

AUTISM SPECTRUM DISORDER AND SCHOOL INTERACTIONS: CLASSROOM AND SCHOOLYARD¹

TRANSTORNO DO ESPECTRO AUTISTA E INTERAÇÕES ESCOLARES: SALA DE AULA E PÁTIO

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ABSTRACT: This study aimed at analyzing interactional episodes of children with autism in the classroom and schoolyard contexts, considering their peers and teachers. It is understood the relevance of school inclusion and specific social interactions that occur in these contexts from the neurodevelopmental, socio-communicative and behavioral characteristics of children diagnosed with Autism Spectrum Disorder. In order to do that, eight filming sessions were held in two private schools, with four teachers, four children with autism and 42 children with typical development. The results were presented in quantitative terms, from the frequencies of interactional episodes; and qualitative terms, from the description of four case studies containing excerpts from the interactional episodes. In spite of the variations between the contexts, the complete interactional episodes were characterized by the use of objects and dyadic mediations directed by the teachers to the autistic children. On the interactions between the pairs, it is emphasized that these exchanges were more frequent during free activities in the context of the classroom. Finally, the role of the study of the interactional episodes for the processes of research, evaluation and intervention in the school area is emphasized.

KEYWORDS: Autism. Social interaction. Educational inclusion.

RESUMO: Este estudo objetivou analisar episódios interacionais de crianças com autismo nos contextos de sala de aula e pátio, considerando seus pares e professores. Entende-se a relevância da inclusão escolar e das interações sociais específicas que ocorrem nesses contextos a partir das características neurodesenvolvimentais, sociocomunicativas e comportamentais das crianças diagnosticadas com Transtorno do Espectro Autista. Para tanto, foram realizadas oito filmagens em duas escolas particulares, com quatro professoras, quatro crianças com autismo e 42 crianças com desenvolvimento típico. Os resultados foram apresentados em termos quantitativos, a partir das frequências de episódios interacionais; e qualitativos, a partir da descrição de quatro estudos de caso contendo trechos dos episódios interacionais. Apesar das variações entre os contextos, os episódios interacionais completos caracterizaram-se pelo uso de objetos e mediações diádicas dirigidas pelas professoras às crianças autistas. Sobre as interações entre os pares, destaca-se que essas trocas foram mais frequentes durante as atividades livres no contexto de sala de aula. Por fim, ressalta-se o papel do estudo dos episódios interacionais para os processos de pesquisa, avaliação e intervenção na área escolar.

PALAVRAS-CHAVE: Autismo. Interação social. Inclusão educacional.

1 INTRODUCTION

Autistic Spectrum Disorder (ASD), of multifactorial etiology (Posar & Visconti, 2017), affects early and chronically the development in the socio-communicative and behavioral areas, causing damage to the overall functioning of the individuals affected (American Psychiatric Association [APA], 2014). Irvin, Boyd and Odom (2015) and Paula, Cunha, Silva and Teixeira (2017) point to variability in terms of degree of impact in areas such as communication, learning, adaptation to activities of daily living and socialization.

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The significant increase in the number of cases has been discussed in the literature from: greater exposure to causal factors, broadening of diagnostic criteria and more trained professionals for symptom identification, screening and diagnosis (Bishop et al., 2017). Even in the face of inconclusive answers to this question, the social relevance of the theme stands out, given the increase in the number of people fighting for their rights, looking for specialized services and regular schools.

Regarding studies in school contexts, schools currently pay more attention to ASD cases due to the popularization of the term through the media and public policies in Brazil (Bandeira & Silva, 2017; Schmidt et al., 2016). Since 2008, the ASD student has been placed as a target population for Special Education, and, in 2012, it was regulated that a person with ASD is considered a person with disabilities for all legal purposes (Law no. 12.764 of December 27, 2012). However, Cabral and Marin (2017), in their review study, state that there is little research in the area at the national level, indicating the need for further studies and greater incentive for the publication of inclusive practices.

Given these considerations, this study aims to analyze interactional episodes (IE) of children with ASD in the classroom and schoolyard contexts, considering their peers and their teachers. It departs from the historical-cultural theory by agreeing that social interactions are constituent elements of human development. According to Vygotsky (2007), the higher psychological functions, typically human, are built on and by the relationship between people. They arise, first, in the social, external sphere, and then on the individual level, be internally reconstructed and definitively internalized. The process of transformation from interpersonal to intrapersonal level is the result of a set of events that occurred throughout development. Thus, interactive contexts are characterized as situations that provide learning and development due to symbolic mediation; therefore, “the path from object to child and from child to object passes through another person” (Vygotsky, 2007, p. 20). It is also noteworthy to point out the inter-influence during social exchanges where child is considered an active participant (Kuchirko, Tafuro, & Tamis-LeMonda, 2017; Martins & Monteiro, 2017; Salomão, 2010).

2 METHOD

In this section, we initially present the research participants. Then, we discuss the instruments used. Finally, the procedures for data collection in schools are described.

2.1 PARTICIPANTS

The study included 42 children with typical development, four male children diagnosed with ASD and four teachers from two private regular schools in the city of João Pessoa, Paraíba, Brazil, two classes from each school. The children were between 3 and 5 years old and were from A, B and C economy class⁵. The criterion for choosing these participants was accidental or convenience sampling, which is characterized by the researcher's selection of the most accessible members of the population.

⁵ The economic classes, according to the Getúlio Vargas Foundation (FGV), are defined based on family income per capita, and class A with an income from R\$11,262.00; B with an income between R\$8,641.00 and R\$11,261.00 and C between R\$2,005.00 and R\$8,640.00.

Considering the heterogeneity of the cases, Table 1 shows the characterization of the children with ASD, all of them had interventions for at least six months and had attended school for at least nine months. The children with ASD, except one, performed interventions in associations that were not mentioned due to confidentiality reasons. Although the levels ranged from mild to moderate, according to the Childhood Autism Rating Scale (CARS), only Mario and Hugo were verbal, but had difficulties in functional language use and communicative intent. Pedro and João did not have verbal communication, they showed interest in objects and toys with functional behaviors before them, having João the characteristic of moderately impaired visual and auditory responses and Hugo slightly impaired.

Child	School	Age	CARS*	Schooling time	Kind of Interventions
Pedro	1	4.6	31	2 years	S. Therap./ Psycho.
João	2	3.3	34	9 months	Assoc./ Mot. Act./ S. Therap.
Mario	2	4.10	34	2 years	Mot. Act./ Swimming/ S. Therap./ Psycho.
Hugo	1	5	33	3 years	Assoc./ S. Therap.

Table 1. Characterization of children with ASD.

Source: Research Data.

Note. * Scores range from 15 to 60, and the cutoff point for ASD is 30. S. Therap.= Speech Therapist; Psycho = Psychopedagogue; Assoc. Association; Mot. Act. = Motor Activities.

2.2 INSTRUMENTS

For the observations, filming was performed with a digital video camera, as this feature allows the recording in detail of the observed situation and the review of the scenes, allowing the analysis of behaviors not observed a priori (Kreppner, 2001). Sociodemographic data and routines and characteristics of children with ASD were seized from a characterization form prepared by the authors. Although children with ASD had the diagnoses before this research, due to the heterogeneity of symptoms, characteristic in cases of ASD, the CARS scale was also used, whose validation evidence for use in Brazil was published in the study conducted by Pereira, Riesgo and Wagner (2008).

2.3 PROCEDURES

For data collection in schools, all ethical precepts were followed according to Resolution No. 466/2012 of the National Research Ethics Committee of the Ministry of Health (*Comissão Nacional de Ética em Pesquisa/Ministério da Saúde - CONEP/MS*), passing by the Ethics and Research Committee of the Science Center of the Federal University of Paraíba, approved under Protocol number 480/10. To record the interactional episodes (IS), two sets of filming were done in each class, contemplating the moments of the classroom and schoolyard. Before filming, the teachers were informed that they should act as they usually do in the school routine.

For data analysis, of the 20 minutes filmed of each situation (classroom and schoolyard), 10 minutes were fully transcribed by the first author of this paper. Two classes were filmed from each school, but of the eight transcripts, in only two of them the filmed

environment was the same (schoolyard situation, school 2, in João and Mario's cases), because the classrooms varied according to the age of the children, and the schoolyards because they have more than one available at school 1.

The arrangement of these environments and the activities performed were different, being described in the case studies with a view to favoring the understanding of the variations of the episodes and their respective influences. According to the theoretical perspective used, activities and objects available in the environments are considered in the analysis because they constitute interactions and mediations. It should also be noted that the classrooms had basically the same configuration with a combination of ventilation and artificial and natural lighting from fans and windows, the presence of mobile desks suitable for children's sizes, as well as books, toys and accessible school supplies to them.

Data analysis did not address the verbal behaviors of children with ASD, as it was not possible to grasp them properly through filming due to the following factors: distance from the researcher, direction of the child's face during such emissions and interference from noises and external noises. Therefore, even considering the relevance of these data, they could not be included in the analysis. Observation data are presented from four case studies, considering the episodes in quantitative and qualitative terms. According to Ventura (2007), the case study can be used in quantitative and qualitative approaches, in different fields of knowledge, highlighting the scientific rigor required for data planning, analysis and interpretation. According to the author, naturalistic case studies are rich in descriptive data and focus on a reality in time and place in a complex and contextual way. Sanini, Sifuentes and Bosa (2013) highlight the importance of case studies in terms of atypical development.

Situations characterized by the presence of two or more participants (dyadic or polydiadic) inserted in a given context (classroom or schoolyard) and during an interactive flow involving the participants' behaviors in terms of initiative, response and continuity/feedback are considered complete IE (Zanon, Backes, & Bosa, 2015). These behaviors can be both the teacher's and of the typical children or of those with ASD. Thus, interactive behaviors can happen as long as common attention is maintained; therefore, the IE is considered interrupted when one partner shifts focus or changes activity. However, it is important to differentiate the terms "adequate response" (Lemos, Salomão, & Agripino-Ramos, 2014) and "complete IE", since, in the latter, besides the response of the child with ASD to the behavior initiated by the other (child or teacher), it is necessary to present a new behavior that indicates continuity or feedback to the behavior of the child with ASD.

3 RESULTS AND DISCUSSION

The quantitative aspects of IE are presented in Table 2 below. In general terms, there was a higher frequency of incomplete IE, as it may be justified by the socio-communicative difficulties of children with ASD (Martins & Monteiro, 2017; Zanon, Backes, & Bosa, 2015). According to Camargo and Bosa (2012), they demonstrate difficulties in understanding the social situation, initiating, directing or maintaining attention for more than a few minutes. These episodes can be compared to what Silva (2010) points out as a disengagement event, whose peer tries to get the other's attention and is not able to capture his/her attention. According to the author, the adult can often draw the attention of the autistic child, but tends

not to continue the actions that were the initial focus of the exchange. In this research, this characteristic was observed in the teachers' behaviors during the analyzed IE.

Child	Classroom situation					Schoolyard situation				
	Total	Complete IE		Incomplete IE		Total	Complete IE		Incomplete IE	
		F	%	F	%		F	%	F	%
Pedro	19	6	31.6	13	68.4	20	7	35	13	65
João	20	7	35	13	65	16	3	18.7	13	81.3
Mario	15	3	20	12	80	10	5	50	5	50
Hugo	30	10	33.3	20	66.7	5	1	20	4	80

Table 2. Interactional episodes set in the classroom and schoolyard.

Source: Research Data.

Next, qualitative analysis of these data are presented answering the following research questions: What happens in common in these interactional episodes? With whom are interactive exchanges established? How is the mediation of teachers characterized? How do autistic children participate? In addition to this, a script was elaborated with information covered in these case studies as shown in Figure 1.

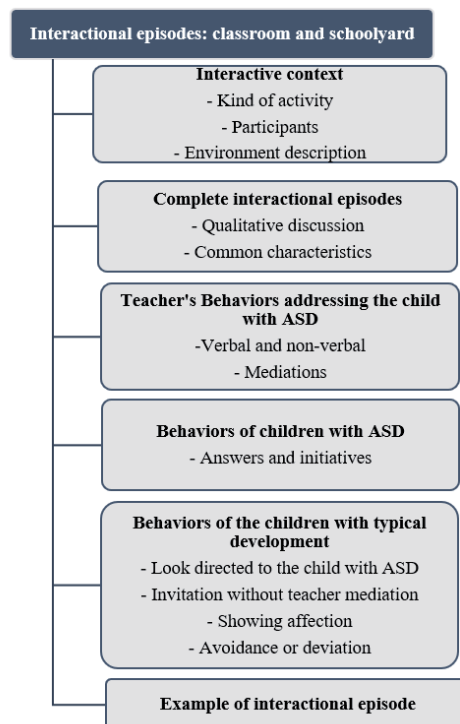


Figure 1. Diagram of information covered in interactional episodes.

3.1 CASE STUDIES

- **Case 1: Pedro (4 years and 6 months old)**

Filming in the classroom context recorded a directed activity situation: a painting on a sheet of paper using gouache and ink dropper. At this moment, the children were sitting in their chairs and the teacher walking around the classroom and giving instructions for the task. Of the IEs established in this context, six of them were considered complete. The qualitative analysis of these episodes revealed that there are in common, at these times, aspects such as: object manipulation, physical support or verbal support, instructions and information directed directly to Pedro

Regarding the teacher's behaviors directed to Pedro, it was observed that she offered physical help, but did so by continuing the behaviors already started by the child. The same thing happened in the conversations; many times the teacher directed instructions to Peter when he was already performing the action mentioned by her. When analyzing Pedro's behaviors in this dynamic, it is highlighted that he adequately responded to various verbal and nonverbal behaviors of the teacher; and performed his task independently, observing the objects available and demonstrating initiative toward them. Although Peter showed little initiative toward the other children, he got close and looked toward the actions of those who were close to him.

In relation to the behaviors of typical children directed to Pedro in the classroom, there were glances directed to him and invitation, to play or sit next to him, without mediation of the teacher. It is worth mentioning the type of activity that was being performed in this context, because, in general, the children interacted little with each other and with the teacher, remaining, most of the time, dedicated to the painting activity. At the end of the activity and waiting for the time to go to the schoolyard, without directed activities, the children sang some songs sitting in a circle on the floor. In these moments, there were behaviors of invitation to play for the other children in relation to Pedro, besides behaviors of affection, such as touching, smiling or hugging, on Pedro's part, both in response and on his own initiative.

In the schoolyard situation, the teacher and the children grouped at different times according to the toys used and the games that took place. These games were sometimes started by the children, sometimes by the teacher, who, in most cases, watched the children playing freely and approached in case they needed help. The physical environment was characterized by a covered area, with natural lighting and ventilation, delimited in the form of a large square, with sand on the floor and different toys such as tunnels, different stairs, slides, swings, buckets, shovels and small shapes.

Regarding the IE established in the schoolyard context, seven complete interactional episodes were recorded. Qualitative analysis reveals that they occurred at times involving the manipulation of objects (toys). In this context, higher frequencies of visual exchange, more initiatives on Pedro's part and longer duration of IE were observed when compared to the complete episodes that occurred in the classroom. Considering the teacher's participation during the interactions established in the schoolyard, different strategies were observed to insert Pedro into play, requesting, for example, that the typical child repeated a behavior that Pedro had shown interest. Regarding Pedro, the active behaviors in the interaction stand out,

denoting his understanding of the environment and the non-verbal behaviors present in it. The teacher, in turn, perceived these Pedro's behaviors and performed gestures and physical supports, both notably from the interest and behaviors shown by him.

Another relevant aspect refers to the behaviors of the typical children directed to Pedro, having been frequent: directed look at the child with ASD, invitation without mediation of the teacher and demonstration of affection. Unlike the classroom, the children addressed Peter more often and for longer. Such behaviors evidenced the reciprocity of children's behaviors in interactions considering the teacher's mediation. Although the children's invitations to play with Pedro occurred without the teacher's mediation, it is important to emphasize that she approached and helped to continue the established and initiated interaction between the children. The characteristics of these interactions are exemplified from this complete IE in the schoolyard, whose dyadic situation shows that Peter initiates and ends the interaction:

Teacher: With her back to Pedro and her arms crossed, she looks at the other children / Pedro: He stands in front of the teacher, looks towards her face, looks at her arm and extends his arms up towards the teacher. / Teacher: Leans toward Pedro, uncrosses her arms and looks at him smiling. / Pedro: Stretches the teacher's arm, lightly grasping her elbow skin with his fingertips and looks in this direction. / Teacher: Reaches out her arms behind Pedro's back, makes fingertip movements on Pedro (tickling), then hugs him / Pedro: Pedro's hand comes loose from the teacher's elbow as he is hugged by her, he looks across to where the children are running, turns away from the teacher and walks in the opposite direction.

The data obtained from the interactions established in the schoolyard corroborate Camargo and Bosa (2012) when they consider that, in this environment, the child with ASD is more requested by the group, acts more independently and expresses his/her intentions better, besides being more frequent the smiling behaviors and displays of affection than in the classroom context. One of the characteristics of this case refers to the fact that, by the age of the children, the time of their activities in the schoolyard and the space used were different from those of older children. This strategy allowed a schoolyard situation with less noise and visual information, more clarity regarding the physical space and arrangement of objects, which may have favored Pedro's adaptive and interactive behavior.

- **Case 2: João (3 years and 3 months old)**

Filming in the classroom context recorded a group activity situation regarding the presentation of sounds (rattle, clock, for example) and music. During the filming, the children were sitting in a circle on the floor, together with the teacher, and João was walking around the room manipulating different objects that were within his reach (a cart, posters, glue, for example).

During the seven complete IEs observed in the classroom, João showed interest in objects by manipulating different objects within his reach, some unrelated to the proposed activity. In this context, besides object manipulation, adequate responses were observed by João and little information and instructions directed by the children or teachers directly to him. As for the teacher's behavior towards João, she addressed him by bringing him to the group only in his turn to perform the activity. Due to João's behavioral characteristics related to interest in

objects and responding appropriately to dyadic situations, between him and his teacher, such a strategy favored complete IE.

As for João's behaviors, although he presented behaviors of isolation as he moved away from his peers, he responded appropriately to the mediations and instructions directed at him. When observing an object being manipulated by another person, although he did not show initiative directed at the person, he showed behaviors of initiative towards the action or the object. As an example, when watching the teacher with the rattle in hand, he approached, took the rattle, smiled and began to move it up and down.

Upon completion of the classroom activity and before heading out to the schoolyard, the teacher and children listened to music, manipulated the rattles and danced. Then, the teacher took João's hands, moving them along with the music and the other children, and placed his arms around another child's neck. Although João withdrew his arm, they both smiled and looked at each other. Later, other children approached João, showed affection, such as touching and hugging, and made invitations without the teacher's mediation.

In the schoolyard situation, the environment was characterized by a small space, with only a small climbing frame that has a slide, a platform with obstacles on its surface and a tunnel at the bottom. In this context, some children played hide and seek, others played on the slide, and others played with the assistant teacher, while João walked around, towards the gate, climbed and slid without, however, engaging in any play with his classmates or the teacher.

In relation to the three complete IE, it is understood that the teacher performed few mediations among the children in the schoolyard situation. João behaved in this context according to his interests, addressing the available objects and toys, demonstrating initiatives towards them and also actions necessary to manipulate the items.

Considering the dynamics of the schoolyard, the teacher in relation to João and the children in general showed a less active participation in relation to the classroom, observing and intervening in situations where the children needed some kind of help. At the end of the filming, the teacher used verbal explanations in order to explain and draw attention so that João could look through small cracks in the toy, with the children at the bottom of it. This example of a complete IE in the schoolyard, started by the teacher and finished by João, is described below:

Teacher: She approaches João, points towards the children and says: *João, your friends are down there! Look here through the hole!* / João: Stops walking and looks through the hole toward the children. / Teacher: Still pointing, says: *Oh! Down there, look! Can you see Marina there?* / João: He moves his face closer and keeps looking towards the children. / Teacher: Looks at João, smiles and says: *"You found Marina, very well!"*. She touches John, points to the hole and continues: *"There is one more here! Come here, look!"* / João: Looks in the direction the teacher pointed, looks away at the child who goes down the slide and goes toward the slide.

During this play initiated by the teacher, João and the children responded appropriately, looking and smiling at each other. It should also be noted that this is the first year of school life for most of the children in the classroom observed, as well as João's, who has been attending school for nine months. Thus, in relation to the interactions initiated by

the teacher, it is understood that she leaves John a little freer, approaching at times when she realizes that he is more “available”, as occurred in the schoolyard situation or in his turn during the accomplishment of the task in the classroom, complimenting and encouraging interaction through feedback

- **Case 3: Mario (4 years and 10 months old)**

Filming in the classroom context recorded an activity situation in the book, namely: sticking paper balls in a number. During the filming, the children were sitting in their chairs, divided into groups of four or five students; the teacher walked around the classroom guiding the activity.

The three complete IE occurred during the activity involving the use of materials/objects. The teacher used physical support and verbal feedback in these episodes, demonstrating to the child, from compliments, the appropriate behaviors that he had performed. As an example of this, we quote: the teacher, sitting next to the child, speaks while leading the child's hand towards the little balls: *Oh, Mario, take it!* The child with the teacher reaches for the paper and takes it. The teacher says: *Go*. The child passes the paper from the left hand to the right hand and sticks the ball on the sheet of paper. The teacher says: *Cool! Very cool!*

About the teacher's behaviors, she showed physical support, verbal and gestural tips for performing the activity directed dyadically to Mario, besides pointing behaviors as she explained the activity or called his attention to continue the collage. Literature in the area indicates that adult child-directed speech is essential for development and that specifically child-directed teacher speech with ASD facilitates classroom practice and socially competent child behavior (Chang, Shih, & Kasari, 2016; Irvin, Boyd, & Odom, 2015).

In this context, on the one hand, Mario's participation during the activity was characterized by higher passive behaviors, especially in order to initiate interactions. On the other hand, Mario demonstrated understanding of the demands of the environment through adequate answers, smiles and absence of avoidance behaviors, remaining seated next to the others and making the collages, indicating that he understood the demands of the environment.

The schoolyard was the same as that described in the analysis of child 2 (João). In this context, some children played “catch”, others played going down the slide, others simply ran across the yard while Mario walked around, towards the gate, going up and down the slide without, however, engaging in any play with the children or the teacher; though he would look towards them for brief periods.

Among the 10 IEs, five of them were completed, showing Mario's participation and the mediation of the teacher. The duration of these episodes was considerably longer than in the classroom context. The interactions observed in the schoolyard context were characterized by dyadic interaction, since the teacher addressed Mario directly, inviting him verbally and non-verbally to the games, giving instructions and praising his participation. Thus, although Mario showed fewer initiative behaviors, he counted on the teacher's mediation to favor his interactions.

Considering the dynamics of the schoolyard situation, the teacher showed more behaviors directed specifically at Mario than in relation to the other children. For example, verbal explanations sought to explain through instruction or draw his attention during the running play hand in hand with him, initiated by the teacher, encouraging him to climb the stairs, run across the platform and down the slide, along with the other children. This play occurred over and over, characterizing most of the minutes of filming in the schoolyard.

At the aforementioned moment, Mario responded appropriately to the teacher and also showed initiative, since during the breaks given by the teacher in this playing situation, he initiated actions such as: climbing the slide, running down the platform, or even running again towards the stairs, evidencing starting the game again. However, in both contexts, there were few behaviors of the other children directed to Mario. It is understood that, although the teacher performed different types of mediations and feedbacks, these were directed to Mario in isolated terms, not in interactional terms.

Thus, it is emphasized that, just as the teacher performed mediations favoring Mario's behaviors directed at tasks, objects, actions or plays, she should also perform mediations in order to bring children closer, enhancing social interaction, since it seems to be an emerging area in Mario – emerging in the sense that the child, while unable to do it alone, provides clues from his behavior and characteristics that, with help, he would do it. The following is an example of a complete classroom IE during a structured activity:

Mario: Looks at the book, runs his hand over the glue and makes a face./ Teacher: Lightly leads Mario's hand to the shredded papers and says: *Let's go, Mario! Sit up right! Take the paper, stick it in!* / Mario: Looks at the task, takes the paper, glues it and takes his hand away. / Teacher: *Very good! Look at Mario's, it's getting pretty!* / Mario: Smiles / Teacher: Points to the shredded paper and says: *Go, Mario, get the other one!* / Mario: Takes another piece of paper, glues it and rubs his fingers over the glue./ Teacher: *Let's go, Mario! Take more!* / Mario: Takes another paper, glues it, looks at the task and smiles./ Teacher: *Yeab! Get more!* / Looks at Mario's task, smiles and claps./ Mario: Claps his hands and smiles. Looks toward the teacher and looks at the assignment./ Teacher: Points to the papers and says: *Go, get more!* and addresses the other child.

Regarding contexts and peer interactions in school inclusion situations, studies (Sanini, Sifuentes, & Bosa, 2013; Schmidt et al., 2016; Watkins et al., 2015) state that, on the one hand, both free contexts and directed contexts can promote the social development of children with ASD, but the freest ones tend to be longer lasting and more spontaneous. On the other hand, authors such as O'Hara and Hall (2014) argue that free environments such as the schoolyard can be used as settings for interventions based on the structuring of the environment and graduated orientations, since it was observed from empirical data that only in the presence of teachers and other children the interactions and engagement of children with ASD with their peers is lower.

- **Case 4: Hugo (5 years old)**

The classroom context shoot recorded a directed activity situation regarding a dictation of numbers. During the filming, the children were sitting in their chairs, grouped at

small tables, along with other children. The teacher, standing, walked around the classroom while calling the children's attention to the activity.

Regarding the complete IE (10), it is noteworthy to point out that many of them happened due to the activity avoidance behavior demonstrated by Hugo, who avoided the activity, but returned and executed it in response to the teacher's verbal and non-verbal requests/mediations, characterizing the interactional episodes. In this dynamic, the teacher used, in relation to the typical children as well as Hugo, the same instructions to perform the activity; although with Hugo, she directed it dyadically due to avoidance behaviors. Then, the teacher approached Hugo inviting him to get up from the floor and return to the table to do the activity.

Specifically in relation to Hugo, during the activity, there were times when he got up and left his chair, going to the floor, lying down and staying there until the teacher led him back to the activity table where the other children were. Although Hugo showed avoidance behaviors, needing the teacher's mediation to perform the activity, he also demonstrated to respond appropriately to the mediations and instructions directed to him.

In relation to the children, during the minutes observed and recorded through the filming, they were not observed behaviors directed specifically to Hugo. This may have been due either to the presence of an observer, the context of individual activity requested or the avoidance behaviors. However, it should be noted that, on the same day, at other times that Hugo showed greater availability, the children showed greater interaction. At the end of the task and before going to the schoolyard, the children were left without directed activities, some put their materials away, in their bags, others finished the activity, and others gathered in a queue to then go to the yard. At this moment, Hugo addressed the children who were close to a mirror and there were, both, behaviors of affection, such as touches, hugs and smiles, and an invitation without mediation by the teacher, when they touched Hugo's hand bringing him closer to them or showing and sharing a toy, for example.

Given the above, we agree with authors such as Lemos, Salomão, Aquino and Agripino-Ramos (2016), Martins e Monteiro (2017) and Schmidt et al. (2016) who highlight the role of school for children with ASD and the importance both in relation to socialization and learning of these children. As described earlier, Hugo presented behaviors that indicate both social and academic learning, since he wrote the numbers from the teacher's instruction, as well as understanding the context clues and spontaneously addressing himself with the group. However, notably, he needs mediation and the learning of other skills that favor his school life. In this direction, Sanini, Sifuentes e Bosa (2013) point to regular school as a context in which the child with difficulties finds more advanced models of behaviors to follow.

Filming was done in the schoolyard, a large open area with different toys and sand on the floor. During the filming, the children went to different toys, some alone and some in small groups. At that moment, there were other classes also using the same space. The teacher walked around the yard watching and approaching the children when they needed help.

The situation of the schoolyard was characterized by little behavior of the teacher to perform mediations that favored social interactions between children in general, she observed

them at a distance, approaching in case anyone requested. About the only complete IE observed in the schoolyard situation, it is noteworthy that it was characterized by the initiative and continuity of the child with typical development, during play and a toy of Hugo's interest and in a dyadic situation.

Regarding Hugo's behaviors, we point out that he showed interest in the swing and seesaw, and this can be analyzed from initiative behaviors directed at these objects. Much of the schoolyard situation was characterized by swing play, with no evidence of interactions with peers at these times. However, to play with the seesaw, another child is needed, and Hugo, although looking at people, showed no initiatives directed at them, denoting the need for mediation. However, one of the children noticed and made an invitation with no teacher's mediation to play on that apparatus. During the play, there were exchanges of looks and demonstrations of affection of the child with typical development directed to Hugo. It is interesting to note the respect, sensitivity and empathy shown during that play by the child with typical development. This child, when observing Hugo's non-verbal behaviors, started, continued and ended the play asking after a few minutes: "Do you want to stop?". At this moment Hugo looks at her and comes down from the seesaw, and headed for another toy.

When analyzing the situation described, Camargo and Bosa (2009) and Irvin, Boyd e Odom (2015) stated that inclusion of children with ASD in regular schools provides, on the one hand, social contacts favoring their development and that of other children, as they live and learn from differences. On the other hand, to Kasari, Locke, Gulsrud and Rotheram-Fuller (2010), the schoolyard, although it is a good setting for social skills interventions, it seems to be more difficult for the child with ASD because it is often chaotic and crowded.

In general terms, the teacher showed few mediations directed at Hugo. Although it showed avoidance behaviors when requested by the teacher in situations related to the task, the same may not happen in freer situations, such as the schoolyard. Thus, the teacher could use the most pleasurable situations for the child, in order to establish contacts with him, providing a bond that could possibly extend to other contexts and situations. The following example demonstrates a full classroom IE initiated by a typically developing child directed at the child with ASD and completed by the teacher. It consists of a sequence of actions that resemble a way of greeting:

Child: Reaches his hand out towards Hugo./ Hugo: Looks towards the child's hand and hits his hand./ Child: Raises his thumb toward Hugo./ Hugo: Imitates the action with his thumb, looks towards the child's hand, approaches and closes his hand towards the child's hand / Child: Imitates the action, lowers his thumb, closes his hand and looks at Hugo./ Hugo: Looks towards the child's hand and hits him with his hand. With the opposite hand and thumb extended, he hits the child's hand./ Child: Looks at Hugo and stays with his hand closed towards him./ Hugo: Looks at the child's hand, imitates the action and hits the child's hand. / Child: Looks at Hugo and stretches his index finger towards him./ Hugo: Looks at the child's hand and touches his finger./ Teacher: Behind Hugo, puts both hands under his arms, helps him to sit down and says: *Let's finish!*

That being said, Sanini, Sifuentes e Bosa (2013) reveal that research on school inclusion and social interactions of children with ASD in natural environments has shown

encouraging results. The authors highlight the importance of addressing the symptomatology of children with ASD, in terms of adaptive, social, cognitive and linguistic levels.

4 FINAL CONSIDERATIONS

Given the aspects addressed, the importance of social interaction for the acquisition of skills related to child development is emphasized. From the case studies presented, we understand the benefits of school inclusion in terms of both atypical children and other children, who develop skills related to tolerance, respect and empathy through school experiences. Based on the data and discussions presented, it is intended to contribute to consider the participation of children with ASD in school interactions, in order to understand how they interact and through which mediations.

We understand that the difficulties imposed by the ASD do not necessarily constitute limitations that completely prevent interactions. Although it is not possible to establish correlations between behaviors and contexts, nor is the objective of the present study, it is important to analyze social interactions in these scenarios, verifying the participation of children with ASD and their peers, considering the context, the type of activity, the teachers' mediation and the mutual influences from the concept of bidirectionality.

When considering the data of this study, in general, we found that it was common to the IEs that completed dyadic verbal and non-verbal mediations addressed directly to the child with ASD and use of objects, mostly among teachers and children with ASD. Interactive exchanges were observed less frequently between peers, suggesting the importance of teachers' mediation from a more interactionist perspective, balancing the situations in which they directly address the child with ASD and those that address the other children favoring joint activities.

Regarding the participation of children with ASD and their peers, the following aspects were highlighted: children with typical development did not demonstrate avoidance behaviors and addressed children with ASD more frequently during free classroom activities. Variations were observed in terms of the characteristics of each class, the children in general, as well as the characteristics of the disorder and its respective degree of impairment.

For example, in some cases children with ASD showed greater functionality in their behavior and less interaction; in others, they showed more appropriate response behaviors and less initiative; or greater impairment in verbal comprehension or functional language use and less impairment in socialization or academic behaviors. Finally, for each of these peculiarities, the role of appropriate mediation is emphasized in order to enhance social interactions.

From the limitations of this study, we suggest that further research with observational methodology be carried out, contemplating a larger number of observations, in order to minimize the influence of the presence of the observer. The participation of independent judges for the analysis is also suggested. We should emphasize that other studies may consider the children's verbal behaviors in the analysis, and also that additional instruments involving assessment of the characteristics of the child with ASD are used, since the scale used in this study is more directed to identifying the degree of impairment.

We highlight the relevance of this study, since there are few researches with observational methodology in naturalistic contexts in this area, especially those that address school contexts and classroom and schoolyard situations. We also emphasize that the presentation of data from case studies favored a greater understanding of the inter-influences between the analyzed aspects. We hope that the data can provide evidence for research, evaluation and intervention in the area of school inclusion of children with ASD, in order to favor strategies that promote interactions among them and their peers, as well as reflections on the role of mediations in the development of children with ASD.

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