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Original Article

Perception of sensory processing in children with autism spectrum disorder: influences of age, family education, and professional education

Percepção sobre o processamento sensorial em crianças com transtorno do espectro autista: influências de idade, educação familiar e formação profissional

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Abstract

Autism spectrum disorder (ASD) is currently considered a complex behavioral disorder characterized by deficits in social communication and restricted and repetitive behaviors, interests, and activities. Studies indicate that 40% to 80% of children with ASD exhibit sensory processing alterations, which manifest as difficulties in appropriately responding to sensory stimuli. This study aims to analyze parents' and professionals' perceptions of the sensory processing of children with ASD, aged 3 to 6 years, and to investigate whether sociodemographic and professional variables influence the sensory processing development profile of these children. This is a quantitative and inferential study using the Assessment Scale for Children with Autism Spectrum Disorder validated in Portugal as its data collection instrument. The study included 50 family members and 50 professionals. The results indicate discrepancies between parents' and professionals' assessments of the children. Therapists assess the sensory processing dimension more positively than parents do. The sociodemographic profile shows that children with ASD are referred by physicians for early intervention and are attended to by multidisciplinary teams. Most professionals in these teams have education in ASD; however, few have specific education in early intervention or sensory integration. No statistically significant influence of socioeconomic variables was found.

Keywords: Autism Spectrum Disorder, Early Intervention, Educational, Perception, Occupational Therapy.

Resumo

O transtorno do espectro autista (TEA) é atualmente considerado um distúrbio complexo do comportamento, caracterizado por déficits na comunicação social e

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por comportamentos, interesses e atividades restritos e repetitivos. Estudos indicam que de 40% a 80% das crianças com TEA apresentam alterações no processamento sensorial, manifestadas pela dificuldade em responder adequadamente a estímulos sensoriais. Este estudo tem como objetivo analisar a percepção de pais e profissionais sobre o processamento sensorial de crianças com TEA, de 3 a 6 anos, e investigar se variáveis sociodemográficas e profissionais influenciam o perfil de desenvolvimento sensorial dessas crianças. Trata-se de uma pesquisa quantitativa e inferencial, cujo instrumento de coleta de dados foi a Escala de Avaliação do Perfil de Desenvolvimento de Crianças com Perturbações do Espectro do Autismo, desenvolvida e validada em Portugal. A mostra do estudo foi composta por 50 familiares e 50 profissionais. Os resultados indicam divergências nas avaliações feitas pelos pais e pelos profissionais. As terapeutas avaliam mais positivamente a dimensão do processamento sensorial em comparação com os pais. O perfil sociodemográfico aponta que as crianças com TEA são encaminhadas por médicos para a intervenção precoce e atendidas por equipes multidisciplinares. A maioria das profissionais dessas equipes tem formação em TEA; no entanto, poucas apresentam formação específica em intervenção precoce ou integração sensorial. Não houve influência estatisticamente significativa das variáveis socioeconômicas.

Palavras-chave: Transtorno do Espectro Autista, Estimulação Precoce, Processamento Sensorial, Terapia Ocupacional.

Introduction

The evaluation of child development in early intervention is marked by its complexity, requiring a set of knowledge from different disciplinary fields, as well as the active and collaborative participation of the family throughout the process (Pereira et al., 2020). The Division for Early Childhood (2014) emphasizes that assessment is a critical aspect of services for children with disabilities or developmental delays, as it aims to screen and define service eligibility, as well as plan interventions and monitor achieved goals. In this regard, the family is considered a key element throughout this evaluation process and in future intervention.

In the case of children with autism spectrum disorder (ASD), the situation becomes even more complex. This complexity arises from the fact that these children present social, communication, and behavioral difficulties. Relevant information can be obtained through family reports and experiences, both to collect authentic data about the child and to promote better levels of interaction between the child and their interlocutors (Reis et al., 2016).

Reis et al. (2017) point out that in evaluation processes within early intervention programs, the materials and procedures used to assess children with ASD present challenges, as these children may have difficulty demonstrating their skills in different contexts. Assessments conducted by professionals unfamiliar to the child, as well as tests administered in often unfamiliar environments, generate apprehension for both the child and their family members (Bagnato, 2008). In this sense, evaluation scales, observation processes, and information provided by parents and/or caregivers complement the data obtained and enable a more realistic understanding of the child's skills and behaviors (Reis et al., 2017).

Additionally, Marques & Bosa (2015) highlight difficulties in using international instruments in this field, as their application requires high-cost training, they include broadly defined categories and rely essentially on information provided by caregivers. This factor may be a limitation, considering that some caregivers have low levels of education, making it necessary for the professional to relate the data obtained to the clinical observation of the child.

Regarding the assessment of sensory processing, Caminha & Lampreia (2013) emphasize that most studies on the topic use questionnaires administered to caregivers. Among the most used instruments are the Sensory Profile (Dunn & Westman, 1995), the Short Sensory Profile (Dunn, 1999), and the Infant/Toddler Sensory Profile (Dunn, 1999; Ben-Sasson et al., 2009). Other instruments, such as the Sensory Sensitivity Questionnaire-Revised (Talayongan & Wood, 2000), the Sensory Experiences Questionnaire (Baranek et al., 2006), and the Evaluation of Sensory Processing (Johnson-Ecker & Parham, 2000), are also used, though less frequently (Caminha & Lampreia, 2013).

In this context, it is necessary to deepen studies and develop assessment tools that consider the diversity of families of children with ASD, considering their composition and specificities. These tools should allow for the active and interactive participation of professionals and family members, providing a shared and more realistic view of the child.

Thus, it becomes essential to include the family in the assessment process. By reporting the skills, interests, capacities, and difficulties of the child with ASD, the family contributes to the assessment and intervention process, providing information that helps the professional choose the most appropriate assessment tool, define the objectives of the intervention plan, and determine action strategies (Reis et al., 2016).

In studying sensory integration difficulties in childhood, occupational therapists have stood out since the 1960s, when Ayres (1969, 1972) introduced a new understanding of child development. The literature describes vulnerabilities in sensory integration and its negative impact on children's participation in their occupations and daily routines, including sleep, eating, hygiene, learning, play, and socialization (Bundy & Lane, 2020; Lucas et al., 2023).

Sensory processing is inherent to human development and refers to the responses and interpretations individuals give to daily sensory experiences. It influences self-regulation ability, social interaction, and the development of adaptive behavioral skills, and may be influenced by genetic, cultural, and environmental factors (Loh et al., 2021). Sensory integration dysfunctions refer to the brain's inability to register, modulate, and differentiate sensory stimuli to generate an adaptive response. This difficulty can significantly impact the child's life, resulting in challenges in using sensory information in everyday life. Such difficulties are reflected in functional impairments, such as reduced social participation, difficulty engaging in occupations, emotional dysregulation, challenges in basic activities of daily living, complications in family and school relationships, as well as delays in neuropsychomotor development and learning (Araújo et al., 2021).

Children with ASD display various specificities in their daily occupations within the family environment because of the heterogeneous clinical manifestations of the disorder. The variety of symptoms and atypical behaviors can impact different occupational areas, including activities of daily living, sleep, education, and play (Kuhaneck et al., 2015). Additionally, these children may not respond when called by name, may show inflexibility toward certain sounds and/or take pleasure in atypical and repetitive stimuli.

Some show food selectivity, rigidity in routines, excessive restlessness, or agitation (Posar & Visconti, 2018).

In Brazil, studies conducted by occupational therapists on sensory integration and its importance in family and school contexts have expanded research in the field (Rocha et al., 2023; Souza & Nunes, 2019; Oliveira & Souza, 2022; Barros et al., 2023).

In this context, it is essential to understand how parents and professionals assess sensory processing difficulties in children with ASD, aged three to six years, who are enrolled in early intervention programs.

This article aims to present and discuss the results of a study involving parents and professionals regarding their perception of the sensory processing of children with ASD. To this end, the Assessment Scale for Children with Autism Spectrum Disorder (EACTEA) was used as the evaluation tool. The scale was validated in Portugal and was developed with the participation of parents and family members in the evaluation process (Reis et al., 2016).

The EACTEA aims to outline the assessment profile of children with ASD and to monitor the results obtained through the therapeutic intervention to which these children are subjected. The authors emphasize that, for this purpose, it is essential that the scale has properties of precision and validity, minimizing the subjectivity of a descriptive evaluation of child development (Reis et al., 2016).

Method

This is a quantitative, descriptive, and inferential study, as it aims to quantify the number of elements that describe a data set or one or more situations and analyze the relationships between variables (Mussi et al., 2021). The research hypotheses were formulated based on the questions under investigation.

Research questions and hypotheses

Given the current context and aiming for a more comprehensive and specific evaluation of the population with ASD, this study used the EACTEA questionnaire, applied to family members and professionals of children aged 3 to 6 years diagnosed with ASD. The study was based on two main questions:

1. Is there a degree of differentiation in the perception of parents and professionals regarding the sensory processing of children with ASD in this age group?
2. Do different sociodemographic and professional variables influence the assessment of the developmental profile of children with ASD regarding sensory processing?

The hypotheses were organized according to the main variables of the study, related to the characteristics of the children, families, professionals, and the instrument used, as follows:

- (H1) There are differences in the perception of parents and professionals regarding the sensory processing development of children with ASD aged 3 to 6 years;
- (H2) The child's age influences the perception of their sensory processing development;
- (H3) The educational level and professional background of parents influence their perception of the sensory processing development of children with ASD;

- (H4) The professional background of practitioners influences their perception of the sensory processing development of children with ASD.

Participants

The sample consisted of two groups: the first formed by a family member and/or primary caregiver of the child with ASD, aged 3 to 6 years, and the second formed by a reference professional responsible for the child's intervention.

✓ 50 family members/primary caregivers of children with ASD aged 3 to 6 years;

✓ 50 professionals working in early intervention with these children.

The inclusion criteria for caregivers were being parents or other guardians with knowledge of the child's development. For children, the inclusion criteria were being aged 2 to 5 years and having a diagnosis or being in the process of being diagnosed with ASD. For professionals, the inclusion criterion was providing care to or being the reference therapist of the participating child. Children with other associated comorbidities, such as syndromes or other diagnoses, were excluded from the study.

It is worth noting that the research was conducted during the COVID-19 pandemic. In Brazil, public services were encouraged to suspend in-person care, while only private initiatives, such as private clinics and therapy offices, maintained services, depending on each family's needs and decisions. In this context, the study used a convenience sample, with the participation of private institutions. Data were collected between 02 February 2021 and 10 January 2022.

Eight services providing care to children with ASD in the municipality of Santos, state of São Paulo, Brazil, were contacted. In cases of acceptance, the service was asked to provide professionals and family members with questionnaires, in separate envelopes—one addressed to a family member and another to the reference therapist working with the child. The questionnaires were completed and later returned to the researcher.

Three private clinics and one public-private clinic located in Santos agreed to participate.

The EACTEA, developed and validated in Portugal by Reis (2014), was used as the collection instrument. This scale has a multidimensional character and includes four dimensions: interaction, verbal and non-verbal communication, repetitive behaviors and interests, and sensory processing.

The EACTEA assesses the dimension of social communication through 16 items, sensory processing through 14 items, and behavior and interests through 9 items. It uses a five-point Likert scale with the following response options: never or almost never, occasionally or sometimes, often, and almost always or always. There is also an additional option to indicate a lack of information when the behavior cannot be observed or does not apply to the child. The intermediate category—occasionally or sometimes—was included considering that children with ASD do not always exhibit consistent responses.

In the sensory processing dimension, the items related to various sensory systems were developed based on Dunn (2007) four quadrants: poor registration, sensory seeking, sensitivity, and avoidance (Reis et al., 2013).

In addition to the EACTEA, two sociodemographic questionnaires were developed to characterize the profile of participants: one intended for family members and another for professionals. The questionnaire for family members included aspects such as identification of the primary caregiver, relationship with the child, caregiver's educational level and

occupation, referral of the child to intervention, follow-up duration, weekly therapy hours, intervention context, and specialties of the professionals working with the child. The questionnaire for professionals included questions about their profession, academic background, years of experience in the field, and time working with the participating child.

This study was conducted in accordance with Resolution no. 466/12 and was approved by the Research Ethics Committee for Human Subjects of the Federal University of São Paulo (UNIFESP) under protocol no. 3.977.812. After the research objectives were explained, participants signed an Informed Consent Form.

Data analysis

Descriptive statistical analysis was used to process the data obtained. In the descriptive analysis of sociodemographic data, categorical variables were presented as absolute and relative values, while numerical variables were described using mean, standard deviation, and minimum and maximum values. To compare the children's sensory processing scores based on the perceptions of family members and professionals, an inferential analysis was conducted using the paired-sample Student's t-test. A significance level of 5% ($p<0.05$) was adopted for all statistical analyses.

Results

The presentation of the results begins with the identification of the sociodemographic profile of the families and children, related to the first objective of this study, which enabled the characterization of the children's main caregivers and their support network, considering the social context. The family sociodemographic profile revealed that 94% of respondents were the child's primary caregiver, and among them, 78% were mothers, with a mean age of 36.8 years.

Regarding educational level, 38% of participants had not completed elementary or high school, while 62% had completed high school or higher education, or were currently enrolled in higher education. As for occupation, 26.5% of respondents reported working in domestic services.

Most families (76%) identified as nuclear families, followed by 22% single-parent families, and 2% blended families. Among these families, 66% had only one child, 30% had two children, and 4% had three children. The average age of the children participating in this study was 54.22 months, or between four and four and a half years.

Concerning referrals to the early intervention team, 80% of the children were referred by a physician. It should be noted that, in the context of this study, the participating clinics required a medical referral and/or ASD diagnosis for admission.

For 64% of the sample, the length of time in early intervention ranged from one to three years. Weekly therapy hours mostly ranged from one to five hours, corresponding to 62% of the children.

Regarding the place of intervention, 91.8% of the children were seen at the institution, while only 6.1% received home-based care. This model of intervention is widely used in Brazilian clinical practice, despite the importance of intervention in other natural contexts of the child. However, health insurance and the Brazilian Public Health System (SUS) do not cover this type of home-based care, except for children with severe clinical conditions that justify such a need.

As for the professionals working with the children, 96% formed a basic team as defined by law, composed of an occupational therapist, a psychologist, and a speech-language pathologist. Additionally, 36.7% of the children received care from a physician and 18% were assisted by an educator. Among the professionals who responded to the study, there were 15 occupational therapists, 24 psychologists, nine speech-language pathologists, one educator, and one music therapist.

To assess the qualifications of the professionals caring for the children in this study, a sociodemographic questionnaire was applied to gather information on their education and experience in the field. The average length of care provided to the children in the study was 9.74 months. Regarding experience in the field, 45% of the professionals had up to 24 months of experience. Concerning the profile of the professionals involved, it was found that 78% of the children were being followed by psychologists and occupational therapists.

In relation to the education of the participating professionals, 74% did not have specific education in early intervention or sensory integration. Specifically among the occupational therapists participating in this study, none reported holding full certification in sensory integration.

Presentation of inferential results

Hypothesis 1 – There are differences in the perception of parents and professionals regarding the sensory processing development of children with ASD aged 3 to 6 years.

To evaluate differences between the perspectives of family members and professionals, the responses to the EACTEA questionnaire are presented below. Descriptive analysis of the data was performed, with categorical variables presented as absolute and relative values, and numerical variables described using mean, standard deviation, and minimum and maximum values. The higher the mean value, the greater the difficulties presented by the child in that item (Reis, 2014), as shown in Table 1 below.

Table 1. Descriptive statistics of the sensory processing questionnaire items according to professional and family member.

Items	Professional		Family member	
	Mean*	Std. deviation	Mean*	Std. deviation
Q1	1.84	1.06	2.90	1.39
Q2	2.70	1.42	2.92	1.28
Q3	1.66	1.00	2.04	1.18
Q4	3.42	1.28	3.30	1.40
Q5	2.30	1.47	2.74	1.54
Q6	1.86	0.99	2.30	1.36
Q7	2.64	1.29	2.46	1.11
Q8	2.50	1.42	3.34	1.51
Q9	2.20	1.18	3.52	1.37
Q10	2.20	1.26	2.32	1.48
Q11	1.82	1.26	2.00	1.32
Q12	2.34	1.41	2.86	1.48
Q13	1.82	1.22	2.58	1.37
Q14	1.38	0.64	1.78	1.17

*The higher the mean value, the greater the difficulties presented by the child in that item. Source: Prepared by the authors, 2022.

Table 1 shows that family members reported the greatest difficulties in items Q2 (Enjoys watching spinning or shiny/light-up objects), Q4 (Has trouble focusing in visually stimulating environments), Q8 (Seeks contact with surfaces or people), and Q9 (Shows discomfort during daily hygiene tasks such as haircuts or washing) These results indicate that family members perceive greater difficulties related to these sensory dimensions.

In the "Professionals" column, the items evaluated by those who work directly with the children as most compromised are, respectively, Q2 (Enjoys watching spinning or shiny/light-up objects), Q4 (Has difficulty paying attention in environments with a lot of visual information), and Q7 (Is easily distracted by background noises, such as a lawn mower, airplane, or passing car).

It is worth noting that item Q4 shows high mean values and is similarly emphasized by both professionals and family members. This convergence supports both groups' perceptions regarding the child's difficulty in maintaining attention in environments where there is an overload of visual information and/or in visual contexts that the child cannot adaptively integrate.

Regarding the comparative analysis between family and professional perceptions on the sensory processing dimension in children with ASD aged 3 to 6 years, a statistically significant difference was found ($p<0.001$) between the scores given by family members ($M = 37.06$; $SD = 9.03$) and by professionals ($M = 30.68$; $SD = 8.96$). Thus, it is evident that families report greater sensory processing difficulties, with higher average scores compared to professionals' evaluations.

Question 2 – Do the sociodemographic variables of family members and professionals influence the sensory processing developmental profile in children with ASD aged 3 to 6 years?

Hypothesis 2 – The child's age influences the perception of their sensory processing development.

There was no evidence of a statistically significant difference between the two age groups for the scores given by professionals ($p=0.424$) or by family members ($p=0.845$), as shown in Table 2. This result indicates that families and professionals do not report differences in the assessment of sensory processing in children between the age groups of 3 to 4 years and 5 to 6 years.

Table 2. Descriptive statistics and comparison of sensory processing scores by professionals and family members according to the child's age group.

Family member scores	**3-4 years**	**5–6 years**	**Difference**	**95% CI**	**p**
Mean	31.48	29.37	2.11	(-3.15; 7.39)	0.424
SD	9.01	8.96			
Min	14.00	18.00			
Max	46.00	59.00			
Professional scores	3–4 years	5–6 years	Difference	95% CI	p
Mean	37.26	36.74	0.52	(-4.82; 5.87)	0.845
SD	9.57	8.32			
Min	20.00	22.00			
Max	68.00	50.00			

SD: standard deviation; CI: confidence interval.

Hypothesis 3 – The educational level and professional background of parents influence their perception of the sensory processing development of children with ASD.

To examine whether the difference between the sensory processing scores given by family members and professionals varies according to the family member's occupation and educational level, the differences between the family member's score and the professional's score were calculated, and an independent samples Student's t-test was performed, as shown in Table 3 below.

Table 3. Descriptive statistics and comparison of sensory processing scores between family members and professionals according to the family member's occupation.

	Group 1 to 3	Group 4 to 5	Difference	95% CI	p
Mean	6.60	6.16	0.44	(-5.51; 6.39)	0.882
SD	10.49	10.43			
Min	-10.00	-19.00			
Max	31.00	26.00			

SD: standard deviation; CI: confidence interval.

Table 4 reveals no statistically significant differences in sensory processing scores between family members and professionals when the family member's educational level is considered. However, the mean values suggest that those reporting greater difficulties in the child's sensory processing tend to have lower levels of education compared to the professionals.

Table 4. Descriptive statistics and comparison of sensory processing scores between family members and professionals according to the family member's educational level.

	Complete/incomplete Elementary School and/or High School	Completed/Incomplete High School or Higher Education	Difference	95% CI	p
Mean	7.79	5.52	2.27	(-3.82; 8.37)	0.457
SD	9.17	11.08			
Min	-11.00	-19.00			
Max	26.00	31.00			

SD: standard deviation; CI: confidence interval.

Hypothesis 4 – The professional background of practitioners influences their perception of the sensory processing development of children with ASD.

To determine whether the difference between sensory processing scores assigned by family members and professionals varies according to the professional's education in ASD and sensory integration (SI), the differences between the family and professional scores were calculated, and an independent samples Student's t-test was performed.

Concerning ASD-specific education, the results presented in Table 5 show no significant differences in sensory processing scores between family members and professionals when the professional's education in ASD is considered. Furthermore, the mean values were similar for professionals with and without specific ASD education, suggesting that ASD-related education did not influence the scores reported by professionals in this sample.

Table 5. Descriptive statistics and comparison of sensory processing scores between family members and professionals according to professional education in ASD.

	No	Yes	Difference	95% CI	p
Mean	**6.42**	**6.37**	**0.05**	**(-6.92; 7.02)**	**0.989**
SD	11.26	10.22			
Min	-11.00	-19.00			
Max	26.00	31.00			

SD: standard deviation; CI: confidence interval.

Discussion

The results of this study show that parents of children with ASD rate them less positively regarding sensory processing. It is important to highlight that this research was conducted during a challenging period for society, with significant impact on the everyday lives of children with ASD and their families. The COVID-19 pandemic led to social distancing and forced families to remain at home. This situation may have triggered behavioral changes in both children and their families (Almeida et al., 2023).

Nevertheless, even within this adverse context, the scale used in this study includes activities that are part of children's routines, allowing family members to reflect on changes in their children beyond the pandemic period.

Reis et al. (2017) found that professionals rated children less positively than parents did, which contrasts with the findings of the present study. One possible explanation for this difference in perception between families and professionals may relate to the lack of education among professionals regarding sensory processing alterations. Another factor to consider is that families spend more time with the child than therapists do, experiencing more directly the daily challenges (Allen et al., 2025).

Another contributing factor may be the fact that most interventions occur in therapeutic settings. These environments tend to be more controlled, which limits children's exposure to diverse sensory stimuli and, consequently, reduces the likelihood of observing behaviors associated with sensory processing difficulties. Studies conducted in naturalistic and family environments are essential for more accurate observation of children's behaviors. In general, therapeutic settings follow standardized protocols with structured teaching, designed for targeted intervention, adopting a prescriptive treatment approach. Although this type of treatment can be effective in managing challenging behaviors, its success often depends on controlled environments and may not produce the same outcomes—or may even be unsuitable—within natural and familial contexts (Moes & Frea, 2000).

In contrast, assessments conducted in children's real-life settings, such as at home and in school, are referred to by Bagnato (2008) as authentic assessments, as they allow observation of the child's skills, knowledge, and behavior while performing meaningful tasks in familiar environments.

According to Reis et al. (2016), other factors also contribute to authentic assessments, including the involvement of parents, educators, and other individuals who interact with the child. Thus, the assessment process for children with ASD is complex and can be challenging, especially because it is common for these children to have difficulty generalizing skills and capacities across different contexts (Bagnato, 2008).

Hypothesis 2, which investigated whether age influences perceptions of sensory processing development in children with ASD aged 3 to 6 years, found no statistical difference between the two age groups in the scores assigned by either professionals or family members. Research in this field suggests that, from an early age, children with ASD demonstrate atypical sensory responses (Tomchek & Dunn, 2007).

This result agrees with findings by Silva (2014). However, this author notes that although the results were not statistically significant, the correlation coefficient indicated a negative trend, in which the total mean score decreased with age. In other words, as children grow older, they exhibit fewer behaviors indicative of sensory processing difficulties. Bringing this interpretation into dialogue with the literature, Dunst (2002) suggests that as intervention progresses, professionals increase families' knowledge and provide new strategies to support child development. This ongoing relationship may help explain the growing alignment between professional and family assessments in older children (Dunst, 2002).

Hypothesis 3, which examined whether the educational and professional background of family members influences their assessments of sensory processing, revealed no statistically significant differences between scores assigned by family members and professionals according to family education level. However, analysis of mean scores showed that families reporting greater sensory processing difficulties in their children tend to have lower educational levels than the professionals.

Results from the study by Silva et al. (2016) indicated that the educational and professional levels of family members did not influence the assessment of sensory processing in children with ASD. However, this author highlights that individuals with higher educational levels generally hold more qualified, higher-paying jobs, while those with lower education levels tend to work in less qualified, lower-paying positions—leading to socioeconomic disparities.

Favorable socioeconomic conditions are known to improve access to goods and services. In the case of children with ASD, this can increase the likelihood of access to both therapeutic and educational services. In this study, caregivers with lower educational attainment reported greater sensory difficulties in their children. This may reflect a barrier in accessing specialized services and proper parental guidance. In the Brazilian context, social inequality can result in delayed—or even absent—access to necessary therapeutic interventions for children from lower socioeconomic backgrounds, potentially compromising their overall development.

In recent years, despite the increase in initiatives focused on early identification of ASD signs, diagnosis still tends to occur late. According to Zanon et al. (2017), Brazilian children are typically diagnosed around age five, although parents and/or caregivers usually notice the first signs around age three. This gap between early signs and formal diagnosis suggests delayed support and highlights the need for actions that reduce this waiting time.

Hypothesis 4, which investigated whether professional education in ASD influences the perception of sensory processing development in children with ASD aged 3 to 6 years, revealed—as shown in Table 5—no significant differences in scores assigned by family members and professionals based on whether professionals had ASD-specific education.

Fregnan (2020) argues that lack of knowledge among professionals working with children with ASD may stem from gaps in academic education, lack of training, and

limited understanding of child development, or from inappropriate use of screening tools. According to this author, access to ongoing education and professional development is essential to minimize these shortcomings. In this regard, offering effective education programs can equip professionals with the foundational knowledge needed for high-quality intervention.

The literature underscores the effectiveness of continuing education programs in ASD for enhancing care from early childhood (Fregnan, 2020; Ranalli, 2017; Steyer et al., 2018). Therefore, considering that initial education may have gaps, it is reasonable to infer that professionals with less specialized education may have less accurate perceptions of the behaviors and characteristics associated with a complex condition like ASD.

Conclusion

Sensory processing difficulties negatively impact on several areas of child development, hindering the use of essential sensory information for functionality and participation in activities of daily living (Jorquera-Cabrera et al., 2017; Mattos, 2019; Silva et al., 2016). Given this influence, it is essential that assessment occur as early as possible and include the active participation of the family.

The results of this study indicated a significant divergence between the perceptions of caregivers and professionals regarding the sensory processing of the same child. The items with the highest mean scores reported by family members were Q2 (Enjoys watching spinning or shiny/light-up objects), Q4 (Has difficulty paying attention in environments with a lot of visual information), Q8 (Seeks contact with surfaces or people nearby), and Q9 (Expresses discomfort during daily hygiene – cries or screams when getting hair or nails cut, or when having face or hair washed), suggesting that family members perceived greater difficulties in these areas.

According to professionals, the most compromised items were Q2 (Enjoys watching spinning or shiny/light-up objects), Q4 (Has difficulty paying attention in environments with a lot of visual information), and Q7 (Is easily distracted by background noises, such as lawn mowers, airplanes, or passing cars).

Notably, both groups identified item Q4 as a shared concern, reinforcing the joint perception that children with ASD have difficulty maintaining attention in visually overstimulating environments or contexts that they cannot process adaptively.

The comparison between family and professional perceptions of sensory processing in children with ASD aged 3 to 6 years revealed a statistically significant difference in scores. Families reported greater difficulties, assigning higher average scores compared to professionals.

Parental involvement in the assessment process allows for greater accuracy and validity of results, as well as a better understanding of the child's skills, interests, and functional abilities in daily routines (Macy et al., 2019). Occupational therapists and other professionals should therefore encourage active family participation, fostering regular and effective communication to contextualize the child's challenges and strengths and to define priority goals for intervention (Lemire et al., 2019).

This difference in perception may be related to the fact that families spend more time with the child than therapists do, directly experiencing everyday challenges. Additionally,

professionals may rate children more positively because of the controlled nature of the therapeutic setting, which reduces exposure to a variety of sensory stimuli and may limit the manifestation of behaviors indicative of sensory processing difficulties.

These findings underscore the importance of incorporating natural settings—such as the home environment—into both the assessment process and the structure of early intervention services. Home-based assessment makes the process more realistic and comfortable for the child, enabling professionals to understand the family's priorities and concerns ore comprehensively, as well as the child's capabilities and challenges within their routine. This approach supports communication between professionals and families and enhances the development of children's skills (Macy, 2022; Macy & Bagnato, 2022).

Another important finding from this study relates to early intervention referrals, which were primarily made through the healthcare system, particularly by physicians. In the context of this research, participating clinics required a medical referral and/or an ASD diagnosis for children to enter intervention programs.

Regarding professional education, the study revealed a significant lack of preparation in sensory integration (SI), which may explain the more positive evaluations given by professionals in this area. Specific education could provide greater knowledge and competency in assessing this dysfunction, which is essential for supporting children with sensory processing difficulties more effectively. In this study, professionals trained in SI identified more sensory challenges than those without such training, emphasizing the importance of targeted education programs for this specific need.

Limitations of this study include the fact that it was conducted during the pandemic, a time when many institutions—particularly public ones—were closed. Another limitation was the difficulty in engaging professionals to participate, given the high demand for ASD-related services and the shortage of specialists in the field, which affected their availability for academic research.

Given the relevance of this study, future research should consider the following:

1. Expanding and diversifying the sample to strengthen and validate the results obtained, ensuring greater consistency. It is worth noting that the EACTEA remains a suitable tool for broader studies, as it is easy to administer and participants reported no difficulties completing it.
2. Extending the study to other municipalities and states across Brazil.
3. Developing new qualitative research that enables a more comprehensive understanding of the findings, especially the differences between family and professional perceptions, the issues related to education in sensory processing and early intervention, and the dynamics of service provision for this population—considering the roles of the family, therapist, and child in the intervention process.

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Luísa de Mattos Graziani Silva: study design, data collection, analysis and discussion, and writing of the manuscript. Andrea Perosa Saigh Jurdi and Ana Paula da Silva Pereira: study guidance, discussion and analysis of data, writing and review of the manuscript. All authors approved the final version of the text.

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