed that parents involved into an aural rehabilitation program that emphasizes the use of communication strategies to improve the development of linguistic and auditory skills, suitably use communicative behaviors during interaction with their children or adolescents in a controlled situation.

Keywords: Hearing Loss; Parent-Child Relations; Family

RESUMO

Objetivo: caracterizar a interação comunicativa entre pais ouvintes e crianças ou adolescentes com deficiência auditiva que utilizam comunicação oral, por meio da análise de filmagens.

Métodos: participaram deste estudo os pais de nove crianças e nove adolescentes com deficiência auditiva sensorineural bilateral, pré-lingual de grau moderado a profundo, que frequentam ou frequentaram um programa de intervenção fonoaudiológica, com ênfase no desenvolvimento da função auditiva e comunicação oral. Entre as nove crianças, quatro fazem uso de implante coclear e cinco de Aparelho de Amplificação Sonora Individual. Em relação aos adolescentes, seis fazem uso de implante coclear e três de Aparelho de Amplificação Sonora Individual. O procedimento adotado foi a Escala de Índice de Comportamentos que promovem a Comunicação, a qual apresenta 22 comportamentos que analisam a interação quanto à estimulação da audição e linguagem. Os referidos comportamentos foram pontuados a partir de uma escala Likert e classificados como “raramente”, “ocorre” e “frequentemente”. A interação entre os deficientes auditivos e seus pais foi filmada para posterior análise de três juízes com experiência na área de audiologia educacional.

Resultados: foram realizadas 18 filmagens da interação, nas quais foi possível estabelecer uma concordância entre os juízes de 97,8%. Foi estatisticamente significativa a ocorrência do comportamento “frequentemente”.

Conclusão: os resultados demonstraram que os pais, inseridos em um programa de reabilitação auditiva onde se enfatiza o uso de estratégias que favorecem o desenvolvimento de habilidades linguísticas e auditivas, empregam adequadamente comportamentos comunicativos na interação com seus filhos, em uma situação controlada.

Descritores: Perda Auditiva; Relações Pais-Filho; Família

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INTRODUCTION

Parents and family members are the first models in language building and thus they provide a good family interaction in order to integrate hearing, speech, language and communication in all daily opportunities that arise¹⁻⁴. Different studies, such as “Dialogue-based diary with the hearing impaired child: a case report”⁵ and “Journal of experiences in the therapeutic process of a child with hearing loss”⁶, focus on the importance of family involvement in the therapeutic process and maintenance of the interaction between parents and children in order to promote language construction.

Parental behavior during interaction may provide or reduce opportunities to stimulate hearing, language and social aspects of the child which are acquired through effective interaction. A procedure called “Communication-Promoting Behavior Index Scale”⁷ was used in order to analyze the influence of communicative behaviors of parents and relatives during interaction with hearing-impaired children so as to provide guidelines for improving interaction with the video analysis method.

In their studies, the authors claim^{1,8} that the analysis method of parental communicative behaviors by means of recording the interaction, used in the analysis of the Communication-Promoting Behavior Index Scale⁷, enables verification of the importance of the speaker’s attitudes in the auditory and language behavior of the hearing-impaired child^{8,9}.

One study⁹ examined the interaction of ten mothers with their hearing-impaired children with cochlear implants and ten mothers with their normal-hearing children through the transcription of spontaneous conversation obtained during each interaction as well as by checking the answers each mother provided to their children’s statements. The results of this research showed that the mothers of hearing-impaired children are more responsive to the expressions of their children than mothers of normal-hearing children, and this is due to their awareness of their child’s hearing impairment.

The effect of speech therapy was evaluated in a case study of three dyads composed of a normal-hearing parent and their hearing-impaired child with a cochlear implant, using the interaction analysis method by means of filming, in which each dyad was assessed before and after speech therapy¹⁰. The findings of this study showed that the intervention performed with the video analysis of the interaction between parents and their hearing-impaired child may favor the pre-linguistic

communicative development of children with hearing loss.

Other authors¹¹ examined the effect of a psychosocial intervention program in video-feedback focused on the communication of 14 normal-hearing parents and their children with pre-lingual hearing impairment. The 14 dyads completed 3 intervention sessions analyzing the interaction before and after speech therapy. The authors of this study concluded that the video-feedback method improves communication in families with pre-lingual hearing-impaired children, increases the appropriate use of communicative cues employed with the children and promotes behavior adjustment in parents during the interactions.

The analysis method by means of recording a hearing-impaired child’s interaction has been highlighted by several authors in the area of educational audiology¹²⁻¹⁸, since the use of video technology during intervention allows us to verify the successful elements of communication during the interaction and promotes reflection on why these elements were successful.

The use of communication strategies during the interaction with hearing-impaired children or teenagers is favorable for auditory and language development, as these facilitate dialogue. These communication strategies should be employed daily, being related to voice, articulation, verbal and behavioral expressions, in addition to recognizing the child’s communication attempts, allowing dialogue and expanding the semantic and grammatical productions, repeating the message, if necessary and emphasizing keywords^{19,20}.

The aim of this study was to characterize the communicative interaction between normal-hearing parents and children or adolescents with hearing impairment who use oral communication through video analysis.

METHODS

It is a cross-methodological study with quantitative and qualitative analysis. This project was submitted to the Ethics Committee of the School of Philosophy and Sciences, São Paulo State University - FFC / UNESP / Marília – SP, beginning only after its approval (Protocol 730/2013), according to Resolution No. 466 / 12 of the National Health Council.

Participants

The parents of each hearing-impaired participant were invited to take part in the study and signed the

Term of Consent. This study included parents of nine children and nine adolescents with moderate to profound bilateral sensorineural pre-lingual hearing impairment. Each of the hearing-impaired participants used a Hearing Aid (HA) and/or Cochlear Implant (CI) and attended a speech therapy intervention program, with emphasis on hearing development and oral communication. The analyzed dyad was composed of the family and the child or adolescent with hearing impairment.

Among the nine children, four had cochlear implant, five used a Hearing Aid. As for the adolescents, six had cochlear implant and three used Hearing Aids.

The selection criteria for the participation of hearing-impaired children and adolescents were: a) present bilateral sensorineural hearing loss without associated cognitive impairment; b) effectively use the cochlear implant or hearing aid; and c) participate or have participated in the speech therapy process, with emphasis on the development of hearing and oral communication.

Parents or caregivers of children and adolescents with impairments such as: (a) children with associated neurological disorder; (b) post lingual hearing impairment; (c) children with conductive change were excluded from this study.

The descriptive statistics of the group of hearing-impaired children and adolescents in relation to age at diagnosis (months), hearing thresholds of the better ear (dB), hearing rehabilitation time (months) and time interval between diagnosis and speech therapy (months) are shown in Table 1.

The hearing impaired participants were divided into two groups, according to the chronological age of the children and adolescents:

- Group 1: Composed of nine children aged 1 to 10 years
- Group 2: Composed of nine adolescents aged 10 years and 1 month to 15 years.

Table 1. Characteristics of hearing-impaired participants in relation to the variables age, level of hearing loss, electronic device used, hearing rehabilitation time and interval between diagnosis and intervention

Variables	Mean	Standard Deviation	Mínimum	Median	Maximum
Age of participant (months)	22.83	21.36	1	17.5	85
Hearing thresholds of best ear (dB)	100.55	20.13	70	105	120
Hearing Rehabilitation Time (months)	61.38	43.70	11	46	129
Interval between diagnosis and Intervention (months)	11.08	11.28	0	5.5	30

Data collection instrument

The data collection instrument for parents and hearing-impaired children interaction was a checklist⁷ translated into Brazilian Portuguese as the Communication-Promoting Behavior Index Scale⁸, composed of 22 items on communicative behavior which analyzed the interaction between hearing parents with their hearing-impaired children. This procedure allows to examine the 22 behavior items filmed during the interaction, relating them to hearing and language stimulation.

Video analysis of the parent's communicative behavior during interaction enables verification of the importance of the speaker's attitudes in the auditory and language behavior of the hearing-impaired child. These behaviors are divided into four categories shown in Figure 1.

The dyads formed by hearing-impaired children or adolescents and their parents were filmed for twenty minutes where the first five minutes recorded were eliminated from analysis as these minutes were deemed necessary for the participants to adapt to the presence of the camera.

The recordings of each dyad were filmed with a Sony camera, model DCR-SR 47. All recordings took place in the therapeutic environment of the Center for Education and Health Studies (CEHS) at the School of Philosophy and Sciences in the Universidade Estadual Paulista (São Paulo State University) at the Marília campus.

During filming, material that would enable replication of activities which may occur in the family environment and of interest to the participants were made available. For example, in the interaction of children with their parents there were dolls, puzzles, stuffed animals and

Categories	Sensitivity	Behavior observed in response to the child	Behavior observed in establishing shared attention	General Behavior
Behaviors	<ol style="list-style-type: none"> 1. Conduct the child positively 2. Regulate playing time and speak according to the time of the child 3. Most of the time follow the interests of the child 4. Offer appropriate stimulation, activities and games suitable for the age and stage of the child 5. Encourage and facilitate the child's playtime with objects and material 	<ol style="list-style-type: none"> 1. Recognize the child's communication attempts 2. Respond to the child's communication attempts 3. Respond with an answer that includes a question or comment and requires a response from the child 4. Imitate the child's production 5. Provide the child with the appropriate words he/she apparently wants to express 6. Expand the semantic and grammatical production of the child 	<ol style="list-style-type: none"> 1. Attempt to engage the child 2. Talk about what the child is experiencing, looking at, and doing 3. Use the voice (primarily) in order to attract the child's attention to objects, events and to him/herself 4. Use body movements, gestures and touch appropriate to attract the child's attention to the objects and to him/herself 	<ol style="list-style-type: none"> 1. Use phrases and sentences of appropriate size and complexity 2. Allow pauses after speaking to encourage the child's response 3. Speak to the child with appropriate rhythm, intensity and pitch 4. Use an interesting and lively voice 5. Use normal mouth movements, not exaggerated 6. Use hearing maximization techniques 7. Use appropriate gestures

Figure 1. Behavior analyzed in the dyads in reference to hearing and language stimulation

a variety of toys. For the interaction between teens and their parents there were games, story books, magazines and material that replicated activities in a hair salon. Before each recording, the parents and their children were instructed to conduct the interaction spontaneously.

Analysis of the Results

These recordings were submitted for consideration by three judges with experience in educational audiology. The judges analyzed the footage and scored each of the 22 behavior items included in the Communication-Promoting Behavior Index Scale. As a criterion for analysis of this study, the judges gave the score of 1-3 for the behavior that "is rarely observed," the score of 5-7 for the behavior that is "frequently observed" and the score of 4 to the observed behavior that is "occasional", i.e., not frequently observed, but "present".

The behavior was considered occasional when at least two judges scored within the same category, regardless of the assigned value. The results were presented in a Table containing the evaluations of each of the judges.

Moreover, in order to meet the objectives of the study, the exploratory data analysis including mean, median, standard deviation, minimum, maximum,

absolute and relative frequency and chi-square test for equality of proportions was used.

RESULTS

Each dyad was recorded, totaling 18 videos of the interaction between parents and their hearing-impaired children. In relation to the review and analysis of the judges, it was possible to get a 97.8% agreement among them.

The percentage established by the judges for "frequently observed" behavior was approximately 100% in all interactions analyzed for both the interactions of children as well as adolescents and their parents. The results regarding the distribution of behavior scored by the judges as "frequently", "occasionally" or "rarely" in the analysis of the interactions of children as well as the results for the higher scored behavior are found in Table 2. The same results on the interactions of hearing-impaired teenagers and their parents are available in Table 3.

The exploratory data analysis including mean, median, standard deviation, minimum, maximum, absolute and relative frequency and chi-square test for equality of proportions was used in order to evaluate if in each question addressed the proportions of "frequently", "occasionally" and "rarely" observed are different.

Table 2. Mean, median, standard deviation, minimum and maximum for each question addressed in the sample group of children

Dimension	Question	Mean	Median	Standard Deviation	Minimum	Maximum	p-value
Sensitivity	1. Conduct the child positively	5.67	6.00	1.36	2.00	7.00	0.9996
	2. Regulate playing time and speak according to the time of the child	5.48	6.00	1.34	2.00	7.00	0.9996
	3. Most of the time follow the interests of the child	5.93	6.00	0.87	4.00	7.00	1.0000
	4. Offer appropriate stimulation, activities and games suitable for the age and stage of the child	6.11	6.00	0.89	5.00	7.00	1.0000
	5. Encourage and facilitate the child's playtime with objects and material	5.70	6.00	1.14	2.00	7.00	0.9999
	Score	5.78	6.00	0.62	4.40	6.60	1.0000
Behavior observed in response to the child	1. Recognize the child's communication attempts	6.07	6.00	0.78	5.00	7.00	1.0000
	2. Respond to the child's communication attempts	6.04	6.00	0.81	5.00	7.00	1.0000
	3. Respond with an answer that includes a question or comment and requires a response from the child	5.85	6.00	1.03	4.00	7.00	0.9999
	4. Imitate the child's production	3.63	3.00	2.02	1.00	7.00	0.0466*
	5. Provide the child with the appropriate words he/she apparently wants to express	5.59	6.00	1.15	3.00	7.00	0.9941
	6. Expand the semantic and grammatical production of the child	5.81	6.00	1.04	3.00	7.00	0.9999
Score	5.50	5.50	0.67	3.83	6.67	1.0000	
Behavior observed in establishing shared attention	1. Attempt to engage the child	5.85	6.00	0.91	4.00	7.00	1.0000
	2. Talk about what the child is experiencing, looking at, and doing	5.70	6.00	1.14	3.00	7.00	0.9987
	3. Use the voice (primarily) in order to attract the child's attention to objects, events and to him/herself	5.48	6.00	1.22	3.00	7.00	0.9867
	4. Use body movements, gestures and touch appropriate to attract the child's attention to the objects and to him/herself	5.04	5.00	1.68	1.00	7.00	0.8684
	Score	5.52	5.75	0.72	3.75	6.50	0.9992
General Behavior	1. Use phrases and sentences of appropriate size and complexity	5.85	6.00	0.91	4.00	7.00	1.0000
	2. Allow pauses after speaking to encourage the child's response	5.74	6.00	1.38	2.00	7.00	0.9998
	3. Speak to the child with appropriate rhythm, intensity and pitch	5.59	6.00	1.45	2.00	7.00	0.9993
	4. Use an interesting and lively voice	5.52	6.00	1.22	2.00	7.00	0.9998
	5. Use normal mouth movements, not exaggerated	6.07	6.00	0.87	4.00	7.00	1.0000
	6. Use hearing maximization techniques	5.89	6.00	1.05	4.00	7.00	0.9998
	7. Use appropriate gestures	4.44	5.00	1.80	1.00	7.00	0.4119
Score	5.59	5.86	0.74	4.00	6.43	0.9999	

*Chi-Square test with p-value less than or equal to 0.05

In all interactions, both the total sample as well as in the separate samples of the interactions of children and adolescents, the only behavior that cannot be considered statistically frequent is "Imitates the child's productions", referring to the category "Behavior observed in establishing shared attention". In all other cases, it can be said that the noted behaviors are statistically "frequent", since the values of their medians are statistically greater than or equal to 5 (p greater than 0.05).

Among these behaviors in the general sample concerning all interactions, "Acknowledges the child's communication attempts" and "Uses normal mouth

movements, not exaggerated" are the behaviors with the highest score, with a mean of 6.19 and a median of 6.

In the interactions of the children, the behavior "Provides appropriate stimulation, activities and games suitable to the age and stage of the child" has the highest score with a mean of 6.11 and a median of 6. In the interactions of the adolescents the behaviors "Encourages and facilitates play with objects and materials" and "Uses voice (primarily) in order to attract the child's attention to objects, events, and to him/herself" have the highest score with a mean of 6.41 and a median of 7.

Table 3. Mean, median, standard deviation, minimum and maximum for each question addressed in the sample group of adolescents

Dimension	Question	Mean	Median	Standard Deviation	Minimum	Maximum	p-value
Sensitivity	1. Conduct the child positively	5.96	6.00	1.13	3.00	7.00	0.9999
	2. Regulate playing time and speak according to the time of the child	5.78	6.00	1.25	1.00	7.00	1.0000
	3. Most of the time follow the interests of the child	6.04	6.00	1.06	4.00	7.00	0.9999
	4. Offer appropriate stimulation, activities and games suitable for the age and stage of the child	6.07	6.00	1.11	3.00	7.00	1.0000
	5. Encourage and facilitate the child's playtime with objects and material	6.41	7.00	0.89	4.00	7.00	1.0000
	Score	6.05	6.40	0.86	4.20	7.00	1.0000
Behavior observed in response to the child	1. Recognize the child's communication attempts	6.30	7.00	0.82	5.00	7.00	1.0000
	2. Respond to the child's communication attempts	5.96	7.00	1.43	1.00	7.00	0.9999
	3. Respond with an answer that includes a question or comment and requires a response from the child	5.04	5.00	1.43	1.00	7.00	0.6855
	4. Imitate the child's production	2.67	3.00	1.36	1.00	6.00	<.0001*
	5. Provide the child with the appropriate words he/she apparently wants to express	5.67	6.00	1.49	1.00	7.00	0.9998
	6. Expand the semantic and grammatical production of the child	5.00	6.00	1.80	1.00	7.00	0.9331
Score	5.10	5.33	0.82	2.83	6.17	0.9953	
Behavior observed in establishing shared attention	1. Attempt to engage the child	5.81	6.00	0.83	4.00	7.00	1.0000
	2. Talk about what the child is experiencing, looking at, and doing	6.15	6.00	0.82	4.00	7.00	1.0000
	3. Use the voice (primarily) in order to attract the child's attention to objects, events and to him/herself	6.41	7.00	1.22	1.00	7.00	1.0000
	4. Use body movements, gestures and touch appropriate to attract the child's attention to the objects and to him/herself	4.22	4.00	1.85	1.00	7.00	0.2706
	Score	5.65	5.75	0.51	4.50	6.50	1.0000
General Behavior	1. Use phrases and sentences of appropriate size and complexity	6.22	6.00	0.89	4.00	7.00	1.0000
	2. Allow pauses after speaking to encourage the child's response	6.07	6.00	0.83	4.00	7.00	1.0000
	3. Speak to the child with appropriate rhythm, intensity and pitch	6.07	7.00	1.41	1.00	7.00	1.0000
	4. Use an interesting and lively voice	5.19	5.00	1.39	3.00	7.00	1.0000
	5. Use normal mouth movements, not exaggerated	6.30	6.00	0.78	5.00	7.00	1.0000
	6. Use hearing maximization techniques	5.23	5.00	1.14	3.00	7.00	1.0000
	7. Use appropriate gestures	4.89	6.00	1.89	1.00	7.00	0.9331
Score	5.72	5.71	0.62	4.57	6.86	1.0000	

*Chi-Square test with p-value less than or equal to 0.05

In the total sample, the behavior "Acknowledges the child's communication attempts" was the one with the highest proportion of ratings classified as "frequent" (100% of the cases), while the behavior with the highest proportion of ratings classified as "rarely" was "Imitates the child's productions" (63% of the cases).

It was not possible to apply the chi-square test for the behaviors "Provides appropriate stimulation, activities and games appropriate to the age and stage of the child", "Acknowledges the child's communication attempts" and "Responds to the child's communication attempts" since they were classified as "frequently" in 100% of the cases.

The results showed no significant difference between the communicative behaviors observed in the analyses conducted by the judges of the interactions of hearing-impaired children and adolescents. Therefore, there was no association between the frequency of communicative behavior observed and analyzed and the chronological age of the hearing impaired participant.

DISCUSSION

In all interactions between hearing-impaired children and adolescents and their parents, it can be seen that

the behavior examined in the videos led to the frequent use of hearing and language. Thus, these data showed that the participants of this study, in a controlled situation, demonstrated appropriate behavior for interacting with their children, allowing the use of auditory function and oral communication as well as the use of communication strategies.

In relation to the sensitivity results, it was observed that the parents often led the children adequately, regulated the playing time and spoke according to the time of the child, followed the interests of the child most of the time, offered appropriate stimulation and performed activities and games suitable to the age and stage of the child. It is important to note that by being a controlled situation, the material had been previously selected and made available, and the behavior to provide appropriate stimulation, with games and activities appropriate to the age and stage of the child may not portray family life.

Regarding behaviors during conversation, these are exposed in topics related to the response to child, shared attention and general behavior. The results showed parents' positive actions during the conversation.

The results of the video analysis of the interaction revealed that parents know the behaviors that favor communication with their children, an aspect that may have been brought about by participating in the orientation and monitoring of children in the therapeutic process^{21,22}.

In order for parents to know and utilize communication strategies that promote the development of their hearing-impaired children, they must be guided and accompanied in the therapeutic process²³⁻²⁵. Some authors emphasize the importance of family focus to succeed in developing the children's oral communication and speech therapy work^{26,27}.

The findings of this research may serve as indicators of the degree of adequacy of the parents' behavior when they interact with their hearing-impaired children. Thus, this data can show the parents' understanding of the communicative behavior used during communication situations with their child, facilitating the use of dialogic situations with the enrichment of auditory experiences, which should be meaningful and varied so as to dominate oral communication.

Although the results of this study have shown that parents who attend a program with emphasis on the development of hearing and oral communication use appropriate communication strategies in a controlled

situation, it is not possible to say whether the attitudes that enable better communication conditions with hearing-impaired children and adolescents are adopted systematically during the day to day family routine. This analysis showed that parents know these strategies.

The analysis method by means of filming the hearing-impaired child's interaction with his family enables a thorough analysis of the communication strategies used and the frequency of their use during a structured interaction situation.

From this assumption, the checklist procedure used in this study was shown to be effective in characterizing the communicative interaction of hearing-impaired children and adolescents and their parents in a controlled situation, and may be used for scientific purposes and in clinical practice in hearing rehabilitation programs. However, further studies and clinical procedures that may accompany the hearing-impaired child's exposure time in non-controlled everyday situations are necessary.

There are investigations that verify the relationship between hearing speech sounds, the use of hearing aids and the development of listening skills in children diagnosed with hearing loss, which demonstrate that the consistent use of the electronic device in unsupervised everyday situations is a challenge for children and that the partnership between the speech therapists and the families is crucial in raising awareness of the continued use of the hearing aid during the communicative interactions with the hearing impaired, which require the use of communication strategies^{28,29}.

Given the above, studies analyzing the impact of communicative interactions in the development of auditory and linguistic behavior of children will be beneficial.

CONCLUSION

In this study, we characterize the communicative interaction between parents and their hearing-impaired children, through filming and observation, thus concluding that parents use strategies that favor the development of language and auditory skills in a controlled situation. The results showed that parents of hearing-impaired children and adolescents inserted in an auditory rehabilitation program, in which there is great emphasis on the development of hearing and oral communication in family orientation and communication strategies, understand the guidance provided during the therapeutic process.

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