Case Report

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Analysis of interaction and attention processes in a child with multiple disabilities

Análise dos processos de atenção e interação em criança com deficiência múltipla sensorial

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ABSTRACT

Children with multiple sensory disabilities may not develop the language effectively, given that the combination of disabilities tends to reduce their participation in the environment and harm language development. The objective of this research was to analyze the interaction processes, i.e., the attention (attention to the person, attention to the object and joint attention) and communicative behaviors between a student with multiple disabilities (age: 4 years and 6 months) and her teacher specialized in the field of sensory multiple disabilities. The data were collected during activities in the classroom, through participant observations and audiovisual recordings of teacher/child interactions and analyzed with the *ATLAS.TI* program. The results indicated that the student showed attention to the object in activities involving music and rhythm. As potential forms of nonverbal communication it was observed eye gaze body movement and vocalizations. The teacher forms of communication were verbal, touch, visual, auditory (rhythm) and Brazilian Sign Language. The student presented potential turn-taking only when the action was initiated by the teacher. The quality of the activities, the materials used and the participation showed to have impact on the levels of attention and communication. More researches should consider these results as a way to define which activities that can contribute to support the development and quality of life of children with sensory multiple disabilities. Thus, teacher and speech/language therapist should know the way each child communicates and to be alert to nonverbal behaviors as a way to establish effective communication.

Keywords: Disability; Communication; Interpersonal relations; Speech, language and hearing sciences; Education, Special

RESUMO

Crianças com deficiência múltipla sensorial podem não desenvolver a linguagem de forma efetiva, pois a combinação de deficiências tende a reduzir a participação em seu meio e prejudicar o desenvolvimento da linguagem. O objetivo desta pesquisa foi analisar os processos interacionais, ou seja, os comportamentos de atenção (atenção à pessoa, atenção ao objeto e atenção conjunta) e comunicativos, entre uma aluna com deficiência múltipla sensorial (4 anos e 6 meses de idade) e sua professora, especializada na área da surdocegueira e deficiência múltipla sensorial. Os dados foram coletados durante atividades em sala de aula, por meio de observação participante e de gravações audiovisuais da interação/díade, e analisados com auxilio do programa ATLAS.TI. Os resultados apontaram que a aluna apresentou atenção ao objeto, em atividades que envolveram música e ritmo. Como potencial forma de comunicação não verbal, observou-se olhar, movimentos corporais e vocalização. As formas de comunicação da professora foram verbal, toque, visual, auditiva (ritmo) e sinais de Língua Brasileira de Sinais. A aluna apresentou potenciais trocas de turnos apenas quando a ação foi iniciada pela professora. A qualidade das atividades, os materiais utilizados e a participação mostraram ter impacto sobre os níveis de atenção e comunicação. Mais pesquisas devem considerar esses resultados, como forma de definir quais as atividades que podem contribuir para apoiar o desenvolvimento e a qualidade de vida das crianças com deficiência múltipla sensorial. Assim, professor e fonoaudiólogo devem conhecer a forma como cada criança se comunica e manterem-se alertas para os comportamentos não verbais, a fim de estabelecerem uma comunicação efetiva.

Palavras-chave: Deficiência; Comunicação; Relações interpessoais; Fonoaudiologia; Educação especial

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INTRODUCTION

Children with multiple sensory disabilities may not speak at the expected age, or effectively and efficiently develop language, as the combination of disabilities tends to reduce and limit their participation in the environment and restrict their access to the symbol system that is the basis for language use[1].

In the first year of life, three interaction transitions are identified[2]. The first transition occurs during the first two months, when children begin to pay attention to adults, who communicate with them by responding to their behaviors. The second occurs by the age of 5 months, when children seem to lose interest in face-to-face interactions with adults and become interested in objects they can manipulate. The last transition, by the age of 9-10 months, involves the connection of the children interests for objects and other people's actions. This is when the beginning of an effective and real communication is verified.

Such behaviors, when interpreted by adults, allow children to develop an understanding of the consequences and influence of their behaviors in adults, which are crucial for communication development[3].

When thinking about non-verbal communication of babies with multiple sensory disabilities, other forms of communication should be considered, as they will be probably used in interactive processes with an adult[4]. These forms of communication are divided into three groups[4]:

1) Forms of communication involving the whole body of the baby.
2) Forms of communication involving body parts, being characterized by touching, objects and indicative gestures.
3) Information conducted by actions in clear and defined contexts, from the interactions of children with adults in different environments, and from the physical and symbolic characteristics of these environments.

In the absence of a clinical and educational intervention, children with multiple sensory disabilities can develop nonverbal behaviors to establish a communication, although they may not start speaking at the expected age or effectively develop language. However, if the adult is not aware of this possibility of communication, impairment of significant relationships may happen, due to the difficulties in establishing signaling systems, preventing or hindering the recognition of behaviors from both sides[5].

The difficulty in the interpretation of behaviors and turn-taking for both sides (child and adult) can cause problems in the communication process development[4].

Therefore, this study aimed to analyze attention (attention to the person, attention to the object and joint attention) and communicative behaviors between a child with multiple sensory disabilities and her teacher, specialized in the field of multiple sensory disabilities and deaf-blindness. To this end, three theoretical references on some aspects of language development were used: turn-taking[6], intentional behavior[7] and joint attention[8].

This study is considered of utmost importance in the field of Speech Language Pathology, as it highlights the significant role of the speech therapist in such work, where aspects of the language, often overlooked or poorly understood, are left aside, compromising the children development to their full potential. Thus, in other cases in the same setting, the teacher will be able to act in a more complete way and ensure a work covering the specific needs of each child, when working with a speech-language therapist.

CLINICAL CASE PRESENTATION

This study was approved by the Research Ethics Committee of *Pontifícia Universidade Católica de São Paulo*, under protocol Nº. 08159612.9.0000.5482.

In order to perform this research, an association dedicated to the educational assistance of individuals with deaf-blindness and multiple sensory disabilities was selected, located in the city of São Paulo. Contacts, clarifications and explanations about the research were carried out with the Association, the teacher and the individuals responsible for the student, followed by signature of the Informed Consent Form for collection and utilization of research data.

The first participant, hereinafter referred to as student, is a 4-year and 6-month old girl, with multiple sensory disabilities (associated visual and physical impairment). She spends most of the time sitting in her adapted chair, due to her body posture condition. She cannot support her head without adaptations and her motor and visual conditions make her development and responses during activities difficult. Her communication is restricted to gazing, body movements, head movements and some vocalizations. Her preferences are interpreted by her family in contexts, through specific movements.

The second research participant, hereinafter referred to as the teacher, is a 31-year woman with a degree in Pedagogy, expert in deaf-blindness and multiple sensory disabilities and has been working in the association for 13 years.

The interaction between student and teacher was observed during school activities and, for record of observations during moments of interaction, an audiovisual recording was used, as it presents a high degree of reliability[9]. The shooting focused only in the interaction between the two research participants, although both were in a group with other children. The interaction activities used for the recordings were selected in accordance with the class schedule, and the following were recorded and analyzed: 1) body contact activity; 2) ball playing activity; 3) singing/rhythm activity; 4) musical instruments playing activity; 5) playing activity with other toys.

The communication used by the teacher during the activities was recorded, as well as the form of communication and

Chart 1. Summary of observation of the records of number of occurrences related to attention behaviors, according to each classroom activity

Participant	Activity/Situation	Attention to person	Attention to object	Joint attention
Student	Body contact	0	0	0
	Ball playing (hot potato)	6	11	0
	Singing and rhythm	0	0	0
	Playing + music: rhythm and music	4	0	0
	Musical instrument	3	4	3
	Toys	2	6	11

answers presented by the student. The shooting took place over a period of six months and totaled 93 minutes and 27 seconds, with observations ranging from a minimum of 1 minute and a maximum of 24 minutes.

*The Qualitative Data Analysis & Research Software** (ATLAS.TI) was used for data transcription, in addition to field notes registration. Orality traces were respected and maintained.

For purposes of data validation, video recordings were checked by two experts, a pedagogue and a speech therapist, both experienced in primary care to sensory disabled people.

Potential situations corresponding to the attention behaviors of attention to the person, attention to the object and joint attention were quantified and categorized in the video duration record[2].

Observations of attention behaviors of both participants in an interaction situation were recorded in analysis matrices, according to each performed activity[10].

These moments were transcribed, identified, organized and recorded in matrices after watching the videos several times, in order to emphasize terms that emerged. The terms were subsequently recorded in sequence, in side-by-side columns, according to each video time-point, followed by comments. The assignment of a color code to identify observed moments was chosen, using thematic analysis.

The records show behaviors presented by the student, referring to the time of the shooting, potential forms of communication used, her responses and comments made, through systematic observation. From the total of 93 minutes and 27 seconds of footage, 36:70 minutes were transcribed and recorded, as the moments when people interfered and other situations not pertaining to the objective of this research occurred were discarded.

Each behavior was categorized and recorded according to the thematic analysis proposal[11] and, in the end, the verbal (speech), touch, visual and auditory (according to the activities where the teacher used music and/or rhythm) categories were defined. The occurrence of turn-taking between the doublet was checked, counted and recorded in the analysis matrix.

According to the previously exposed classroom activities, the potential attention behaviors of the student were observed.

The results of the quantification and categorization of occurrences related to potential attention behaviors (attention to the person, attention to the object and joint attention)[2] are found in Chart 1.

According to the observed data, the behavior of attention to the object appeared in higher numbers, followed by attention to the person and joint attention.

During the "body contact" activity, the student did not present any kind of attention behavior. She did not reject touch, but showed no reaction. The "ball playing activity", while singing the "hot potato" song, was the activity that had the highest number of the attention to the object behavior, followed by attention to the person, most of the time by gazing. A question was raised here of whether the student was annoyed by the touch of the ball, because the teacher touched the student's body with the ball in varying intensities, sometimes soft, sometimes strong, following the rhythm of the song. In this activity, the student presented some body movements as reaction.

In the activity with the musical instrument (güiro), the student did not make any movement to hold it or handle it at any time, however, she showed potential attention behaviors, by following with her eyes and some body movements the teacher's speech and the movement of the object.

During the activity with toys she seemed to respond through vocalization when the teacher asked if she would like to take care of the toy (stuffed animal). In another situation, she seemed to be uncomfortable with the stuffed animal and this could be perceived through her gaze. Then the teacher showed the toy closer to the student's eyes, removed it from her visual field and, at this moment, when the toy passed through the lateral (visual field) of her eye, the student followed the teacher's hand movement, by gazing. Such behavior was registered as joint attention.

The results of observations of potential communicative behaviors between teacher and student are presented in Chart 2.

The student presented non-verbal communicative behavior, little response reaction as response and it can be inferred that

*The Qualitative Data Analysis & Research Softwares (ATLAS.TI). Available at: http://www.atlasti.com/index.html

Chart 2. Partial description of observed activities and audiovisual recordings, referring to the teacher/student doublet

Activity	Teacher's action	Communication from the teacher	Potential communicative behaviors of the student
Body contact Teacher and student in the classroom. Teacher sitting on the floor on the E.V.A. red carpet and student sitting in adapted chair, with posture correction support belt and feet support.	Touched the student's leg sometimes.	Verbal/Touch	No reaction.
	Teacher hit the ground a few times to draw the student's attention .	Touch/Verbal/Vibration (kinesthetic)	No reaction.
	She touched the student's leg again.	Verbal/Touch	She looked at her leg while the teacher touched, turned her head and looked towards the teacher.
	Teacher spoke louder and clapped her hands.	Verbal/Touch	She seemed to look towards the sound source.
Playing with the ball Teacher sitting on the floor, on the E.V.A. red carpet, next to the student, who was sitting in the adapted chair. The teacher placed the big yellow ball in the student's lap.	The teacher touched the ball, following the rhythm and pacing of the song.	Verbal/Auditory/Touch	No reaction.
	The teacher slid the ball down in the student's legs.		She presented a small and quick reaction.
	The teacher returned the ball to the student's lap.		She lifted her head, opened her eyes and looked at the teacher.
	The pacing and speed of the touches and the song were increased.		
	The song concluded with the ball in the student's lap.		She looked at the ball.
	The teacher places the student's hand on the ball.		She remained still, with her hands on the ball.
Singing and rhythm Teacher in the classroom, with three more students, besides the student.	They start to sing and clap.	Verbal/Auditory	The student did not follow her colleagues in the clapping and singing. She remained still, but it seemed that she reacted to clapping by "blinking her eyes".
	Teacher touched the student's leg.	Verbal/Touch	She did not react to the touch.
Playing with musical instruments Teacher sitting on the floor next to the student, who is in the chair, placed an instrument (güiro) in the student's hands so she could play following the music.	The teacher made the movement of the instrument and sang the song along with the student.	Auditory	With her head up, eyes wide open. She did not move.
	The teacher placed the student's hand on the instrument.	Auditory/Touch	She remained without reaction.
	The teacher tried again to get the student to hold the instrument.		She did not hold the instrument.
Playing with other toys Teacher and the other kids chose a stuffed animal. A plush cow was chosen for the student, as it had been presented to her in another class. Teacher showed the toy to each of the children.	Teacher showed the toy close to the student's face, in her visual field.	Verbal/Visual	She turned her head and did not look at the toy.
	The teacher turned on the toy and it began to vibrate.	Verbal/Visual/Touch	The student did not look and did not touch the toy. She raised her arms.
	The teacher turned the toy off.	Touch	She looked more comfortable.
	The teacher brought the toy closer to the student's face.	Verbal/Visual/Touch	She moved hers arms and legs and quickly glanced at the teacher.

she potentially used forms of communication, such as gazing, some body movements (reactions) and vocalization. For most of the time, she remained still, quiet and unresponsive. She presented involuntary movements, did not move independently and remained seated in the adapted chair. Although she did not reject touch, in many moments it was difficult to understand if she was enjoying something or not, or even if she was feeling uncomfortable.

The student did not initiate any communication during the activity, even as a reaction to some movement presented by the teacher. A potential reaction to the teacher speech and to sound stimulus (bass and strong sounds) was recorded, which raised questions about it being a communicative behavior. She did not handle or explore any object.

The results of communication used by the teacher and those relative to turn-taking between teacher and student, during the same classroom activities, in five observed situations were the following: verbal (speech), touch (contact and vibration), auditory (stimulation, rhythm) and visual. The forms of communication of the student were often interpreted by the teacher. The student showed a greater number of turn-taking during activities involving music and rhythm, by means of some body movements and gazing, and a few times she seemed to respond to the teacher's speech.

DISCUSSION

Analysis of the results provided information to understand the attention behaviors of the student, who presented non-verbal communication.

These behaviors were not understood by her communication partners (family members) as a valid form of communication, which may have compromised the relations with communication partners and interfered in attention behaviors. Such impairment occurred due to difficulties in establishing a signaling system for understanding behaviors of the child and communication partners[5]. This fact highlights the need to verify the forms of communication used by children in the non-verbal field, so they can be widened to generate an effective communicative situation.

Children with multiple sensory disabilities present difficulties in behavior interpretation and turn-taking, in respect to the synchronization process and the number of turns on developed interactions [4].

The need to search for directed attention is highlighted by situations in which children can express attention to people and objects and develop joint attention, with the perspective of communication and language development. The attention in these children can often be limited, as it is focused on people and eventually on objects but, in some cases, they do not present directed attention behavior. This aspect should be considered in the intervention, with respect to communication, ensuring adequate stimulation to children according to their development level and providing proposals of interaction with people, objects and actions, in meaningful activities mediated by communication[4].

The difficulty to establish an effective communication in the doublet during the attention processes was evidenced. The student did not start and/or extend any communication episode with the teacher, even in situations when some attention behaviors were identified, such as attention to the object. As potential answers to the teacher's actions, the initial command by the teacher was always required to carry out activities and the student did not conduct any activity independently. Therefore, the need for significant intervention from the other person to support and guide the child's actions is undeniable.

In some situations, the teacher inferred meanings from the student's behaviors, looking for an answer, thus showing the potentiality she observed in the child[4].

In certain activities, the teacher waited some time for answers that did not occur immediately after the action. It was also possible to observe that in some situations the teacher did not continue the child's actions or simply changed to another action. It is extremely important that those who live with children with multiple sensory disabilities are advised about potential forms of communication, so they can give them meaning and widen them[4].

The results showed that the teacher was required to provide tactile stimulation (touch) concomitant to speech (verbal), working with routine situations, so the student could respond. In such cases, if the teacher infers there is understanding and awareness of the situation by the student, such movements can be transformed into contextualized gestures. However, and this is a crucial aspect, if the teacher does not realize how to make the child understand what is happening, such child may perform movements randomly, without real communicative intent.

The reaction to sound and visual stimuli shows there are both auditory and visual residues that can be used for stimulation in the search for significant linguistic behaviors.

In this study, it seems the teacher sought several forms of communication to get linguistically closer to the student, based on what the teacher observed as a potential response possibility: verbal (speech), followed by touch, visual, auditory (rhythm) and some signs of the Brazilian Sign Language. In certain activities, the teacher provided a lot of (verbal) information, concurrently to two or more commands, apparently in an attempt to bring the information to the student. Throughout the collected sample, the strategies used by the teacher demonstrated that she identified the student as someone able to develop language. Believing in the possibility of interaction was part of her action for the whole time.

In some situations that demanded a potential answer from the student, the teacher did not wait long enough for the student to answer or to explore the object. Perceiving the communicative intentions of children with multiple sensory disabilities is a difficult task, as many times the behaviors are

not explicit and only the analysis of a video recording allows apprehending such intentions.

It was also observed that during many activities the teacher anticipated the events and presentation of objects, a strategy that was proved efficient in some occasions, indicating that their use is beneficial in propitiating the appearance of communicative situations.

It is essential that the work with attention and communication behaviors observed in the teacher's work with the student stimulate interactions and make the child want to repeat them, thus favoring an effective communication process.

It is worth noting that this type of research, for being a case study, does not allow generalizing findings. However, the observed and analyzed aspects regarding the teacher's actions seem to constitute strategies that enable a significant interaction with children with multiple sensory disabilities, which is an aspect that should be taken into account when working with these children.

Discussing the role of the family in interactions with children with multiple sensory disabilities was not within the scope of this study, but it is important to emphasize this point of view, considering that the family is one of the main elements of communication stimulation, and interactions with the family are essential for the development of communication skills. The extension of these interactions to community environments is essential, ensuring a differentiated look that considers the person with multiple sensory disabilities as someone able to interact, to make themselves understood and to understand what is going on around them.

It is worth noting that the national academic education presents gaps in the setting of multiple sensory disabilities in the health area, specifically in speech therapy. There are few studies in the international literature aimed to discuss communication development through intersubjective experience among children with multiple sensory disabilities and their social partners[12,13].

If the specificities of Health and Education professionals are considered, which is the focus of this research, then the work conducted by experts, including the speech therapist, will allow the development of the individual in various aspects and can contribute for people with deaf-blindness and multiple sensory disabilities to have their actual place in society[14]. In particular, it is up to the Speech-Language Pathologist to collaborate in the identification of priorities and needs of individuals with multiple sensory disabilities and to establish programs and actions along with their family and teacher, so they can contribute to a better development of language and communication[15].

FINAL COMMENTS

In many cases, children with multiple sensory disabilities do not use speech as the main form of communication, with the use of non-verbal means being necessary. These non-verbal means are unknown to teachers, family members or professionals from diverse fields.

However, the communication partners must identify, interpret and respond to the child's actions, offering opportunities for initiative, interaction or answer. To date, little is known about the learning skills of these children and about attention and communication behaviors. Thus, knowing how each child communicates and their characteristics is essential for the care, both by teacher and speech therapist.

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