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Original Article

Risk identification for Autism Spectrum Disorder in preschool children: design and validation of a screening instrument

Instrumento de rastreamento para identificação de Transtorno do Espectro Autista na educação infantil (IRTEA.Educ): evidências de validade baseada no conteúdo

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Abstract

Introduction: Autism Spectrum Disorder (ASD), which has a multifactorial etiology, is primarily diagnosed through clinical evaluation. It is well established that early identification significantly contributes to a more favorable prognosis. The educational environment is conducive to screening for signs of ASD in preschool children; however, there is a lack of specific instruments designed for this purpose. **Objective:** To examine the content validity evidence of an instrument aimed at identifying signs indicative of ASD in the educational context. **Method:** The development of the instrument followed the guidelines of the *Standards for Educational and Psychological Testing* (American Educational Research Association, 2014) and of Pasquali (1998). The process involved three stages: (1) item development and submission to a panel of 15 experts in ASD, consisting of 10 occupational therapists and five speech-language pathologists; (2) assessment of item clarity by 10 preschool teachers; and (3) analysis of the revised version by two experts and six preschool teachers. **Results:** The literature review supported the development of the initial version of the instrument. In the expert panel analysis, the Content Validity Index (CVI and CVI-I) indicated high agreement among the specialists, although adjustments were necessary, resulting in a second version. The evaluation by preschool teachers revealed the need for further modifications to some items, which led to the development of a third version. Finally, the analysis of the third version by two experts and the group of teachers indicated additional

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revisions, resulting in the fourth version of the instrument. **Conclusion:** The instrument developed demonstrated evidence of content validity, and it is recommended that the next stages of validation be pursued.

Keywords: Autism Spectrum Disorder, Child, Preschool, Validation Study.

Resumo

Introdução: O Transtorno do Espectro Autista (TEA), de etiologia multifatorial, possui diagnóstico essencialmente clínico. Sabe-se que a identificação precoce contribui significativamente para um prognóstico mais favorável. O ambiente educacional é propício para o rastreamento de sinais de TEA em crianças pré-escolares; contudo, observa-se a ausência de instrumentos específicos com essa finalidade. **Objetivo:** Verificar evidências de validade de conteúdo de um instrumento destinado à identificação de sinais indicativos de TEA no contexto educacional. **Método:** A elaboração do instrumento seguiu as diretrizes estabelecidas pelos *Standards for Educational and Psychological Testing* (American Educational Research Association, 2014) e por Pasquali (1998). O processo envolveu três etapas: (1) desenvolvimento das questões e submissão a um comitê de 15 especialistas com experiência em TEA, composto por 10 terapeutas ocupacionais e cinco fonoaudiólogas; (2) avaliação da compreensão dos itens por 10 professores da educação infantil; e (3) análise da versão revisada por duas especialistas e seis professores da educação infantil. **Resultados:** A revisão da literatura fundamentou a construção da versão inicial do instrumento. Na análise realizada pelos juízes, os Índices de Validade de Conteúdo (IVC e IVC-I) indicaram alta concordância entre os especialistas, embora ajustes tenham sido necessários, resultando em uma segunda versão. A avaliação pelos professores da educação infantil revelou a necessidade de modificações em alguns itens, culminando na elaboração de uma terceira versão. Por fim, a análise da terceira versão por duas especialistas e pelo grupo de professores indicou a necessidade de novas alterações, originando a quarta versão do instrumento. **Conclusão:** O instrumento desenvolvido apresentou evidências de validade de conteúdo, recomendando-se a continuidade das etapas subsequentes de validação.

Palavras-chave: Transtorno do Espectro Autista, Criança, Pré-Escolar, Estudo de Validação.

Introduction

Autism Spectrum Disorder (ASD) is a complex neurobiological disorder that manifests in early childhood and generally persists throughout life (Pellecchia et al., 2016). The Brazilian Institute of Geography and Statistics (IBGE) released data from the 2022 Census, which reveal that Brazil has 2.4 million people diagnosed with Autism Spectrum Disorder (ASD), which represents 1.2% of the Brazilian population, these are the first official data from Brazil (Instituto Brasileiro de Geografia e Estatística, 2025).

According to data from the most recent Basic Education Census, there was a 50% increase in the enrollment of students diagnosed with ASD, rising from 405,056 to 607,144 in just one year (Brasil, 2024).

Data from the Centers for Disease Control and Prevention (2019) revealed that the average age of the first diagnosis of ASD remains above four years, highlighting the need for assessment tools capable of accurately quantifying signs and symptoms of autism in individuals within this age range.

Pine et al. (2006) suggest that a quantitative method for assessing preschool children regarding subtle aspects of social impairment may be essential for the early identification of milder signs of autism. There is evidence that children's social behaviors can be well observed in educational settings. Children engaged in peer interactions demonstrate socio-cognitive and communication skills at a more advanced level in the school environment. Thus, incipient social difficulties often become apparent in this context (Gibson et al., 2011).

Given the known impact of ASD on social behavior and the need for well-planned school inclusion, it is essential to propose and implement assessment tools and methods that provide teachers with adequate information about the condition of enrolled students, thereby enabling early identification actions (Wang et al., 2011; Brasil, 2014).

The scarcity of instruments for screening early signs of autism in Brazil was identified in a systematic review conducted by Seize & Borsa (2017), as well as by Backes et al. (2014). Currently, four instruments have been translated and partially validated: the Autistic Traits Assessment Scale – ATA (Assumpção Júnior et al., 1999), the Autism Behavior Checklist – ABC (Marteleto & Pedromônico, 2005), the Autism Spectrum Screening Questionnaire – ASSQ (Sato, 2008), and the Modified Checklist for Autism in Toddlers – M-CHAT (Losapio & Pondé, 2008). There is also the instrument Risk Indicators in Child Development (Machado et al., 2014). All these instruments were designed to be answered by parents or guardians through semi-structured interviews.

Therefore, with the aim of expanding service possibilities and supporting the political and financial management of actions directed to individuals with ASD, this study sought to examine the content validity evidence of an instrument for identifying signs indicative of ASD in the educational context.

Materials and Method

This study was approved, in accordance with Resolution No. 466/12 of the National Health Council (CNS), by the Research Ethics Committee on Human Subjects of the Federal University of Pernambuco (UFPE) under CAAE No. 27016919.0.0000.5208, Opinion No. 3.907.478. All participants signed an Informed Consent Form prior to study commencement.

The guidelines set by the Standards for Educational and Psychological Testing (American Educational Research Association, 2014) were followed to develop the instrument in the present study, The model proposed by Pasquali (1998) was adopted to operationalize the stage of content validity evidence.

Content validity evidence of the instrument

To obtain evidence of content validity of the instrument, three stages were conducted: item development, expert panel evaluation, and evaluation by the target population.

Item development

To plan and develop the first version of the instrument, a literature review was conducted at the PubMed and SciELO databases and on the *Biblioteca Virtual de Saúde* (BVS) portal, aiming to identify the main risk signs for ASD in preschool children that could be recognized by preschool teachers. The descriptors *validation studies* and *autistic disorder* were used for searches in BVS and SciELO, whereas the following strategy was used in PubMed: *preschool children* AND *autism spectrum disorder* AND *screening assessment* AND *early diagnosis*. The inclusion criteria were original articles, published in national or international journals, in any language, with no time restriction.

A total of 317 articles were identified, of which only 14 met all the inclusion criteria and were therefore selected for analysis. A variety of instruments aimed at screening ASD in children aged 14 to 18 months was observed, with particular emphasis on the Modified Checklist for Autism in Toddlers (M-CHAT), which has the highest number of translation studies into other languages. However, for preschool-aged children, only two instruments were found: the Childhood Asperger Syndrome Test (CAST) and the Questionnaire to Assess Social Interaction Quality (SIQ), both presenting gaps in their respective validation processes.

Additionally, books and other assessment instruments were consulted, such as the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP), an international assessment developed by Sundberg (2008) and translated into Brazilian Portuguese by Martone (2017); the Assessment of Basic Language and Learning Skills (ABBLS), by Partington & Sundberg (1998); and the Denver Model for promoting language, learning, and socialization, by Rogers & Dawson (2014). The diagnostic criteria of the DSM-5 were also considered to develop the instrument.

At the end of this investigative stage, the items that comprise the first version of the instrument were drafted. It was named the Screening Instrument for Children with Autism Spectrum Disorder in the Educational Context (IRTEA.Educ).

Expert panel evaluation

To form the expert panel, the fields of speech-language pathology and occupational therapy were taken into consideration.

The choice of occupational therapists was because the main object of study in this profession is occupations. Childhood occupations, in turn, are understood as intentional actions conducted by children throughout their development, with school being a privileged context for the performance of many of these occupations (Folha & Barba, 2022). In the preschool education context, the occupational therapist is the professional qualified to assess and intervene in the student's occupational performance in the school setting (American Occupational Therapy Association, 2015; Brasil, 2018b).

Speech-language pathology, in turn, includes language as one of its fields of practice, understood in its dimensions of promotion, prevention, assessment, diagnosis, and treatment of related disorders, with the goal of ensuring and optimizing the individual's communication skills, promoting well-being and social inclusion (Brasil, 2006). Both professions are mentioned in the Salamanca Statement (Organização das Nações Unidas

para a Educação, a Ciência e a Cultura, 1994), a document that introduced the concept of inclusive education on the international stage as part of a set of support services.

According to Pasquali (1998), six judges are considered sufficient for this stage. In this study, the panel consisted of 15 experts: five speech-language pathologists and 10 occupational therapists. The inclusion criteria for participation were being an occupational therapist or speech-language pathologist and declaring a minimum of five years of clinical experience in ASD care. Sampling followed the snowball technique, in which one participant refers another.

In the invitation sent by email, the Informed Consent Form and a description of the study objectives were attached. The judges were instructed to assess each item using a Likert scale (0 to 5), where the numbers indicated, respectively: 1 – strongly disagree; 2 – partially disagree; 3 – neither agree nor disagree; 4 – partially agree; 5 – strongly agree. At the end of each section, there was space for comments and observations, where the judges could indicate aspects they believed were not covered in the instrument and/or form.

To evaluate the items, 11 adapted criteria were considered, as proposed by Pasquali (1998): objectivity (CO), simplicity (CS), clarity (CC), relevance (CR), precision (CP), scope (CA), modality (CM), and credibility (CCd). Additionally, the following grammatical criteria were considered: sentence length (ES), sentence structure (EF), and vocabulary (V).

To determine the acceptance of the items, the data were analyzed using the Content Validity Index (CVI). The CVI was calculated for each individual item (CVI-I) and for the entire set of items (CVI-T), with values above 0.78 considered acceptable (Almeida et al., 2017; Coluci et al., 2015; Polit & Beck, 2006). Items with lower values, as well as all suggestions, were analyzed by the instrument's authors, and necessary modifications were made by consensus, resulting in the second version of the instrument.

Also in this stage, a qualitative analysis was conducted based on the judges' comments. For this purpose, the research group applied Bardin's (2016) Content Analysis, organizing all observations and suggestions by item to interpret the information in depth, giving it meaning and coherence.

Evaluation by the target population

For the stage of content evaluation by representatives of the target population, preschool teachers were selected to assess the second version of the IRTEA.Educ, as this is the professional category that will apply the instrument. The inclusion criteria were having completed their degree at least five years prior and having a minimum of three years of classroom experience with preschool children. Professionals who reported having first-degree relatives diagnosed with ASD were excluded because of the potential research bias associated with greater familiarity with autistic behaviors.

The sample of teachers was selected using the snowball sampling technique. Ten teachers participated: five from public schools and five from private schools, all with at least five years of classroom experience with children with ASD. The inclusion of teachers from both public and private educational sectors aimed to encompass different classroom realities and student profiles.

In the invitation sent by email, an Informed Consent Form and an explanation of the study objectives were attached. Teachers were instructed to complete a form evaluating each item of the instrument in terms of its relevance to classroom dynamics, clarity of the questions, and adequacy of the response options. After receiving the completed forms, individual interviews were conducted by the researcher using the Google Meet platform, with the aim of exploring general impressions about the instrument: what they thought of the response categories, whether there was any question they would not answer, and whether they had suggestions for changes.

After completing this stage, two groups of teachers were formed to assess item comprehension by members of the target population using the brainstorming technique. This technique consists of presenting the items aloud, read by one of the participants in rotation, followed by an explanation of the content by the reader. If the explanation raises no doubts and demonstrates correct understanding, the item is considered adequate. If there are discrepancies in interpretation, the item is considered problematic and must be revised (Pasquali, 1998). The researcher determined who would read and explain each item, and each group participant was asked to state whether they understood the item in the same way as the presenter.

Group 1 was composed of three teachers with less professional experience (recent graduates with five to six years of classroom experience), whereas Group 2 consisted of three teachers with longer careers (postgraduates with over 20 years of teaching experience). Forming groups with different profiles is a recommendation by Pasquali (1998), to ensure that evaluators with varied levels of education and experience can provide input on the instrument, ensuring that it is comprehensible and relevant across diverse professional contexts.

The group meetings were held via the Google Meet platform and lasted approximately two hours. Both the interviews and the focus group discussions were recorded with the participants' express consent and later transcribed into Word® documents. To preserve the identity of the participating teachers, identification codes were used (P1, P2, P3, etc.).

After completing the interview and brainstorming stages, the research group met to discuss the proposed item changes, which led to the development of the third version of the instrument. This version was submitted for analysis by two experts: a member of the panel of judges and an external evaluator. Following this new review, two new items were added to Category II. These items were then submitted to the teachers from Groups 1 and 2, who used an evaluation form to judge the items' relevance to classroom routines and the clarity of their wording. At the end of this process, the fourth version of the IRTEA.Educ was developed.

Results

Item development

Based on the literature review concerning autistic behaviors considered for diagnosis according to the DSM-IV, items were formulated in the form of questions, resulting in the definition of the first version of the instrument. As shown, the questions were

organized into two categories based on the diagnostic dimensions of the DSM-5 (American Psychiatric Association, 2013): Category I – Social Communication and Social Interaction consisted of five questions on receptive language, five on expressive language, and five on peer social interaction; Category II – Restricted and Repetitive Patterns of Behavior included five questions on group routines, five on play, and five on sensory aspects.

Each category, therefore, contained 15 questions, totaling 30 items in the first version of the IRTEA.Educ. The response options were defined as "yes," "no," and "sometimes." The interpretation of the results is that the lower the total score, the higher the risk for ASD. However, at this stage of the research, it was not yet possible to define the minimum score that would determine the risk for the disorder.

Expert panel evaluation

The descriptive analysis, based on measures related to the evaluation of the general aspects of the instrument and its two categories, revealed that the median of the responses assigned by the judges was 4.

The lowest values indicated that the general aspects with the lowest scores—and which were therefore revised—corresponded to the following items: "categories that compose the instrument," "clarity of the items," and "instructions for application." Similarly, the general analysis variables related to the evaluation of the categories that received the lowest scores were "item alignment within the category" and "clarity of the items." These aspects were addressed, although they did not negatively impact the overall evaluation of the instrument.

Considering the CVI, based on responses 4 and 5 on the scale, it was observed that the general aspects of the instrument presented CVI = 1, and the overall evaluation of the categories showed CVI = 0.93. These results indicate a high level of agreement among the judges, as the indices exceeded the reference value of 0.78, suggesting that the instrument, overall, met its intended objective.

A specific analysis of the content of the items in Categories I and II was also performed. Table 1 presents the CVI-I values, calculated based on the following criteria: objectivity, simplicity, clarity, relevance, precision, scope, modality, and credibility, as well as the grammatical criteria of sentence length, sentence structure, and vocabulary.

Table 1. CVI-I values for items in Categories I and II.

Items	Category I – Social Communication and Social Interaction											
	CO	**CS**	**CC**	**CR**	**CP**	**CA**	**CM**	**CT**	**CCd**	**ES**	**EF**	**V**
1	0.94	0.88	0.88	0.94	0.81	0.88	0.88	0.94	0.94	1	0.81	0.88
2	0.94	0.88	0.88	0.81	0.75*	0.75*	0.75*	0.75*	0.75*	0.94	0.88	0.88
3	0.94	0.88	0.75	0.88	0.81	0.75*	0.81	0.81	0.75*	0.88	0.69*	0.75*
4	0.94	0.81	0.88	0.81	0.81	0.75*	0.75*	0.75*	0.75*	0.88	0.75*	0.81
5	0.94	0.88	0.94	0.88	0.88	0.81	0.94	0.94	0.88	0.94	0.88	0.88
6	0.94	0.94	0.94	0.94	0.88	0.88	0.94	0.94	0.94	0.88	0.88	0.88
7	1	0.94	0.94	1	1	1	0.94	1	1	0.94	0.94	1
8	0.88	0.88	0.88	0.88	0.88	0.88	0.94	0.88	0.88	0.88	0.81	0.88
9	0.81	0.81	0.81	0.88	0.94	0.88	0.81	0.81	0.81	0.75*	0.75*	0.75*

Table 1. Continued…

Items	Category I – Social Communication and Social Interaction											
	CO	**CS**	**CC**	**CR**	**CP**	**CA**	**CM**	**CT**	**CCd**	**ES**	**EF**	**V**
10	1	1	1	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	1
11	1	1	1	0.94	0.88	0.88	0.94	1	0.94	1	0.94	1
12	1	0.94	0.94	0.88	0.88	0.88	0.94	1	1	0.94	0.94	0.94
13	0.94	0.94	0.94	0.88	0.88	0.88	0.81	0.81	0.81	0.88	0.81	0.94
14	1	0.94	1	0.94	0.94	0.88	0.94	0.94	0.94	1	0.94	1
15	0.81	0.84	0.84	0.81	0.81	0.81	0.81	0.81	0.81	0.88	0.75*	0.81
Items	**Category II – Restricted and Repetitive Patterns of Behavior**											
	CO	**CS**	**CC**	**CR**	**CP**	**CA**	**CM**	**CT**	**CCd**	**ES**	**EF**	**V**
1	0.81	0.88	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.94	0.94	0.94
2	0.94	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.94	0.88	0.88	0.88
3	0.81	0.81	0.81	0.88	0.81	0.88	0.81	0.81	0.81	0.88	0.88	0.81
4	0.94	0.94	0.94	0.81	0.88	0.88	0.88	0.88	0.88	0.88	0.94	0.88
5	0.88	0.88	0.81	0.88	0.81	0.88	0.88	0.88	0.94	0.94	0.88	0.88
6	1	0.88	0.94	0.94	0.87	0.81	0.88	0.94	0.94	0.88	0.88	0.94
7	0.81	0.81	0.81	0.88	0.81	0.81	0.88	0.88	0.88	0.81	0.81	0.81
8	0.94	0.94	0.94	0.88	0.88	0.88	0.88	0.88	0.94	0.94	0.94	0.94
9	0.88	0.88	0.81	0.88	0.81	0.81	0.88	0.88	0.88	0.94	0.88	0.88
10	0.88	0.94	0.75*	0.94	0.81	0.94	0.88	0.94	0.94	0.94	0.88	0.88
11	0.69*	0.75*	0.69*	0.81	0.75*	0.75*	0.75*	0.81	0.75*	0.75*	0.69*	0.75*
12	0.88	0.88	0.88	0.88	0.88	0.94	0.81	0.88	0.88	0.88	0.88	0.81
13	0.81	0.81	0.81	0.94	0.81	0.94	0.88	0.94	0.88	0.81	0.81	0.81
14	0.94	0.94	0.94	0.94	0.81	0.88	0.94	0.88	0.88	0.94	0.94	0.94
15	0.81	0.88	0.88	0.88	0.88	0.94	0.94	0.94	0.94	0.88	0.88	0.88

CVI-I: Content Validity Index by Item; CO: Objectivity Criterion; CS: Simplicity Criterion; CC: Clarity Criterion; CR: Relevance Criterion; CP: Precision Criterion; CA: Scope Criterion; CM: Modality Criterion; CT: Typicality Criterion; CCd: Credibility Criterion; ES: Sentence Length; EF: Sentence Structure; V: Vocabulary. *Score below 0.78. **Source:** Prepared by the authors, 2021.

Content analysis using the CVI demonstrated a degree of agreement among the judges above 0.80 for all items in Categories I and II, indicating that the content of these items adequately reflects the construct intended to be measured. However, items that scored below 0.78 in any of the criteria were reviewed by the panel of experts and revised, as presented in Table 2.

Table 2. Items revised according to CVI-I.

Variable	IRTEA.Educ (1st version)	CVI-I < 0.78	IRTEA.Educ (2nd version)
Category I			
2	Follows a direct instruction to give an item to someone or place an item on top of another object? (e.g., "Hand the notebook to João," "Put your notebook in the bag").	CP 0.75; CA 0.75; CM 0.75; CT 0.75; CCd 0.75	Does the child follow a direct instruction to give an object to someone or place an object on top of another object? (e.g., "Hand the notebook to João," "Put your notebook in the bag").
3	Spontaneously responds to peers' requests (e.g., a peer says, "push me in the cart" and the child pushes; a peer says, "I want the train" and the child gives them the train).	CA 0.75; EF 0.69; V 0.75	Does the child spontaneously respond to peers' requests? (e.g., a peer says, "push me in the cart" and the child pushes; or a peer says, "I want the train" and the child gives them the train).

Table 2. Continued…

Variable	IRTEA.Educ (1st version)	CVI-I < 0.78	IRTEA.Educ (2nd version)
Category I			
4	Follows a group instruction – everyone shows the same receptive response (e.g., the teacher says, "Everyone stand up!", "Get your notebooks").	CA 0.75; CM 0.75; CT 0.75; CCd 0.75; EF 0.75	Does the child follow group instructions – everyone shows the same behavior? (e.g., the teacher says, "Everyone stand up!" or "Get your notebooks").
9	Describes the function of objects. (e.g., "What do you do with a spoon?").	EF 0.75; ES 0.75; V 0.75	Can the child describe the function of objects? (e.g., "What is a chair for?", "What can we do with a pencil?", "What is glue for?").
15	Spontaneously cooperates with a peer to achieve a specific outcome. (e.g., raises arms to request a hug; asks to wash hands when needed).	EF 0.75	Does the child spontaneously cooperate with a peer to achieve an outcome? (e.g., holds the bucket while a peer fills it with sand, hands over a shovel so a peer can dig, helps stack blocks).
Category II			
10	Independently engages in continuous play for at least five minutes.	CC 0.75	Does the child engage in play independently for at least five minutes? (e.g., builds sandcastles at the playground, stacks blocks, uses a slide or swing, or other playground equipment).
11	Changes in routine do not alter their behavior.	CO 0.69; CS 0.75; CC 0.69; CP 0.75; CA 0.75; CM 0.75; CCd 0.75; ES 0.75; EF 0.69; V 0.69	Do changes in routine affect the child's behavior? (e.g., when an unusual activity occurs in class, snack time is delayed, or there is no playground time due to rain).

CVI-I: Content Validity Index by Item; CO: Objectivity Criterion; CS: Simplicity Criterion; CC: Clarity Criterion; CP: Precision Criterion; CA: Scope Criterion; CM: Modality Criterion; CT: Typicality Criterion; CCd: Credibility Criterion; ES: Sentence Length; EF: Sentence Structure; V: Vocabulary. *Score below 0.78. **Source:** Prepared by the authors, 2021.

Still within this stage of item evaluation by the expert judges, a qualitative analysis was conducted based on the comments recorded directly on the assessment form. The objective was to identify aspects not addressed by the evaluation material or to justify low scores assigned to certain items. Comments were coded by central themes as they emerged. These data were interpreted by consensus among the researchers, who assessed the relevance of the suggestions considering the instrument's screening purpose.

Most comments (11) referred to the need to revise the vocabulary used, making it more accessible to teachers by inserting and/or replacing examples. This need is based on the understanding that teachers, not being healthcare professionals, may have difficulty comprehending some of the terminology proposed in the items. Nonetheless, the average scores assigned to the vocabulary of each category indicated a rating of 5 across all items, suggesting a positive evaluation in this regard, despite comments pointing to possible adjustments.

Other thematic classifications were also identified: content (four mentions), item clarity (eight), syntax (three), sentence structure (five), category appropriateness (four), and structure (one). Modifications to the instrument were made to address all of these

aspects. Additionally, some comments were classified as suggestions (two) and compliments (four). The suggestions were incorporated into the second version of the instrument; as a result, item 14 was replaced, and three new questions were added to Category II, which now includes 18 items, as shown in Table 3.

Table 3. Items revised based on the analysis of judges' comments.

Variable	IRTEA.Educ (1st version)	IRTEA.Educ (2nd version)
Category I		
15	Spontaneously cooperates with a peer to achieve a specific outcome (e.g., raises arms when wanting a hug; asks to wash hands when needed).	Does the child spontaneously cooperate with a peer to achieve an outcome? (e.g., holds the bucket while the peer fills it with sand, hands over the shovel so the peer can dig a hole, helps stack blocks).
Category II		
14	Has a diet with different flavors and textures for at least five minutes.	Does the child play with materials of different textures—play dough, paint, clay, slime? (e.g., when these materials are offered, the child accepts them without resistance). 16. Does the child accept walking on grass or sand? (e.g., walks on these surfaces without showing refusal behaviors). 17. Does the child accept playing with peers? (e.g., shares toys and other objects with classmates, taking turns). 18. Does the child play with toys that involve movement? (e.g., swing, slide, merry-go-round, seesaw).

Source: Prepared by the authors. Recife, 2021.

Following the analysis and suggestions from the panel of expert judges, as well as the consensus of the research group, several modifications were made: all items were revised to begin with the phrase "Does the child…"; one item was excluded, four were added, and six were reformulated. In addition, new examples were included to facilitate comprehension of the questions in both categories. These modifications resulted in the second version of the IRTEA.Educ, now composed of 15 questions in Category I and 18 in Category II.

Evaluation by the target population

Analysis of the form used to assess the relevance of each item to classroom dynamics, its clarity, and the adequacy of the response options revealed that all teachers considered the items relevant to the school routine. None reported difficulty understanding the questions, and only two indicated that the response options did not adequately reflect the situations presented.

Regarding the reformulation of some questions, two teachers (P1 and P8) suggested changes to the wording of item 1, and one of them (P8) proposed revisions for items 2, 3, 6, 7, and 9, all of which belong to Category I.

The interview analysis revealed positive impressions of the instrument, with the questions considered both relevant and easily observable in the school context. Concerning the response categories, eight out of 10 teachers reported missing a larger space for commenting or expanding on their answers. Two of them suggested adding fields for expressing opinions, arguing that, in early childhood education, situations do not always fit binary options such as "yes" or "no." As for the possibility of not knowing how to answer a given question, all teachers stated they had no difficulties. No additional suggestions for changes were made beyond those previously recorded by P1 and P8 on the earlier form.

The collection of proposals presented during the brainstorming sessions revealed the need for adjustments. Group 1 suggested vocabulary revisions for items 2, 4, 5, 10, and 11 of Category I, and for items 2, 5, 7, and 9 of Category II, as well as the removal of items 3, 4, 11, and 17 from the latter category. Group 2 proposed vocabulary changes for items 2 and 15 of Category I and for items 1, 3, 11, 12, 14, and 18 of Category II, in addition to the removal of item 4 from Category I and items 9 and 17 from Category II.

The suggestions were reviewed by the research group, who analyzed them and implemented several adjustments, as detailed in Table 4. In Category I, vocabulary was revised in items 2, 5, and 10; item 11 received an additional example to improve clarity; and item 4 was excluded. In Category II, vocabulary was adjusted in items 1, 3, 12, and 15; items 9 and 17 were removed; and item 5 was moved to Category I, replacing item 4. Thus, the third version of the instrument again comprised 15 items in each category, totaling 30 items. The response criteria were also revised, adopting a five-point Likert scale.

Table 4. Items modified for the 3rd version of the IRTEA.Educ.

IRTEA.Educ (2nd version)	IRTEA.Educ (3rd version)
Category I	
2. Does the child follow a direct instruction to give an object to someone or place an object on another object? (e.g., "hand the notebook to João," "put your notebook in the bag")	2. Does the child follow a direct instruction to give an object to someone or place it somewhere? (e.g., "hand the notebook to João," "put your notebook in the bag")
4. Does the child follow group instructions – everyone shows the same behavior? (e.g., the teacher says, "stand up everybody" or "get your notebooks")	4. Removed
5. Does the child pay attention to short stories? (e.g., remains seated during story time or responds to a question about the story)	5. Does the child pay attention to short stories? (e.g., interacts with the story being told, engages during story time, or answers a question about the story)
10. Does the child ask for missing items needed to complete a task? (e.g., asks for paper while holding a crayon)	10. Does the child ask for missing items needed to complete a task? (e.g., asks for a crayon while holding paper)
11. Does the child initiate social interaction with a peer? (e.g., holds the peer's hand)	11. Does the child initiate social interaction with a peer? (e.g., holds the peer's hand, invites the peer to play)

Table 4. Continued…

IRTEA.Educ (2nd version)	IRTEA.Educ (3rd version)
Category II	
1. Does the child sit during group teaching activities without showing inappropriate behavior? (e.g., during morning circle time remains seated without shouting or trying to get up for five minutes)	1. Does the child sit during group teaching activities without showing problem behavior? (e.g., during morning circle time participates without shouting or trying to get up for five minutes)
3. Does the child work independently on non-academic activities? (e.g., puzzles, play dough, building blocks)	3. Does the child independently play with toys in an appropriate manner for at least five minutes? (e.g., puzzles, play dough, building blocks)
5. Does the child respond when hearing their name in a group, following a direct instruction? (e.g., during an activity the teacher calls the child to perform a specific task, and the child responds as requested)	5. Transferred to Category I, replacing item 4
9. Does the child use classroom materials such as books and activity sheets appropriately? (e.g., when given a book or sheet, does not tear it, throw it, or ignore it)	9. Removed
11. Do changes in routine affect the child's behavior? (e.g., when an unusual activity takes place in the classroom, snack time is delayed, or playground time is canceled because of rain, the child cries the entire morning)	11. Do changes in routine affect the child's behavior excessively? (e.g., when an unusual activity takes place in the classroom, snack time is delayed, or playground time is canceled because of rain, the child cries the entire morning)
12. Does the child remain active and attentive while participating in the group? (e.g., when called by name, responds promptly, plays, and engages in activities, does not appear distracted in class)	12. Does the child remain active and attentive while participating in the group? (e.g., when called by name, responds, plays, and engages in activities, does not appear distracted in class)
14. Can the child manage frustration without intense behavioral outbursts? (e.g., frustrations are easily managed through dialogue)	14. Can the child manage frustration without intense behavioral outbursts? (e.g., frustrations are managed through dialogue)
17. Does the child accept playing with peers? (e.g., shares toys and other objects with classmates, taking turns)	17. Removed

Source: Prepared by the authors. Recife, 2021.

The third version of the IRTEA.Educ was analyzed by two experts: one from the original panel of judges and one external evaluator. Both highlighted the need to include items in Category II that addressed repetitive and atypical behaviors. Following discussion by the research group, it was proposed that two items previously flagged for exclusion by Group 1 during the earlier stage be removed, specifically, items 4 and 6 of Category II. The decision to exclude these items was based on feedback from some teachers who indicated that the difficulties described in those behaviors could frequently occur in typically developing children within the preschool age range.

The two newly proposed items were then evaluated for relevance and content by the teachers in Groups 1 and 2. Regarding content, all participants considered both items relevant to classroom dynamics. As for comprehension, two teachers (P2 and P3) reported difficulty understanding the first item, with one suggesting a vocabulary adjustment. For the second item, only one teacher (P2) reported difficulty

understanding it, but did not suggest changes. On the other hand, teacher P6, who reported understanding the item well, suggested adding the word "frequency."

After further discussion among the researchers, the teachers' suggestions were accepted, resulting in the fourth version of the IRTEA.Educ, as shown in Table 5.

Table 5. The four versions of the IRTEA.Educ Item.

	1st Version	2nd Version	3rd Version	4th Version
Category I				
1	Follows instructions in routine situations. (e.g., "Get in line to wash their hands," "Playground time")	Does the child follow instructions in routine situations? ("get in line to wash their hands," "playground time")	Does the child follow instructions in routine situations? (e.g., "get in line to wash their hands," "playground time," "get their notebooks")	Does the child follow instructions in routine situations? (e.g., "get in line to wash their hands," "playground time," "get their notebooks")
2	Follows a direct instruction to give an item to a person or place an item on top of another object? (e.g., "Hand the notebook to João," "Put your notebook in the bag")	Does the child follow a direct instruction to give an object to a person or place it on another object? (e.g., "hand the notebook to João," "put your notebook in the bag")	Does the child follow a direct instruction to give an object to a person or place it somewhere? (e.g., "hand the notebook to João," "put your notebook in the bag")	Does the child follow a direct instruction to give an object to a person or place it somewhere? (e.g., "hand the notebook to João," "put your notebook in the bag")
3	Spontaneously responds to peers' requests (e.g., a peer says, "push me in the cart" and the child pushes; or "I want the train" and the child gives the train)	Does the child spontaneously respond to peers' requests? (e.g., a peer says, "push me in the cart" and the child pushes; or "I want the train" and the child gives the train)	Does the child spontaneously respond to peers' requests? (e.g., a peer says, "push me in the cart" and the child pushes; or "I want the train" and the child gives the train)	Does the child spontaneously respond to peers' requests? (e.g., a peer says, "push me in the cart" and the child pushes; or "I want the train" and the child gives the train)
4	Follows a group instruction—everyone shows the same receptive response (e.g., teacher says, "Everyone stand up!" or "Get your notebooks")	Does the child follow a group instruction—everyone shows the same behavior? (e.g., teacher says "Everyone stand up!" or "Get your notebooks")	Does the child respond when hearing their name in a group setting, following a direct instruction? (e.g., teacher says, "It's your turn to go to the board" and the child goes)	Does the child respond when hearing their name in a group setting, following a direct instruction? (e.g., teacher says, "It's your turn to go to the board" and the child goes)
5	Shows attention to short stories.	Does the child show attention to short stories? (e.g., remains seated during story time or answers a question about the story)	Does the child show attention to short stories? (e.g., makes comments about the story, retells it, or answers a question about it)	Does the child show attention to short stories? (e.g., makes comments about the story, retells it, or answers a question about it)

Table 5. Continued…

	1st Version	2nd Version	3rd Version	4th Version
Category I				
6	Responds to yes/no questions. (e.g., "Is your name Lucas?" "Is this a…?")	Does the child respond to yes/no questions? (e.g., "Is your name Lucas?" "Is this a pencil?")	Does the child respond to yes/no questions? (e.g., "Is your name Lucas?" "Is this a pencil?")	Does the child respond to yes/no questions? (e.g., "Is your name Lucas?" "Is this a pencil?")
7	Responds to questions about themselves. (e.g., "What's your name?" "How old are you?")	Does the child respond to questions about themself? (e.g., "What's your name?" "How old are you?")	Does the child respond to questions about themself? (e.g., "What's your name?" "How old are you?")	Does the child respond to questions about themself? (e.g., "What's your name?" "How old are you?")
8	Responds to questions about others. (e.g., "What's your teacher's name?" "Who is the girl in blue?" "Where is João?")	Does the child respond to questions about others? (e.g., "What's your teacher's name?" "Who is the girl in blue?" "Where is João?")	Does the child respond to questions about others? (e.g., "What's your teacher's name?" "Who is the girl in blue?" "Where is João?")	Does the child respond to questions about others? (e.g., "What's your teacher's name?" "Who is the girl in blue?" "Where is João?")
9	Describes the function of objects. (e.g., "What do you do with a spoon?")	Can the child describe the function of objects? (e.g., "What is a chair for?", "What can we do with a pencil?", "What is glue for?")	Can the child describe the function of objects? (e.g., "What is a chair for?", "What can we do with a pencil?", "What is glue for?")	Can the child describe the function of objects? (e.g., "What is a chair for?", "What can we do with a pencil?", "What is glue for?")
10	Requests missing items needed for a task. (e.g., asks for paper when given a crayon)	Does the child ask for missing items needed to complete a task? (e.g., asks for paper while holding a crayon)	Does the child ask for missing items needed to complete a task? (e.g., asks for a crayon while holding paper)	Does the child ask for missing items needed to complete a task? (e.g., asks for a crayon while holding paper)
11	Initiates social interaction with a peer. (e.g., pushes a peer in a cart, holds their hand, plays circle games)	Does the child initiate social interaction with a peer? (e.g., holds a peer's hand, plays circle games)	Does the child initiate social interaction with a peer? (e.g., holds a peer's hand, invites the peer to play)	Does the child initiate social interaction with a peer? (e.g., holds a peer's hand, invites the peer to play)
12	Spontaneously imitates the actions of other peers. (e.g., sees others and copies them: everyone jumps, claps, or sits)	Does the child spontaneously imitate the actions of other peers? (e.g., sees what others do and repeats it: everyone jumps, claps, or sits)	Does the child spontaneously imitate the actions of other peers? (e.g., sees what others do and repeats it: everyone jumps, claps, or sits)	Does the child spontaneously imitate the actions of other peers? (e.g., sees what others do and repeats it: everyone jumps, claps, or sits)

Table 5. Continued…

	1st Version	2nd Version	3rd Version	4th Version
Category I				
13	Responds appropriately to positive physical interactions initiated by peers. (e.g., if a peer hugs the child, the child hugs back; gives high fives)	Does the child respond appropriately to positive physical interactions initiated by peers? (e.g., if a peer hugs the child, the child hugs back; gives high fives)	Does the child respond appropriately to positive physical interactions initiated by peers? (e.g., if a peer hugs the child, the child hugs back; gives high fives)	Does the child respond appropriately to positive physical interactions initiated by peers? (e.g., if a peer hugs the child, the child hugs back; gives high fives)
14	Requests items from peers. (e.g., asks verbally or with gestures for desired items)	Does the child request items from peers? (e.g., asks verbally or with gestures for desired items)	Does the child request items from peers? (e.g., asks verbally or with gestures for desired items)	Does the child request items from peers? (e.g., asks verbally or with gestures for desired items)
15	Spontaneously cooperates with a peer to achieve a specific goal. (e.g., raises arms to request a hug; asks to wash hands when needed)	Does the child spontaneously cooperate with a peer to achieve a result? (e.g., holds the bucket while the peer fills it with sand, hands over the shovel for digging, helps stack blocks)	Does the child spontaneously cooperate with a peer to achieve a result? (e.g., holds the bucket while the peer fills it with sand, hands over the shovel for digging, helps stack blocks)	Does the child spontaneously cooperate with a peer to achieve a result? (e.g., holds the bucket while the peer fills it with sand, hands over the shovel for digging, helps stack blocks)
Category II				
1	Sits in group teaching situations without showing inappropriate behavior.	Does the child sit in group teaching situations without showing inappropriate behavior? (e.g., during the morning circle stays seated without screaming or trying to stand for five minutes).	Can the child remain seated for at least five minutes in group teaching situations without inappropriate behavior? (e.g., during the morning circle, participates without yelling or trying to stand up immediately).	Can the child remain seated for at least five minutes in group teaching situations without inappropriate behavior? (e.g., during the morning circle, participates without yelling or trying to stand up immediately).
2	Physically moves to the next area or activity. (e.g., teacher says, "story time," and the child independently moves there)	Does the child physically move to the next area or activity? (e.g., teacher says, "story time," and the child independently moves there).	Does the child go to the activity location when asked, without help? (e.g., teacher says, "story time," and the child independently moves there).	Does the child go to the activity location when asked, without help? (e.g., teacher says, "story time," and the child independently moves there).
3	Works independently in non-academic activities (e.g., puzzles, modeling clay)	Does the child work independently in non-academic activities? (e.g., puzzles, modeling clay)	Does the child independently play with toys in a functionally appropriate way for at least 5 minutes? (e.g., puzzles, modeling clay, block building).	Does the child independently play with toys in a functionally appropriate way for at least 5 minutes? (e.g., puzzles, modeling clay, block building).

Table 5. Continued…

	1st Version	2nd Version	3rd Version	4th Version
Category II				
4	Puts away personal items. (e.g., after activity, places materials correctly)	Does the child put away their personal items? (e.g., after activity, places materials correctly)	Does the child recognize and put away their personal items? (e.g., after activity, places materials correctly)	Does the child perform stereotyped movements? (e.g., frequently flaps hands, squeezes themself, runs back and forth, etc.)
5	Responds to name in group with direct instruction.	Does the child respond to hearing their name in the group by following a direct instruction?	Does the child engage in pretend play? (e.g., plays teacher or superhero with peer)	Does the child engage in pretend play? (e.g., plays teacher or superhero with peer)
6	Engages in pretend play.	Does the child engage in pretend play?	Does the child repeat play to improve results? (e.g., throws ball, misses, repeats).	Does the child show atypical repetitive actions? (e.g., interest in unusual objects, rigidly lines up toys, obsession with fans, etc.)
7	Repeats a game to achieve a better result.	Does the child repeat a game to improve results?	Does the child engage in painting, cutting, and pasting for at least five minutes?	Does the child engage in painting, cutting, and pasting for at least five minutes?
8	Engages in painting, cutting, and pasting.	Does the child engage in painting, cutting, and pasting?	Does the child independently play for at least five minutes? (e.g., builds sandcastles, plays on the slide).	Does the child independently play for at least five minutes? (e.g., builds sandcastles, plays on the slide).
9	Uses school materials, like books and worksheets, appropriately.	Does the child use school resources, such as books and worksheets, appropriately? (e.g., does not tear, throw, or ignore them)	Do routine changes alter their behavior excessively? (e.g., when there is a different activity, snack delay, or no playground due to rain, the child cries all morning)	Do routine changes alter their behavior excessively? (e.g., when there is a different activity, snack delay, or no playground due to rain, the child cries all morning)
10	Independently engages in continuous play for at least five minutes.	Does the child independently engage in play for at least five minutes? (e.g., builds sandcastles, stacks blocks, uses slide, swing, etc.)	Can the child remain seated for at least three minutes during snack or lunch without inappropriate behavior? (e.g., eats without throwing or spreading food)	Can the child remain seated for at least three minutes during snack or lunch without inappropriate behavior? (e.g., eats without throwing or spreading food)

Table 5. Continued…

	1st Version	2nd Version	3rd Version	4th Version
Category II				
11	Routine changes do not alter their behavior.	Do routine changes alter the child's behavior? (e.g., if a different activity occurs in the classroom, snack is delayed, or there is no playground due to rain)	Does the child make eye contact during daily interactions? (e.g., approaches a peer or adult while making eye contact; before making a request, establishes eye contact)	Does the child make eye contact during daily interactions? (e.g., approaches a peer or adult while making eye contact; before making a request, establishes eye contact)
12	Remains active and attentive, participating in the group.	Does the child remain active and attentive while participating in the group? (e.g., responds promptly when called, plays, completes tasks, does not appear distracted)	Can the child deal with frustration without intense behavioral outbursts? (e.g., frustration is resolved through dialogue)	Can the child deal with frustration without intense behavioral outbursts? (e.g., frustration is resolved through dialogue)
13	Makes eye contact during daily interactions. (e.g., approaches peer/adult making eye contact; makes request after eye contact)	Does the child make eye contact during daily interactions? (e.g., approaches peer/adult making eye contact; makes request after eye contact).	Does the child play with materials of different textures – playdough, paint, clay, slime? (e.g., accepts them when offered, without resistance)	Does the child play with materials of different textures – playdough, paint, clay, slime? (e.g., accepts them when offered, without resistance)
14	Has a diet with varying tastes and textures.	Can the child handle frustration without strong behavioral outbursts? (e.g., frustration is easily managed through dialogue)	Does the child accept walking on grass, sand, and other textures? (e.g., steps on them without showing refusal behavior).	Does the child accept walking on grass, sand, and other textures? (e.g., steps on them without showing refusal behavior).
15	Can handle frustration without strong behavioral outbursts.	Does the child play with materials of different textures – playdough, paint, clay, slime? (e.g., accepts them when offered, without resistance)	Does the child play with movement-based toys, alternating among them? (e.g., swing, slide, merry-go-round, seesaw)	Does the child play with movement-based toys, alternating among them? (e.g., swing, slide, merry-go-round, seesaw)
16		Does the child accept walking on grass or sand? (e.g., steps on them without refusal behavior)		

Table 5. Continued…

	1st Version	2nd Version	3rd Version	4th Version
Category II				
17		Does the child accept playing with peers? (e.g., shares toys and other objects with turn-taking)		
18		Does the child play with movement-based toys? (e.g., swing, slide, merry-go-round, seesaw)		

Discussion

Screening refers to a form of triage for specific health conditions, with a preventive focus, and falls under what is known as secondary prevention. A clear distinction must be made between screening and diagnosis. Screening aims to identify warning signs, so that the child can be referred to a specialist responsible for early diagnosis and ongoing monitoring of signs and symptoms (Brasil, 2010a, 2014). A positive result in a screening tool does not, by itself, constitute a diagnosis (Brasil, 2010a).

According to the National Common Curricular Base (BNCC), it is the educator's responsibility to reflect, select, organize, plan, mediate, and monitor the set of practices and interactions, ensuring a plurality of experiences that promote children's comprehensive development (Brasil, 2018a). Monitoring is part of the teacher's pedagogical practice and, in the context of autism care policy, this professional is also responsible for observation and screening actions (Seize & Borsa, 2017). In this regard, the instrument proposed in this study was developed for application by early childhood education teachers, with the aim of screening for signs suggestive of ASD in preschool children.

A comparative study on the accuracy of assessments conducted by preschool teachers and by parents of three-year-old children, using the Achenbach System of Empirically Based Assessment – Preschool Forms—which, although not specific to autistic behaviors, includes scales that assess them—found that teachers demonstrated greater accuracy than parents in distinguishing between children with and without ASD, as well as greater consistency with symptoms identified by medical professionals. These findings highlight the value of information provided by preschool educators for early detection and diagnostic assessments (Jobs et al., 2019).

One of the initial procedures in obtaining psychometric evidence is the critical assessment of the alignment between the instrument's components and the attributes it intends to measure, that is, content validity (Echevarría-Guanilo et al., 2019). At this stage, the analysis conducted by a panel of experts with experience in the area is essential, as it allows for an evaluation of whether the content is appropriate and consistent with the instrument's objectives (Moura et al., 2008). In this study, the assessment was conducted by a panel composed of speech-language pathologists and occupational therapists with education and/or experience in ASD, enabling the analysis of the instrument's first version and the development of its second version.

The instrument is composed of two categories, as described in the previous section: Category I, related to social communication and interaction, and Category II, which covers behavioral patterns. Both aim to assess how the child interacts with peers and teachers, considering initiative, the production of comments, communicative intent, and aspects related to routine, play, and sensory behavior. According to the National Curricular Guidelines for Early Childhood Education (Brasil, 2010b), in Article 9, interactions and play are central axes of pedagogical practices, through which children construct and appropriate knowledge via their actions and interactions with peers and adults, enabling learning, development, and socialization.

Therefore, it can be stated that the instrument's categories are aligned with current pedagogical practices in early childhood education, as supported by the findings of the present study, particularly the CVI attributed by the expert judges to the category analysis, which was 0.93. A value above 0.9 indicates that the domains are deemed appropriate, meaning the item sample is representative of the category content, according to professionals experienced in the field (Coluci et al., 2015; Seize & Borsa, 2017).

According to the guidelines for the content analysis stage by an expert committee, items that do not meet the minimum CVI threshold must be revised, even when the overall category shows strong agreement (Almeida et al., 2017). In this study, item 11 in Category II showed a CVI below the ideal value, and although the overall category score exceeded 0.9, the item had to be reformulated.

Based on means, item-level CVIs, and the comments/observations recorded by the expert judges, specific modifications were made, including deletions, additions, item relocation, and rewording, mainly concerning content and vocabulary.

Thus, following the judges' suggestions and considering that, according to the DSM-5 (American Psychiatric Association, 2013), unusual sensory behaviors are among the diagnostic criteria for ASD, three questions addressing these behaviors—observable in the school context—were added to Category II. Also in Category II, item 11 received low scores both in the mean and CVI. Since excessive adherence to routines and ritualized behavior patterns is also a DSM-5 diagnostic criterion, the item was reformulated rather than removed, as it addresses behavioral responses to changes in school routine—an important theme.

In addition to being diagnostic criteria according to the DSM-5, these characteristics are also included in the BNCC (Brasil, 2018a) as learning and development rights in early childhood education, which encompass actions such as interacting, playing, participating, exploring, expressing oneself, and self-awareness. In this context, managing one's emotions, exploring the environment, different textures, and dealing with frustrations are part of school life and are easily observed by early childhood education teachers.

In the process of gathering evidence of content validity, listening to the target population is crucial to determine whether all items are understandable to the intended audience (Pasquali, 1998). In this study, that phase occurred in three stages, as detailed in the Method section: 1. completion of semantic analysis forms, 2. semi-structured interviews, and 3. application of the brainstorming technique. Teachers suggested changes in wording, including additions, deletions, or substitutions of nouns and adjectives. These suggestions were incorporated, given that cultural appropriateness is one of the essential considerations in the development of instruments (Fernandes et al., 2016).

Among the teachers' suggestions was also the removal of certain items, justified by concerns that they might not be sufficiently sensitive for identifying children with ASD,

considering the age group and group dynamics typical of preschoolers. Group 1 suggested removing six items (one from Category I and five from Category II), while Group 2 proposed the exclusion of three items (one from Category I and two from Category II). Thus, considering the teachers' professional experience and the educational context at the time of application, the items that both groups agreed upon were excluded (item 4 from Category I and item 17 from Category II), as well as item 9 from Category II, as suggested by Group 2—composed of teachers with over 20 years of classroom experience.

Another requested change concerned the reformulation of the response criteria. Teachers emphasized the need for a broader range of response options to enable more precise observation of children's behavior in the classroom. Therefore, a five-point Likert scale was adopted, as it has been considered appropriate for more accurately representing respondents' perceptions (Dalmoro & Vieira, 2013). However, this aspect will need to be further analyzed in future validation stages involving the target population.

Finally, based on the suggestions made by the expert judges in a second round and considering that, according to the DSM-5 (American Psychiatric Association, 2013), stereotyped and atypical behaviors are diagnostic criteria for ASD, the research team reviewed the inclusion of two questions addressing these aspects. A study conducted by Silva et al. (2024), which explored caregivers' perceptions of preschool children with ASD regarding their behavior and occupational performance during the COVID-19 pandemic, found an increase in irritability, stereotypies, tics, aggression, hyperactivity, anxiety, and difficulties returning to social life. This study underscores the relevance of investigating such behaviors in school settings as well.

Some limitations of the present study must be acknowledged, such as its focus on a single stage of validation—evidence of content validity—highlighting the need for subsequent stages. However, this is an essential phase in the process of instrument validation. Moreover, it was conducted rigorously, using multiple construct assessment techniques and described in detail, enabling the tracking of the instrument's development throughout all phases. Future studies should continue this research, seeking validity evidence based on response processes, internal structure, and relationships with other variables.

The development of IRTEA.Educ holds important implications for improving the effectiveness of referral processes in both public and private settings, as it represents the first standardized instrument with evidence of content validity designed for use by teachers in early childhood education. It should be noted, however, that this is a level 1 screening tool and, as such, is not intended for diagnostic purposes, but solely for identifying children showing signs suggestive of ASD.

Final Considerations

The development of IRTEA.Educ, designed for screening autism spectrum disorders in educational settings, demonstrated evidence of content validity, thus fulfilling the objective proposed in this study. The evidence analyzed thus far enabled relevant modifications that led to the fourth version of the instrument, making it suitable for its intended construct. Nevertheless, further studies are needed to continue the instrument's validation process to enable more effective referrals for assessment, diagnosis, and treatment.

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Author's Contributions

Thallyta Midiã Mota de Gois: study conception and design, data collection, processing, analysis, and interpretation, drafting and writing of the manuscript. Leandro de Araújo Pernambuco: study conception and design, data analysis and interpretation, critical review of the manuscript. Bianca Arruda Manchester de Queiroga: critical review of the manuscript. Ana Augusta de Andrade Cordeiro: study conception and design, data analysis and interpretation, critical review of the manuscript. All authors approved the final version of the text.

Data Availability

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

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