RBTCC
e-ISSN: 1982-3541
Revista Brasileira de Terapia Comportamental e Cognitiva
ABPMC
ASSOCIAÇÃO BRASILEIRA DE CIÊNCIAS DO COMPORTAMENTO

Revisão sistemática da literatura sobre o ensino da condução de avaliações comportamentais

Systematic review of teaching behavioral assessment methods in Applied Behavior Analysis

Revisión sistemática de la literatura sobre la enseñanza de cómo realizar evaluaciones conductuales

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RESUMO: A avaliação é fundamental em intervenções baseadas na Análise do Comportamento Aplicada. Esta revisão buscou sistematizar os estudos que ensinaram a aplicação de métodos ou instrumentos de avaliação do comportamento, baseando-se no PRISMA. As buscas foram conduzidas nas bases de dados *PsycINFO*, *PubMed*, *ERIC*, Periódicos Capes e *Web of Science*, com os termos *"behavior assessment" OR "behavioral assessment" OR "development assessment" AND "caregiver training"* AND *"staff training" AND "teacher training"* AND *"parent training"* em inglês. Dentre os 717 documentos identificados, 39 atenderam aos critérios de elegibilidade. Verificou-se que professores foram os participantes mais frequentes, que os componentes do *Behavioral Skills Training* (BST) foram os procedimentos mais utilizados e que a maioria dos estudos ensinou a condução da análise funcional experimental. Discutem-se a relevância de se ensinar professores a identificarem a função de comportamentos interferentes e a escassez de estudos que ensinaram a aplicação de instrumentos que verificam habilidades e déficits comportamentais.

Palavras-chave: Análise do Comportamento Aplicada; Avaliação do Comportamento; Treinamento; Transtorno do Espectro Autista.

ABSTRACT: Assessment is essential in interventions based on Applied Behavior Analysis (ABA). This review sought to systematize studies that taught the implementation of behavior assessment methods or instruments, based on PRISMA. The searches were conducted in the *PsycINFO*, *PubMed*, *ERIC*, *Periodicos Capes* and *Web of Science* databases, with the terms "behavior assessment" OR "behavioral assessment" OR "development assessment" AND "caregiver training" AND "staff training" AND "teacher training" AND "parent training", in English. Among the 717 documents identified, 39 of them met the eligibility criteria. Results demonstrated that teachers were the most frequent participants, that the components of Behavioral Skills Training (BST) were the most used teaching procedures and that most studies taught how to conduct experimental functional analysis. The relevance of teaching teachers to identify the function of interfering behaviors and the scarcity of studies that taught the implementation of instruments to verify skills and behavioral deficits are discussed.

Dados do Artigo
DOI: 10.31505/rbtcc.v27i1.2020
Recebido: 14 de Outubro de 2024
1º Decisão: 29 de Dezembro de 2024
Aprovado: 05 de Julho de 2025
Publicado: 22 de Julho de 2025
Editor-Chefe: Dr. Fábio Henrique Baia
Editor Adjunto: Dr. Angelo A. S. Sampaio
Editor Associado: Dr. Luiz Freitas
Estagiário: Eduardo Caixeta

Declaração: As autoras IAS, JJSS e DMR declaram não ter nenhum conflito de interesses.

Como citar este documento
Santos, I. A., & Santos, J. J. S., & Ribeiro, D. M. (2025). Revisão sistemática da literatura sobre o ensino da condução de avaliações comportamentais. *Revista Brasileira de Terapia Comportamental e Cognitiva*, 27, 34-50. https://doi:10.31505/rbtcc.v27i1.2020

Keywords: Applied Behavior Analysis; Behavior Assessment; Training; Autism Spectrum Disorder.

RESUMEN: La evaluación es fundamental en intervenciones basadas en el Análisis del Comportamiento Aplicado. Esta revisión buscó sistematizar los estudios que enseñaron la aplicación de métodos o instrumentos de evaluación del comportamiento, basándose en el PRISMA. Las búsquedas se llevaron a cabo en las bases de datos PsycINFO, PubMed, ERIC, Periódicos Capes y Web of Science, con los términos "behavior assessment" OR "behavioral assessment" OR "development assessment" AND "caregiver training" AND "staff training" AND "teacher training" AND "parent training" en inglés. De los 717 documentos identificados, 39 cumplieron con los criterios de elegibilidad. Se verificó que los profesores fueron los participantes más frecuentes, que los componentes del Behavioral Skills Training (BST) fueron los procedimientos más utilizados y que la mayoría de los estudios enseñaron la conducción del análisis funcional experimental. Se discute la relevancia de enseñar a los profesores a identificar la función de comportamientos interferentes y la escasez de estudios que enseñaron la aplicación de instrumentos que verifican habilidades y déficits comportamentales.

Palabras clave: Análisis del Comportamiento Aplicado; Evaluación del Comportamento; Entrenamiento; Transtorno del Espectro Autista.

Interventions based on Applied Behavior Analysis (ABA), particularly for individuals with Autism Spectrum Disorder (ASD), should begin with an assessment of the individual's behavioral repertoire. Moreover, it should be conducted continuously throughout the implementation of programs that aim to teach new behaviors or reduce interfering behaviors (Cooper et al., 2020). The primary goal of the assessment conducted before the intervention starts is to identify the function of behaviors already exhibited by the individual, as well as to determine skills and behavioral deficits. Therefore, it provides the necessary information for selecting and defining intervention goals (Cooper et al., 2020; Ribeiro et al., 2024).

Currently, literature has focused on training caregivers and professionals from various fields to implement teaching procedures and the steps of an intervention based on ABA for individuals with ASD. More specifically, studies have addressed the training to implement the discrete trial teaching method (DTT) (e.g., Campanaro & Vladescu, 2023) and preference assessments (e.g., Sipila-Thomas et al., 2022). Additionally, research has been conducted on training for the use of behavioral assessment methods or instruments (e.g., Barnes et al., 2014; Paul et al., 2023).

Given the importance of assessment in ABA-based interventions and the need to train professionals from various fields to conduct assessments, in order to enhance such interventions, it is necessary to identify studies that have taught the implementation of behavioral assessment methods or instruments. Such identification may enable for the examination of which assessment methods and instruments have been taught, as well as the most effective procedures for training individuals to assess the behavioral repertoire of different target populations. This information is valuable, both, for clinicians to remain up to date and for researchers to identify the need for additional investigation (Moher et al., 2009; Page et al., 2021).

The literature includes reviews that aimed to identify the methods that have been used to assess various aspects related to the development and well-being of individuals with ASD. For instance, there are reviews that examined the methods employed to assess speech (Broome et al., 2017) and sleep (Hodge et al., 2012) in children with ASD; quality of life (Ikeda et al., 2013) and anxiety (Grondhuis & Aman, 2012) in children and young people with ASD; sensory processing (Burns et al., 2017) in individuals with ASD, as well as the methods used to train school staffs to conduct functional behavior assessments (McCahill et al., 2014).

More specifically, McCahill et al. (2014)

examined the nature and effectiveness of functional assessment training for school staff as described in the literature. For that, searches were conducted in the EBSCO Academic Search Complete, SCOPUS, PsycInfo, ERIC, and Psychology and Behavioral Sciences Collection databases, using the terms "training", "staff", and "teacher", combined with "applied behavior analysis", "functional behavior assessment", "functional assessment", "functional analysis", and "positive behavior support". Twenty-five studies, carried out with teachers, classroom assistants, and school principals, were identified. The type of functional assessment that was most frequently taught was the brief functional analysis. The studies combined teaching procedures, and the most commonly used strategies were written protocols, feedback, role-play, modeling, and video modeling. The results indicated that participants with different experience and competence levels were able to learn to conduct functional assessments with high levels of integrity. These findings suggest the feasibility of reducing school staff's dependence on consultants and researchers, as well as the effectiveness of assessment procedures in educational settings.

The review by McCahill et al. (2014) focused on studies that taught teachers how to conduct functional assessments. Functional assessments aim to identify the function of a given behavior (Cooper et al., 2020). There is a need for broader systematic literature reviews to be conducted, in order to identify, as well, the procedures that are used to teach the administration of assessment instruments designed to evaluate skills and behavioral deficits, particularly in individuals with ASD. Therefore, this study aimed to systematize the knowledge described in studies that sought to teach the implementation of behavioral assessment methods or instruments.

Method

Search procedure

The review followed the guidelines presented by the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA; Moher et al., 2009; Page et al., 2021).

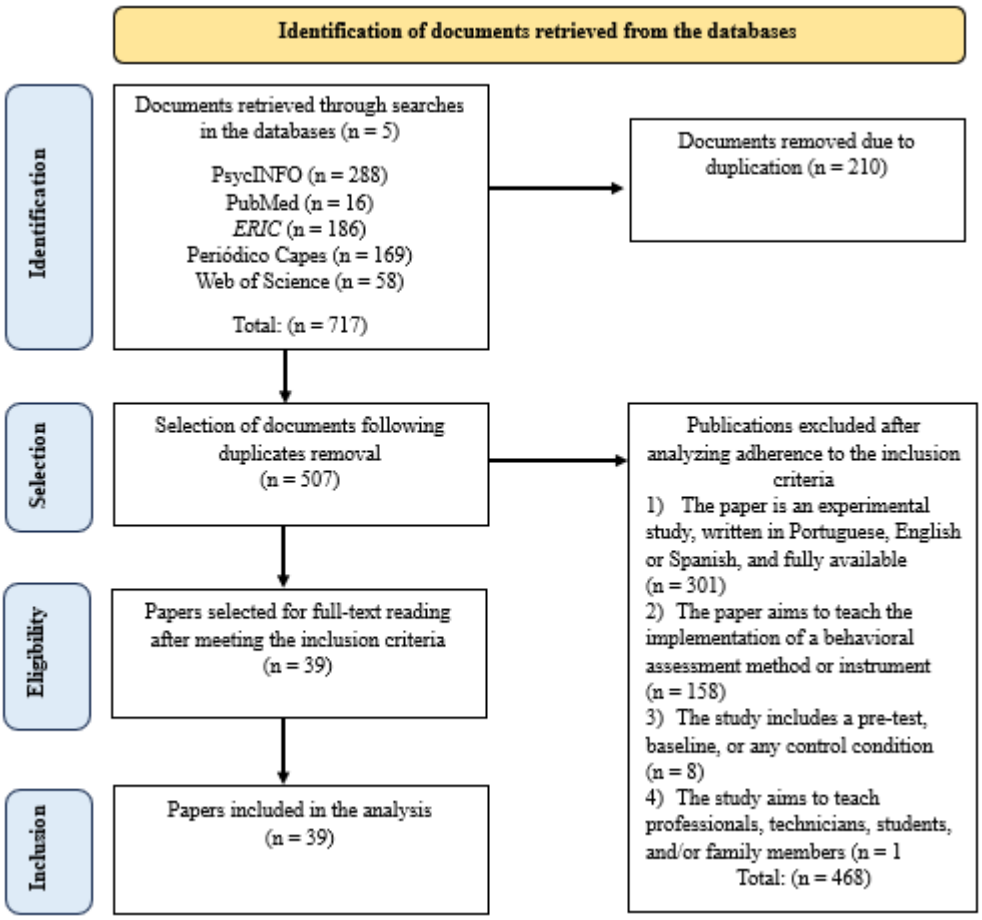
Searches were conducted in the *PsycINFO*, *PubMed*, *ERIC*, *Periódicos Capes*, and *Web of Science* databases, with no restrictions regarding the year of publication. The following combinations of terms were used in each database: "behavior assessment" OR "behavioral assessment" OR "development assessment" AND "caregiver training" AND "staff training" AND "teacher training" AND "parent training," in English. The searches were carried out in April 2024 and 717 documents were found. After cross-referencing, 210 duplicate ones were removed.

Inclusion and exclusion criteria

After duplicate documents were removed, the studies were analyzed according to the four inclusion and exclusion criteria described below.

The first inclusion criterion required the papers to be experimental, written in Portuguese, English, or Spanish, and available in full text. More specifically, to be classified as "experimental", a paper had to describe the manipulation of an independent variable with the purpose of producing changes in one or more dependent variables. A total of 301 documents were excluded for not meeting this criterion. Second, the papers needed to have, as their purpose, teaching the implementation of a behavioral assessment method or instrument. Based on this criterion, 158 studies were excluded. Third, the papers were required to include a pre-test, baseline, or any control condition prior to the intervention. Eight documents were excluded for not meeting this criterion. Finally, participants had to be professionals, technicians, students, or family members of the target population to whom the assessment method or instrument was intended. Examples in the "technician" category included caregivers, auxiliars, and assistants; examples in the "student" category included undergraduate and graduate students. One paper was excluded due to this criterion. 39 papers met all criteria and were included in the review. Figure 1 presents the results for each stage of the review process.

Figure 1
Flowchart of the Results for Each Stage of the Systematic Review



Data extraction and synthesis

The 39 papers that met the inclusion criteria were analyzed in full and categorized according to the categories described below.

Participants

When it comes to the participants in each study, the following aspects were analyzed: (1) the number of participants and (2) their roles or professional backgrounds (e.g., parent of a child with ASD, teacher, undergraduate student).

Type of assessment taught

For each study, the assessment method or instrument whose implementation was taught was identified. Additionally, if the study reported that the method or instrument implementation had been broken down into smaller steps to facilitate instruction, such steps were also identified.

Experimental design

The experimental design adopted in each study was recorded.

Teaching procedure

The procedure used to teach the implementation of the behavioral assessment method or instrument in each study was also identified.

Interobserver agreement

Interobserver agreement was assessed for the eligibility of the 507 papers based on the inclusion criteria, as well as for the analysis of the categories in each paper that met the inclusion criteria.

Initially, two independent reviewers were trained to assess the papers eligibility based on the aforementioned inclusion criteria. The training con-

sisted of both reviewers analyzing five papers, followed by the calculation of their agreement index. An agreement was recorded when both reviewers consented that a paper met the inclusion criteria. A disagreement was recorded when the reviewers differed in their assessment of a paper's eligibility. The interobserver agreement index was calculated by dividing the number of agreements by the total number of agreements plus disagreements, and then multiplying the result by 100. The criterion for completing the training was 100% agreement between the reviewers in the analysis of five papers. A total of ten papers had to be analyzed to meet this criterion. Once the criterion was achieved, the papers analysis was conducted independently: one reviewer analyzed every paper, while the second reviewer analyzed a randomly selected sample comprising 20% of the papers, selected via an online draw. The final interobserver agreement index was 98.9%.

The interobserver agreement for the analysis of the categories in each of the papers included in the review was conducted similarly to the analysis of papers eligibility based on the inclusion criteria. First, a training was carried out, in which both reviewers extracted categories from five studies. The criterion for completing the training was 100% agreement between the reviewers. A total of ten papers had to be analyzed for the agreement criterion to be achieved at this stage. Subsequently, the analysis was conducted independently: one reviewer analyzed every paper, while the second reviewer analyzed a randomly selected sample comprising 20% of the papers, selected through an online draw. The interobserver agreement index was 100%.

Results

Table 1 presents information about the participants, the behavioral assessment method or instrument whose application was taught, the experimental design, and the teaching procedure used in each of the papers included in the review.

Table 1
Analysis of the Papers Included in the Systematic Review

Reference	Participants	Assessment taught	Instructional components or steps	Experimental design	Teaching procedure
Alnemary et al. (2015)	Special education teachers (n=4)	Experimental functional analysis	Testing four conditions: attention, ignore, demand, and play.	Multiple baseline across participants combined with a multielement design.	A group workshop conducted via videoconference, which included a description and a demonstration of the functional analysis, as well as role-play.
Amador et al. (2021)	Graduate students in ABA (n=20)	Experimental functional analysis	Accurately answering 30 multiple-choice questions on functional assessment, and testing four conditions: attention, ignore, demand, and tangible.	Multiple baseline across participants.	CBI: videos, multiple-choice questions and instruction.
Barnes et al. (2014)	School psychologists (n=2)	Levels 1 and 2 of the VB-MAPP	Level 1: 27 steps. Level 2: 29 steps.	Multiple probe across participants.	BST: instruction, video modeling, role-play and feedback, and, if necessary, corrective teaching.

Benavides-Nieto et al. (2019)	Parents of children aged 3 to 5 years (n=18)	Functional analysis	Completing 95 items of the BASC scale regarding adaptive behaviors.	Group.	Guided group discussion, role-play, and collective reflection.
Bloomfield et al. (2020)	Special education teachers and paraprofessionals (n=8)	Experimental functional analysis	Testing four conditions: attention, tangible, demand, and play.	Multiple elements.	BST: instruction, modeling, role-play and feedback via telepresence robots.
Chafouleas et al. (2014)	Undergraduate Psychology students (n=90)	DBR	The accuracy of participants' responses to the DBR.	Group.	Computer-based module incorporating examples and non-examples, videos, modeling, practice opportunities, and feedback.
Cho & Blair (2017)	General education teacher (n=1)	Functional analysis	Conducting interviews and direct observation using ABC record.	Multiple baseline across academic tasks.	The training included instruction, discussion, modeling, role-play, and feedback.
Cordeiro et al. (2021)	Specialized educational services teachers (n=6)	Experimental functional analysis	Testing four conditions: attention, demand, tangible, and ignore.	Intrasubject and intersubject.	Video feedback and video modeling, applied, both, independently and in combination.
Erbas et al. (2006)	Special education teachers (n=5) and intern (n=1).	Experimental functional analysis	Testing four conditions: attention, demand, play, and tangible.	Multiple probe across participants.	Theoretical instructional material, lecture, demonstration, role-play, and feedback.
Flynn & Lo (2016)	Special education teachers (n=3).	Experimental functional analysis	Testing four conditions: attention, ignore, tangible, and demand.	Multiple elements.	BST: description and videos presentation regarding the experimental functional analysis conditions, role-play, and feedback.
Inoue & Takagi (2021)	Preschool and nursery teachers (n=10).	Functional assessment	Filling out an ABC data sheet by recording interfering behaviors, antecedents, and consequences.	Pre- and post-test.	Online lectures and group-based online consultation.
Iwata et al. (2000)	Undergraduate students (n=11).	Experimental functional analysis	Testing four conditions: attention, demand, play, and ignore.	Multiple baseline across participants.	Written description and videos presentation regarding the experimental functional analysis conditions, role-play, and feedback.
Kunnavatana et al. (2013 a)	Special education teachers (n=4).	Experimental functional analysis	Testing four conditions: attention, tangible, demand, and ignore.	Multiple baseline across participants.	Didactic presentation, video demonstrations, role-play, and feedback.
Kunnavatana et al. (2013 b)	Special education coordinators (n=5) and teachers (n=5).	Experimental functional analysis	Testing four conditions: attention, tangible, demand, and ignore.	Multiple baseline across participants.	Didactic presentation, small-group role-play with immediate feedback, and individual role-play with delayed feedback.

Lambert et al. (2013)	Supervisors (n=6) and managers (n=9) at a residential facility for adults with intellectual disability.	Experimental functional analysis	Testing four conditions: attention, tangible, demand, and ignore.	Multiple baseline across participants.	Written description regarding the experimental functional analysis conditions, modeling, role-play, and feedback.
Lloveras et al. (2022)	Behavior analysts (n=13).	Experimental functional analysis	Testing five conditions: alone, play, attention, tangible, and demand.	Multiple baseline across participants and conditions.	Remote instruction and BST: written instructions, model presentation, role-play, and feedback.
Maag & Larson (2004)	General education teacher (n=1).	Functional assessment	Completing FAHP.	Multiple baseline across students.	Instruction, discussion regarding the teacher's experiences, and role-play.
Machalicek et al. (2010)	Teachers (n=6).	Experimental functional analysis	Testing three conditions: attention, demand, and play.	Multiple baseline across participants.	Written description regarding the experimental functional analysis conditions, role-play, and feedback via videoconference.
Marleau et al. (2018)	Parents of children with disabilities (n=26).	Functional assessment	Identifying the function of the behavior based on graph analysis.	Group.	IWT: written instructions, audio recordings accompanied by slide presentations, video models, and questionnaires.
McNeill et al. (2002)	Parents of children aged 3 to 8 years (n=5).	Functional assessment	Completing three questionnaires: PIQ, PAQ and IDQ.	Pre- and post-test.	Examples, descriptions, modeling, video, practice, and feedback.
Moore & Fisher (2007)	Psychologists (n=3).	Experimental functional analysis	Testing three conditions: attention, demand, and play.	Multiple baseline across participants.	Written material regarding the experimental functional analysis conditions, class, and video modeling.
Moore et al. (2002)	General education teachers (n=3).	Experimental functional analysis	Testing two conditions: attention and demand.	Multiple baseline cross participants.	Oral and written description regarding the functional analysis conditions, modeling, role-play, and feedback.
Mueller & Moskowitz (2020)	Mothers of children with ASD (n=3).	Functional assessment	Filling out questionnaires: SIB-R, PSOC, PCS, PSI-4-SF, Thoughts Quiz, and P-RIBS.	Multiple baseline across participants.	Treatment manual (descriptions, examples, and creation of opportunities for home implementation).
Myers (1982)	Couples who had just had their first child (n=42).	*Brazelton Neonatal Behavioral Assessment*	Applying *Brazelton Neonatal Behavioral Assessment Scale*.	Group.	Role-play and explanatory content on infant development.
Noguchi et al. (2013)	Caregivers for elderly people with dementia (n=10).	Functional assessment	Analyzing the function of behaviors based on ABC records.	AB.	Review of manuals and differential reinforcement procedures.

Opartkiattikul et al. (2016)	General education teachers (n=4).	Functional assessment	Conducting an ABC functional assessment.	AB.	Professional development program in functional assessment.
Paul et al. (2023)	Students on a teachers training course (n=83).	Experimental functional analysis	Testing three conditions: attention, demand, and play.	Group.	Video displaying the implementation of functional analysis, live or Skype-based role-play, and role-play in a simulated setting.
Pence & Peter (2018)	Special education teachers (n=6) and master's degree students (n=2).	Functional assessment	Filling out two types of data sheets: structured ABC data sheet and narrative ABC data sheet.	Pre- and post-test.	*PowerPoint* presentation and completion of data sheets based on occurrences of interfering behaviors displayed in videos.
Pence et al. (2014)	Special education teachers (n=6).	Experimental functional analysis	Testing four conditions: attention, demand, tangible, and play.	Multiple baseline across participants.	Modeling, role-play and feedback.
Rios et al. (2020)	Therapists for children with ASD (n=10).	Experimental functional analysis	Testing four conditions: attention, tangible, play, and demand.	Multiple baseline across participants.	BST: written instructions, video modeling, role-play, and feedback.
Rispoli et al. (2015)	Teachers (n=3) and teacher assistant (n=1) in general education.	Experimental functional analysis	Testing three conditions: attention, tangible, and demand.	Multiple baseline across participants.	*PowerPoint* presentation, examples of the implementation of functional analysis displayed in videos, role-play, and feedback.
Rispoli et al. (2016)	Special education teachers (n=6).	Experimental functional analysis	Conducting two types of experimental functional analysis. In one of them, four conditions were tested; in the other, three.	Multiple baseline across participants.	*PowerPoint* presentation, examples of the implementation of functional analysis displayed in videos, role-play, and feedback.
Sivaraman & Fahmie (2020)	Professionals (n=4) and parents (n=6) of children with developmental delays.	Functional assessment	Filling out the FBAI form based on video observations.	Multiple baseline across participants.	Manual on FBAI, *PowerPoint* presentation, live and video demonstrations, role-play, and feedback.
Stern & González (2016)	Caregivers of children with feeding disorders (n=20).	Functional assessment	Completing BBKQ.	Pre- and post-test.	Verbal instructions and examples, role-play, interactive activities, and dissemination of written materials.
Stoiber & Gettinger (2011)	General education teachers (n=70).	Functional assessment	A five-steps process involving the observation, analysis, and recording of interfering behaviors.	Group.	A manual containing data sheets, activities, and step-by-step instructions for implementing the functional assessment, guided implementation, and feedback.

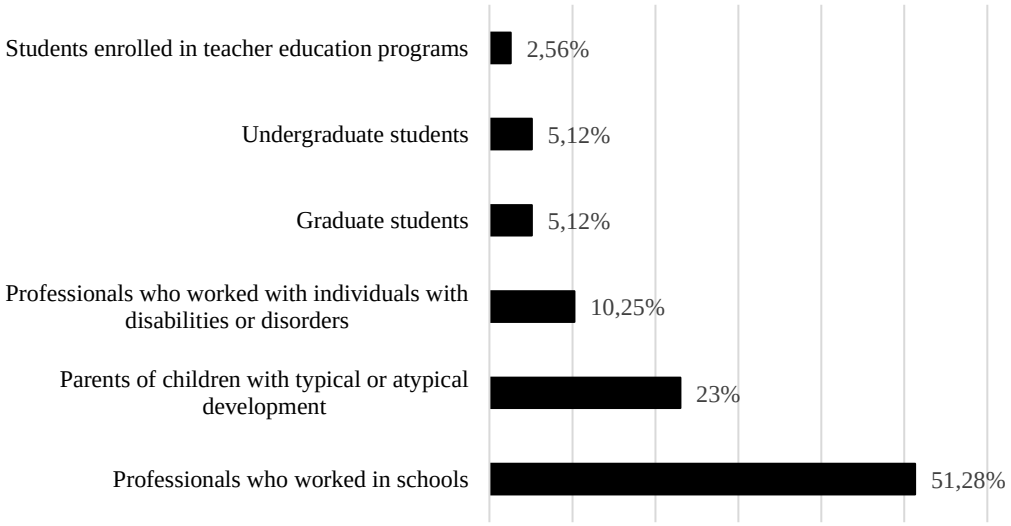
Stokes & Luiselli (2008)	Parents of children with ASD (n=4).	Experimental functional analysis	Testing three conditions: social disapproval, demand, and play.	Multiple baseline across participants.	Role-play, oral feedback, written feedback, and video-based feedback.
Tsami et al. (2019)	Parents of children with ASD (n=12).	Experimental functional analysis	Testing four conditions: attention, tangible, demand, and play.	Multiple elements.	Explanatory content and role-play with feedback via videoconference.
Turgeon et al. (2020)	Parents of children with ASD (n=26).	Functional assessment	Filling out BPI-01 instrument.	Group.	IWT: written manual, presentations, video models, and questionnaires.
Wu (2017)	Public school teachers (n=36).	Functional assessment	Answering multiple-choice questions about functional assessment.	Group.	*PowerPoint* presentation, case study discussions, and written and verbal feedback.

Note. ABA = Applied Behavior Analysis; ASD = Autism Spectrum Disorder; CBI = Computer Based Instruction; VB-MAPP = Verbal Behavior Milestones Assesment and Placement Program; BST = Behavioral Skills Training; BASC = Behavior Assessment System for Children; DBR = Direct Behavior Rating; FBAI = Function-based Behavioral Assessment and Interventions; FAHFP = Functional Assessment Hypotheses Formulation Protocol; PIQ= Problem Identification Questionnaire; PAQ = Problem Analysis Questionnaire; IDQ = Intervention Design Questionnaire; SIB-R = Scales of Independent Behavior—Revised; PSOC = Parenting Sense of Competence Scale; PCS = Parent Cognition Scale; PSI-4-SF = Parenting Stress Index, 4th Edition—Short Form; P-RIBS = Thoughts Quiz, and Parent Rational e Irrational Beliefs Scale; BBKQ = Brief Behavioral Knowledge Questionnaire; BPI-01 = Behavior Problems Inventory-01; IWT = Self-guided Interactive Web Training.

Participants

Figure 2 presents the results with the participants percentage distribution across categories.

Figure 2
Distribution of Participants Across Categories in Percentages



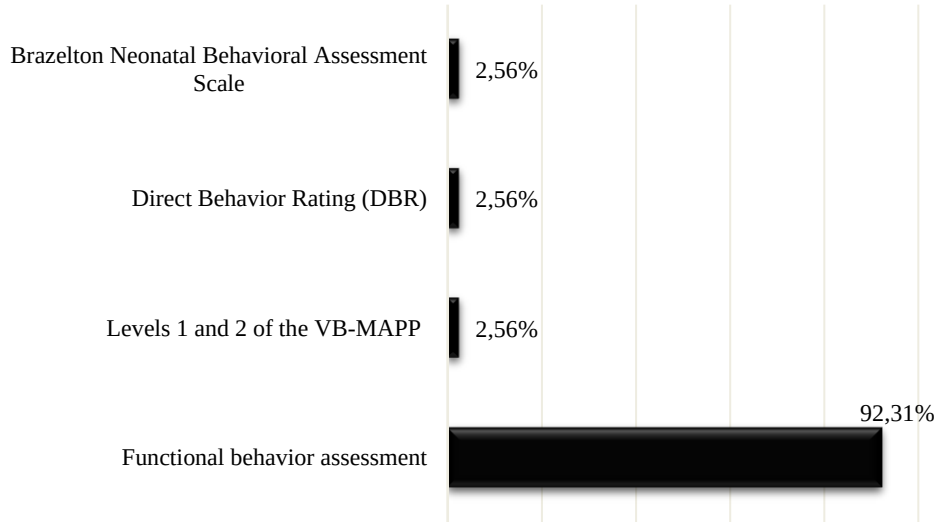
When it comes to the participants, approximately half of the studies (51.2%, N = 20) involved professionals working in school settings. More specifically, among the studies that included school-based professionals as participants, 50% (N = 10) of them were special education teachers, 45% (N = 9) were general education teachers, and 5% of them (N = 1) were school psychologists. In addition, among the studies conducted with special education teachers, two of them also included other professionals, such as special education program coordinators (Kunnavatana et al., 2013b) and graduate students (Pence & Peter, 2018). Participants also included parents of children with typical development, ASD, or other disabilities (23%, N = 9), professionals involved with services for people with disabilities or disorders (10.2%, N = 4), such as behavior analysts, therapists, and supervisors in community residences, as well as caregivers for elderly individuals and children with ASD (5.1%, N = 2). Participation was also observed among graduate students (5.1%, N = 2), undergraduate students (5.1%, N = 2), and teachers preparation program students (2.5%, N = 1).

Considering the 39 studies included in the review, a total of 619 participants were taught to conduct some form of assessment. The number of participants per study ranged from 1 (Cho & Blair, 2017; Maag & Larson, 2004) to 90 (Chafouleas et al., 2014).

Type of assessment taught

Figure 3 presents the results with the percentage distribution regarding the type of assessment taught.

Figure 3
Distribution of Assessment Types Taught in Percentages



As for the behavioral assessment method or instrument whose implementation was taught, most studies (92.3%, N = 36) focused on teaching some form of functional behavioral assessment (FBA). The term FBA refers to, both, indirect assessment tools (interviews and questionnaires) and direct assessment tools (descriptive functional analysis and experimental functional analysis), whose purpose is to identify the function of a given behavior (Cooper et al., 2020).

In this review, the functional assessment methods whose implementation were taught were categorized into two groups: (1) experimental functional analysis, a direct assessment tool in which an-

tecedent and consequent events are systematically manipulated in order to identify their effects on the behavior (Cooper et al., 2020); and (2) functional assessment, which included other direct assessment tools (e.g., observation) and indirect assessment tools (e.g., questionnaires) used to identify the function of one or more behaviors. It was found that the implementation of experimental functional analysis was taught most frequently (53.8%, N = 21), followed by functional assessment (38.4%, N = 15). The three remaining papers, included in the review, taught the implementation of instruments designed to identify present and absent skills in the repertoire of the assessed individual. For example, Barnes et al. (2014) taught the implementation of Levels 1 and 2 of the *VB-MAPP* (Sundberg, 2008), which assesses the presence or absence of language skills in children with ASD and other developmental delays. Chafouleas et al. (2014) taught the implementation of the *Direct Behavior Rating* (DBR), which evaluates behaviors related to student engagement in academic activities. Myers (1982) taught the implementation of the *Brazelton Neonatal Behavioral Assessment Scale*, an assessment that evaluates newborns characteristics.

When it comes to the steps taught, among the 21 studies that provided instruction on conducting experimental functional analyses, most of them (66.7%, N = 14) taught the implementation of four conditions. The most frequently taught conditions were attention, tangible, demand, and ignore. One study (4.7%) taught the implementation of two conditions (attention and tangible), one of them taught five (alone, attention, play, demand, and ignore), and six of them (28.6%) taught three, most commonly attention, demand, and play. It is noteworthy that one study (Rispoli et al., 2016) taught the implementation of two types of functional analysis. In one of them, four conditions were tested (attention, tangible, demand, and play) and, in other, three (attention, tangible, and demand). Among the 15 studies that taught other functional assessment methods, half (50%, N = 8) of them instructed participants to fill out questionnaires related to the function of interfering behaviors – an example of indirect assessment. Additionally, some studies taught the implementation of direct observations and the completion of ABC data sheets (31.2%, N = 5), while others taught the analysis of ABC data and graphs to identify the function of interfering behavior (12.5%, N = 2). The study conducted by Barnes et al. (2014), which focused on *VB-MAPP* implementation, assessed the accuracy with which participants carried out the steps necessary to conduct Levels 1 and 2 of the instrument. The studies carried out by Chafouleas et al. (2014) and Myers (1982) evaluated the accuracy with which participants implemented the DBR and the *Brazelton Neonatal Behavioral Assessment Scale*, respectively.

Experimental design

Single-subject designs were used in most of the studies (79.5%, N = 31), while group designs were employed in 20.5% of the studies (N = 8).

Among the studies that adopted single-subject designs, the one that was most frequently used was the multiple baseline across participants design (58%, N = 18). One study (Alnemary et al., 2015) combined the multiple baseline across participants design with a multiple elements design, and another one combined the multiple baseline across participants and across conditions design (Lloveras et al., 2022). One study adopted a multiple baseline across tasks design (Cho & Blair, 2017). The second most frequently used design was the pre- and post-test design (12.9%, N = 4). The multiple elements design was applied in three studies (9.7%), while the multiple probe and AB designs were used in two studies each (6.4%). Intrasubject and intersubject designs were adopted in one study (3.2%).

Teaching procedure

Every study adopted more than one procedure to teach the implementation of assessment methods and instruments. Thirteen studies (33.3%) used Behavioral Skills Training (BST), a teaching package that combines four strategies: instructions, modeling, role-play, and corrective feedback. It is noteworthy that BST strategies may vary; for example, modeling can be conducted live or through vid-

eos. Among these 13 studies, five of them explicitly referred to the use of BST, while eight did not mention BST by name but described the use of its four strategies. For instance, Lambert et al. (2013) taught supervisors and managers of a community residential service for adults with intellectual disabilities to conduct an experimental functional analysis using written descriptions of the assessment procedures, modeling, and role-play with feedback.

BST components were also identified in studies that did not adopt all four strategies, but used two or three of them. For example, Machalicek et al. (2010) provided written descriptions regarding the conditions of an experimental functional analysis, and participants received feedback during a role-play conducted via videoconference. Thus, this study used three BST strategies (instructions, role-play, and corrective feedback), but did not include modeling.

In addition to the use of strategies that are part of BST, it was found that eight studies (20.5%) delivered training asynchronously, while the remaining ones (79.5%, N = 31) conducted training synchronously.

Discussion

This review aimed to systematize studies that taught the implementation of behavioral assessment methods or instruments, based on PRISMA. It sought to identify the methods or instruments that have been taught, as well as the procedures and experimental designs that have been adopted. A total of 39 studies that provided training in some type of behavioral assessment to professionals working in schools; parents of children with typical development, ASD, or other disabilities; caregivers; undergraduate and graduate students were identified. Among these studies, most of them (92.3%, N = 36) focused on teaching the implementation of a type of functional behavioral assessment. With respect to experimental design, single-subject designs were predominant. Every study adopted more than one instructional procedure, with the most frequently used components being those that are part of BST (instructions, modeling, role-play, and corrective feedback).

An interesting aspect regarding the results refers to the high frequency with which teachers, both, coming from general and special education, were taught to conduct experimental functional analyses. This result can be explained by several reasons, which were discussed by Stoiber and Gettinger (2011) and Cordeiro et al. (2021). Among these reasons, it is noteworthy the stress that interfering behaviors impose on teachers, their lack of knowledge and skills to manage such behaviors, and, as a consequence, the need for external support to address their students' interfering behaviors. Therefore, teaching teachers to conduct functional assessments, specially an experimental functional analysis, enables them to plan instruction based on the individual needs of students who engage in interfering behaviors. Furthermore, identifying the variables that maintain such behaviors enables for the implementation of strategies that prevent their occurrence. Additional benefits of training teachers to implement experimental functional analyses include reducing the impact of interfering behaviors on learning and preventing the development of social and emotional difficulties in students (Fergusson et al., 2005); enhancing teachers' ability to promote and teach socially significant behaviors more effectively (Rispoli et al., 2015); and minimizing school staff members' dependence on external consultants and researchers (McCahill et al., 2014).

Another noteworthy finding concerns the fact that every study adopted combinations of instructional procedures, such as instructions, models, videos, role-play, and feedback. Such intervention "packages" were effective in teaching how to implement behavioral assessment methods and instruments. The use of more than one instructional procedure was also identified by Leaf et al. (2019), who conducted a systematic literature review to identify studies that taught the implementation of DTT to parents and professionals working with individuals with ASD. Similar to this review, every procedure identified in the study conducted by Leaf et al. (2019) was effective to teach DTT implementation

across all target populations (e.g., parents of children with ASD, therapists).

It is also relevant the fact that some studies adopted computer-based procedures, such as modules, online lectures, and videoconferences (e.g., Alnemary et al., 2015; Chafouleas et al., 2014; Pence & Peter, 2018; Tsami et al., 2019; Turgeon et al., 2020). These types of resources are important because they enable the training and supervision of professionals located in geographically distant areas, where there are few or no behavior analysts. On the other hand, internet connectivity issues may cause participants to feel frustrated. One alternative to minimize such difficulties is the use of asynchronous procedures, which do not require researchers and participants to be simultaneously present. Among the advantages of asynchronous procedures over synchronous ones, it is noteworthy their greater cost-effectiveness; ease of dissemination; the possibility for a single researcher to train a much larger number of individuals simultaneously; and their potential to reduce access barriers and reach people living in remote areas (Marano et al., 2020). Considering the increasing need for training parents and professionals, particularly those working with children with ASD, it is likely that, in the future, more studies will adopt asynchronous procedures to train the implementation of, both, assessment and instructional methods based on ABA.

A limitation of this study was the exclusion of theses and dissertations. Several factors justify this criterion. The methodological quality of theses and dissertations can be highly heterogeneous, as they are produced by researchers in training, typically with limited experience (Higgins et al., 2022). Moreover, they are frequently not available in standardized international databases. This unpublished nature of many theses and dissertations hinders proper citations and sources traceability, which compromises systematic reviews transparency and reproducibility and makes future updates more difficult (Booth et al., 2016; Hopewell et al., 2007). Finally, theses and dissertations generally do not undergo the peer-review process in the same way as papers published in indexed scientific journals. This process is essential to ensure the scientific quality, validity, and reliability of the evidence included in a systematic review (Paez, 2017).

As a consequence of such limitation, Martone's (2017) doctoral thesis and Silva's (2017) master's dissertation were not included in this review. Martone aimed to evaluate the effects of a procedures package designed to teach the skills necessary for *VB-MAPP* implementation to professionals in the fields of psychology and education. Silva, in turn, assessed the effects of a package consisting of self-instruction, video feedback, and role-play on teaching how to implement the *Assessment of Basic Learning Abilities – Revised* (ABLA-R) to professionals working with individuals with developmental disorders.

Given the relevance of the studies conducted by Martone (2017) and Silva (2017), as well as the lack of studies that aim to teach the implementation of behavioral assessment methods or instruments, it is suggested for future studies to include theses and dissertations in their reviews, despite the challenges associated with their use in systematic reviews. This includes the possibility of conducting searches in databases that provide exclusive access to such documents. Theses and dissertations may offer data that is not available in formally published literature, serving as an important forum for the dissemination of studies with null or negative results that would, otherwise, remain unpublished. These studies can, therefore, enhance the scope and currency of reviews and promote a more balanced representation of the available evidence (Paez, 2017).

Conclusion

Within the scope of ABA, behavioral assessment is essential for the subsequent planning of programs that aim to teach new behaviors or reduce interfering ones, especially in interventions targeting individuals with ASD. Training parents and professionals who work with this population enables for the intervention to be intensified and, when it comes to the parents, enhances involvement in their chil-

dren's treatment. Specifically, regarding behavioral assessments, this review revealed a predominance of training focused on the implementation of methods designed to identify the function of interfering behaviors. However, the implementation of methods and instruments aimed at assessing the presence or absence of language, academic, and other skills, constitutes a crucial step (especially during initial assessments) that provides the necessary information to select appropriate goals for subsequent interventions. Therefore, future research should invest in training parents and professionals to implement this type of assessment.

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Nota do Autor

Essa pesquisa é parte do programa científico do Instituto Nacional de Ciência e Tecnologia sobre Comportamento, Cognição e Ensino (INCT-ECCE), financiado pelo Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq, processo nº 465686/2014-1) e Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP, processo nº 2014/50909-8).