

Behavioral analysis applied to autistic spectrum disorder: therapeutic aspects and instruments used - an integrative review

Análise do comportamento aplicada ao transtorno do espectro autista: aspectos terapêuticos e instrumentos utilizados - uma revisão integrativa

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RESUMO

Objetivo: investigar a literatura produzida sobre os aspectos terapêuticos e instrumentos utilizados na Análise do Comportamento Aplicada às pessoas no Espectro do Autismo. **Método:** Trata-se de uma Revisão Integrativa da Literatura, realizada em ambiente virtual, nas bases de dados Literatura Latino Americana e do Caribe em Ciências da Saúde - LILACS, Medical Literature Analysis and Retrieval System On-Line - MEDLINE e SciELO - Scientific Electronic Library Online, no período de 2008 a 2018. Foram identificados 10 estudos que atendiam ao objeto de estudo. **Resultados:** a ABA é perfeitamente aplicável às pessoas no Espectro do Autismo, sendo uma ciência que apresenta constructos fortes um corpo de conhecimentos robusto e compreensíveis por pais/cuidadores e professores, desde que devidamente acompanhados por profissionais qualificados. Além do mais, o uso de instrumentos diversos tais como escalas e até games, pode ser muito útil para a aquisição de habilidades essenciais à vida em sociedade e à instalação de comportamentos adequados. **Conclusão:** a ABA se mostrou um processo científico fundamental para identificar as relações funcionais entre o comportamento observável e o contexto ambiental, sendo possível afirmar que a projeção de intervenções baseadas nesta ciência, podem promover uma melhoria no bem-estar social e pessoal, ganhos cognitivos, linguagem e aprendizagem.

Descritores: Análise do Comportamento Aplicada; Autismo; Terapêutica.

ABSTRACT

Objective: to investigate the literature produced on the therapeutic aspects and instruments used in the Analysis of Behavior Applied to people in the Spectrum of Autism. **Method:** It is an Integrative Review of Literature, carried out in a virtual environment, in Latin American and Caribbean Literature in Health Sciences databases - LILACS, Medical Literature Analysis and Retrieval System On-Line - MEDLINE and SciELO - Scientific Electronic Library Online, in the period from 2008 to 2018. Ten studies were identified that met the object of study. **Results:** ABA is perfectly applicable to people in the Autism Spectrum, being a science that presents strong constructs a body of knowledge that is comprehensible and comprehensible by parents /caregivers and teachers, provided they are duly accompanied by qualified professionals. Moreover, the use of diverse instruments such as scales and even games can be very useful for acquiring the essential skills to life in society and the installation of appropriate behaviors. **Conclusion:** ABA has been shown to be a fundamental scientific process to identify the functional relations between the observable behavior and the environmental context, and it is possible to affirm that the projection of interventions based on this science can promote an improvement in social welfare and personal, cognitive gains, language and learning.

Descriptors: Applied Behavior Analysis; Autism; Therapy..

Introduction

Autism Spectrum Disorder Scope Conditions such as Asperger, Global Developmental Disorder (TGD-SOE) and Autism, graduating into levels - moderate or severe, comprising a triad: natural and persistent deficits in interaction and media, and even , diagram and repetitive schematics of behavior, interests, and activities.¹⁻³

Applied Behavior Analysis (ABA) investigates the variables that affect human behavior, being able to change them by modifying their antecedents (which occurred before and may have been a possible trigger for the occurrence of behavior) and their consequences. (events that occurred after the behavior occurred, and that may have been pleasant or unpleasant by determining the likelihood that they will occur again). For these purposes, ABA uses experimental and systematic methods for observing and measuring behaviors, which are defined as those actions of individuals that are observable and measured.⁴⁻⁵

Thus, ABA can be defined as a theoretical system for the explanation and modification of human behavior, based on scientific evidence, which is a rigorous, technological and professional approach. Therefore, the model understands that human behavior is influenced by the environmental stimuli that precede it (called antecedents) and are learned according to their consequences. Thus, behaviors that are followed by consequences that are specifically pleasing to the person (eg. attention or reward) tend to be repeated and learned, while behaviors that result in unpleasant situations for the subject (eg. a reprimand), tend not to be repeated or not learned.⁶⁻⁷

Behavior analysts are qualified professionals to conduct behavior analysis in its dimension, both experimental (through research) and applied (through intervention); being guided to use effective interventions, using evidence, through controlled experimental research in cases involving simple or complex behaviors and have a code of fundamental ethical principles to guide their practice.⁹

Regarding ASD, treatment for these people is generally intense and comprehensive, requiring the participation of the family / caregivers of the child / person and a multiprofessional team. Therefore, based on an evaluation performed by this team, a therapeutic plan is elaborated, which must respect the patient's need and individuality and the family may also combine more than one treatment method, depending on the case in question. Moreover, if the child is in the school context, it is essential to create the necessary conditions for the child to achieve the same learning conditions as the other students, and the application of the ABA principles may also be extended to this environment.⁹

For this reason, ABA-based programs require detailed verification of socioenvironmental factors and their interference with the behavior of the child / person with ASD, seeking possible identification of the determinants of behavior and factors that are likely to result in their repetition. This information is essential for the design and follow-up of intervention processes, including verbal and communication skills at levels of intervention intensity similar to those for cognitive and academic skills and behavioral difficulties.⁹⁻¹⁰

ABA-based programs are based on the verification of factors that interfere with the behavior of the child / person with ASD, which may result in the repetition of inappropriate behaviors. The goal of this program is to reduce such

habits and build more coherent ones.¹¹ However, for this to happen, it is important for the family / caregiver to participate in the process, since extension to the domestic environment contributes to the success of the intervention based on this approach.²⁻³

Thus, ABA presents important tools for the development of skills necessary for the children with Autism Spectrum to achieve goals such as independence, socialization and success in academic activities, where appropriate. And for this reason, conducting a study to ascertain the correct scientific evidence for the use of this method with children living in the Autism Spectrum can be very important for parents, health professionals, teachers, and others involved and interested in the theme.⁹

There are a variety of cognitive and behavioral techniques for changing thinking, mood and behavior. These are learning experiences that help a person to understand the link between his cognition, his affect and his behavior and aim at identify, test reality and correct an individual's maladaptive assumptions. The main techniques used are: identification of cognitive distortions, control of activities and schedules, use of self-help cards, skills training, performing cognitive and behavioral tasks during sessions.¹²

Therefore, this research sought to answer the following problem: What are the therapeutic aspects and instruments used in Applied Behavior Analysis for people with Autistic Spectrum Disorder? This study aimed to investigate the literature produced on the therapeutic aspects and instruments used in the Behavior Analysis Applied to people in the Autism Spectrum.

Method

This is an Integrative Literature Review, a type of study used in Evidence-Based Practice that enables the inclusion of evidence in the practice of clinical practice and provides broader information on a subject / problem, thus constituting a body of evidence. considerable knowledge. Thus, this review answers one or more questions and uses explicit methods to identify, select and critically evaluate the studies.¹³

Integrative Review is a specific method that summarizes the past of the empirical or theoretical literature, to provide a broader understanding of a particular phenomenon, drawing an analysis of the knowledge already built on previous research on a particular topic.¹⁴

The place of this study was the virtual environment in the scientific databases. Therefore, for research, a survey was conducted of the scientific production related to the use of Applied Behavior Analysis in people who are in the Autism Spectrum, using the following databases: Latin American and Caribbean Health Sciences Literature - LILACS, Medical Literature Analysis and Retrieval System - MEDLINE and Scientific Electronic Library Online -SciELO, with the descriptors: Applied Behavior Analysis, Autism Spectrum Disorder, Therapy, Assessment tools, Early interventions, Diagnosis.

Also, to carry out this research, we chose to use the Cochrane Handbook method, produced by the Cochrane Collaboration, through the free and open course of systematic review and meta-analysis provided by UNIFESP Virtual. The selection of the studies to be analyzed was based on the following inclusion criteria: 1) articles that associated the indicators Analysis of Behavior Applied to

Autism Spectrum Disorder; 2) have been written in the form of a scientific article; 3) appear in LILACS, MEDLINE and / or SciELO databases; 4) be written in Portuguese, English or Spanish and in national and international research.

The exclusion criteria were: a) written in the form of chapters or books, theses and dissertations and / or production other than articles; b) repetition of the same article, found in more than one database; c) Literature reviews of any nature; d) have ambiguity regarding some inclusion criteria.

The following stages for the research were: the choice of the theme, the preliminary bibliographic survey, the elaboration of the work plan, identification, localization and obtaining of the sources, reading of the material, file, analysis, interpretation and writing of the text.

For data collection, we used a framework type instrument, to which studies were arranged, with a view to organizing and verifying its importance and relevance to the research and theme in question. Thus, a descriptive analysis of the research was carried out, considering the inclusion and exclusion criteria, with the purpose of identifying the central objective of each article and obtaining information that supports the study in question.

Then, after gathering the selected material, the main information was grouped, and it was used in the elaboration of the study results and discussions. The analysis was made based on the literature produced on the theme, and the interlocution among authors in order to reach the proposed objective. The search for the articles produced a total of 10 articles selected by associating the following descriptors through the Boolean expression "AND":

- 1º Association: Applied Behavior Analysis and Autism - Applied Behavior Analysis and Autism;
- 2º Association: Applied Behavior Analysis and Treatment and Autism - Analysis of Applied Behavior and Treatment and Autism;
- 3º Association: Applied Behavior Analysis and Instruments and Autism - Applied Behavior Analysis and Instruments and Autism.

Results

Through the association of the descriptors identified in this research, they were grouped for analysis of the results later. The first association used "Applied Behavior Analysis and Autism", found 155 results. Of these, 128 studies were published in the LILACS database, 27 in SCIELO and no studies were found in MEDLINE. Regarding the second association "Association: Applied Behavior Analysis and Treatment and Autism - Analysis of Applied Behavior and Treatment and Autism", there were a total of 150 articles found, in which 28 belonged to the LILACS database, no articles were found. SCIELO, and MEDLINE with higher results, making a total of 122 published studies. Finally, through the third association "Applied Behavior Analysis and Instruments and Autism - Applied Behavior Analysis and Instruments and Autism", 61 references were found, among which 49 were publications in LILACS, 12 in SCIELO, and none in MEDLINE. After the analysis using synthesis matrix, represented in Figure 1, 10 articles were selected for the final sample, which were from 2008 to 2018 and with title and content consistent with the theme of this study. Of these, 04 (40%) were in Portuguese and 06 (60%) in English.

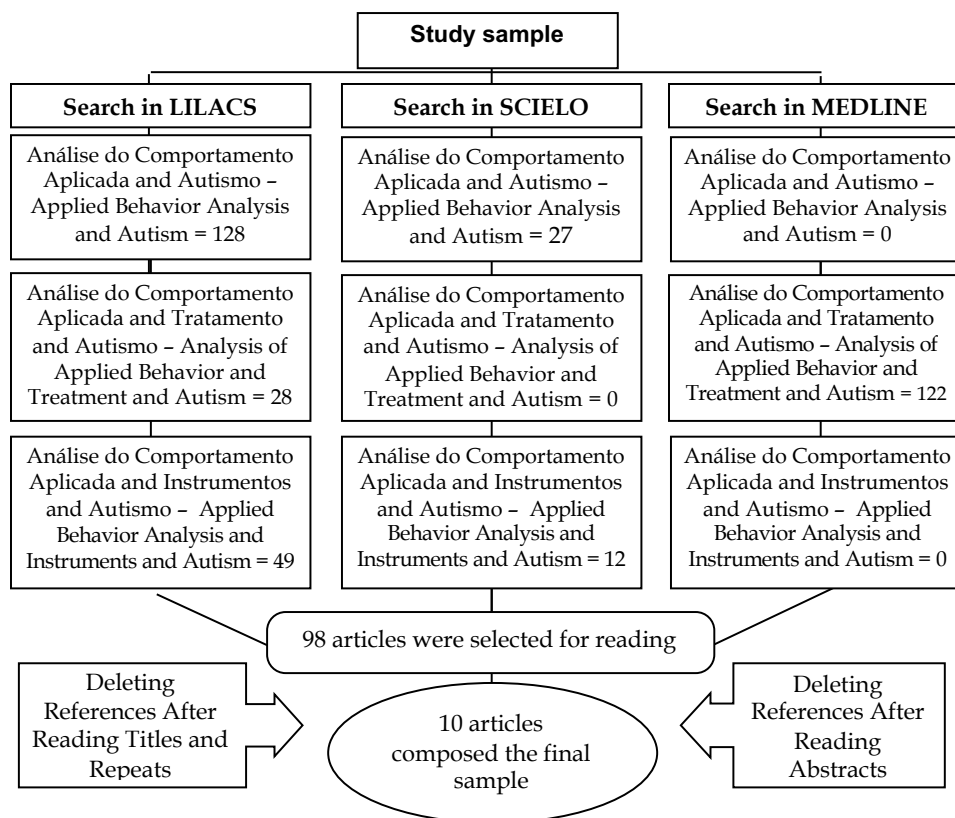


Figure 1 - Systematic arrangement of works found in all associations.

In the distribution of articles over the years studied, it was observed that the year 2013 had the largest number of publications, totaling 03 (30%). The results of the other years included in the study are shown in Table 1.

Table 1- Distribution of articles by year, from 2008 to 2017.

Publication year	N	%
2008	01	10
2010	02	20
2012	03	30
2013	01	10
2015	02	20
2017	01	10
Total	10	100

Source: Databases, 2018.

Regarding the databases, it was observed that LILACS was the database that obtained the most indexed publications, totaling 04 articles found (40%) (Table 2).

Table 2 - Distribution of sample studies from online publication source. Brazil, 2018.

Online sources	N	%
LILACS	4	40
MEDLINE	3	30
SCIELO	3	30
Total	10	100

Source: Research conducted on online databases assessed in 2018.

Chart 1 represents a synthesis of the studies used in this research after the entire analysis process, which describes the author/year, type of study, research objectives, population and sample and the conclusion of the study.

Chart 1. Survey of clinical and epidemiological studies on therapeutic aspects and instruments used in Applied Behavior Analysis for people with Autism Spectrum Disorder.

Author/year	Type of study	Objectives	Population and sample	Conclusion
ELDEVİK et al., (2010)	Experimental and Retrospective Study	To verify the therapeutic influence of behavioral analysis in preschool environments in children with ASD	309 children	Within the behavioral intervention sample, IQ and adaptive intake behavior predicted gains in adaptive behavior. Intervention intensity predicted gains in IQ and adaptive behavior.
MOTA, (2015)	Experimental Study	To evaluate evidence of sensitivity for detecting ASD from a behavioral observation instrument - Child Behavior Checklist (CBCL / 1.5-5)	114 children	The CBCL (Child Behavior Checklist) is a tool capable of performing ASD screening, highlighting the scales of emotional reactivity, withdrawal and invasive developmental problems.
TOMAZOLI et al., (2017)	Pilot and descriptive study	The aim of this study was to verify if Ages & Stages Questionnaires (ASQ) is effective for tracking cognitive behavioral changes in children with Autism Spectrum Disorder (ASD).	14 children	The ASQ was able to identify children with cognitive behavioral impairment and proved to be an easy to apply, fast to fill and low cost instrument, ideal attributes for a primary health care assessment tool.
MARQUE; BOSA, (2015)	Quasi-experimental study	To verify evidence of criterion validity of the Assessment Protocol for Suspected Children of ASD according to behavioral observation (PRO-TEA).	30 children	PRO-TEA is a potentially valid measure for the evaluation of children with suspected autism, considering that some of its items were able to discriminate children with autism from controls.
SILVA NETO et al., (2013)	Longitudinal Study	To verify the effect of a game prototype to assist psychology professionals using the Applied Behavior Analysis (ABA) methodology in the teaching of learning to children.	3 children	G-TEA is an important tool in assisting psychology professionals in solving color learning difficulties in children with Autistic Spectrum Disorder. In addition to assisting the professional in the teaching of colors for autistic children.
ELDEVİK et al., (2012)	Experimental retrospective	To verify the therapeutic influence of behavioral analysis on preschool environments in children with ASD	31 children	Children had higher IQ scores and composite scores of adaptive behavior.
GRINDLE et al., (2012)	Retrospective and experimental study	Observe the therapeutic influence of the Applied Behavior Analysis (ABA) program "in a regular school setting.	11 children	Children learned new skills by the end of 1 year and learned additional skills during a second year. Analysis of the standardized test result group (IQ and adaptive behavior) showed moderate to high effect size changes

				over 1 year, with further changes over a second year. It also showed that increases in language and learning skills
PERRY et al., (2008)	Retrospective Study	To verify the therapeutic influence of the IBI (Intensive Behavioral Intervention) program - which refers to the application of ABA principles in an intensive environment - on children with ASD	332 children	IBI has promoted a reduction in the severity of autism, gains in cognitive and adaptive levels, as well as a doubling of the developmental rate of children.
FLANAGAN et al., (2012)	Retrospective Study	To verify the therapeutic influence of the IBI (Intensive Behavioral Intervention) program - which refers to the application of ABA principles in an intensive environment - on children with ASD.	61 children	The IBI group had better results in all measured areas, with milder autism severity, greater adaptive functionality and higher cognitive skills. The results support the effectiveness of community-based IBI and suggest that earlier age at initiation of treatment may increase the likelihood of better outcomes compared to comparison conditions.
PETERS-SCHEFFER et al., (2010)	Retrospective Study	To verify whether supervision intensity is associated with outcome in preschool children with autism who received intensive and early behavioral intervention.	20 children	Supervisory intensity, along with treatment intensity and pretreatment functioning, are variables that can affect the outcome of children with autism who receive early and intensive behavioral intervention..

Source: Research conducted on online databases assessed in 2018.

Discussion

Some children are identified early for evaluation and diagnosis, either because of parental concern or through general developmental surveillance by Primary Care professionals. In addition to this subgroup, the Primary Care screening population includes other children whose families and providers have no concerns yet. It is estimated that between 42% and 55% of pediatricians perform regular assessments of young children for ASD, with providers less likely to track children from underrepresented ethnic and language groups. However, current approaches that include pediatric surveillance, general developmental screening, and parental confidence have shown that most children with ASD are identified after 4 years of age, which delays initiation of therapy and decreases the chances appropriate behavioral intervention.¹⁵

A recent US report showed that most children with ASD in the United States are diagnosed in the mean age of 4 years and 5 months. On average, the median age of diagnosis is slightly earlier for children with autistic disorder (4 years) than for children with the most broadly defined diagnoses of the autism spectrum, such as PDD-NOS (atypical autism) (4 years, 2 months) and Asperger's Syndrome (6 years, 2 months).¹⁶

Advocates for universal screening say that delays in accurate diagnosis can contribute to family distress and limit access to intervention services, especially those focused on Applied Behavior Analysis and many experts consider it important to improve short-term and long term outcomes for children. Also, while some children may have access to treatment through early intervention and medical systems while awaiting diagnostic confirmation, the number of intervention hours received without a diagnosis of ASD is generally substantially lower than many experts recommend.¹⁵⁻¹⁷

The fact is that many of the difficulties presented by children / people in the Autism Spectrum, such as language and communication, which are very common, may be related to a lack of understanding of what is spoken to them, be it a solicitation, determination or even an initiation. and / or pursuing a conversation or, by means of signals from the face or other body parts. Therefore, the teaching of communication skills can favor social interaction and functioning.

A study developed by Mota in 2015¹⁷, conducted with 114 children using the CBCL (Child Behavior Checklist) for ASD tracking, sought to verify instruments used in Applied Behavior Analysis (ABA) to people in the Autism Spectrum. Therefore, the tool proved to be efficient, highlighting the scales of emotional reactivity, withdrawal and invasive developmental problems.

In another similar study conducted in 2001¹⁶ with 14 children, evaluated the sensitivity of Ages & Stages Questionnaires (ASQ) to track cognitive behavioral changes in children with ASD. Considering that the questionnaire was able to detect that 86% of subjects have cognitive impairment, the authors concluded that the ASQ test is a good instrument for cognitive behavioral screening of children with ASD. In addition, it was shown to be a questionnaire applicable to parents with a guarantee of a faithful response to their children's real performance, being valid as a screening battery component for the identification of children at risk for Autism Spectrum Disorders.¹⁶

Still regarding the screening of TEA, in the research of Marques and Bosa in 2015, it sought to verify whether the Protocol of Assessment for Children with Suspected Autism Spectrum Disorders (PRO-TEA) was a valid measure for identifying ASD. They found that PRO-TEA was a potentially valid measure for the evaluation of children with suspected autism, considering that some of its items were able to discriminate children with autism from controls, even in a small sample. In addition, the cost is relatively low compared to international measures, and this scale should be useful in public health services. Because it is an observational and direct measure, the instrument complements others such as questionnaires and interviews, based on information obtained from parents / caregivers in which important behavioral changes are found.¹⁵

The knowledge and use of validated instruments applied to parents, caregivers, teachers and health professionals and to the children / people themselves in the Autism Spectrum is a relevant factor for the necessary evaluations, as well as for the identification of the areas most affected by the characteristics of the disorder, as well as for the establishment of interventions and consequently, the person is taught / oriented in the acquisition of essential skills, from psychomotor activities such as sitting, picking up toys, moving around, and other activities. more refined as looking at the person (s) next to you, following instructions, reading and more.

A proposal regarding the elapsed theme and the use of a game to assist

professionals in the area of psychology that use the methodology of Applied Behavior Analysis - ABA, in teaching the learning of children with ASD. The results of this study showed that the game was able to assist psychologists in solving color learning difficulties in children with Autistic Spectrum in addition to assisting the professional in the teaching of colors for autistic children. These findings corroborate Grindle's results in 2012, where the application of ABA provided children with the opportunity to learn new skills, as well as broaden those gained, especially in the areas of language and learning.¹⁹

Computer programs, web softwares, tablet or mobile applications are tools that can help the learning of children in the Autistic Spectrum. Digital resources are highly illustrative and provoke visual stimuli, so these resources can be used with caution and in teaching skills, as well as enabling functional play that assists in the socialization experience.

When it comes to behavior analysis it is necessary to create a structured environment, trained professionals and a didactic-pedagogical environment that enables a better learning. In this context, digital resources become allies in the teaching-learning process of children living in ASD, since the use of these tools, by qualified teachers or parents / caregivers, can help cognition, enabling the handling of objects, Interpreting and organizing personal knowledge, interacting and working in groups, and problem solving is a tool that helps in learning and socializing.

Attention should also be paid to the risks that excessive use of such digital resources may pose, as these are people who can easily develop and / or extend stereotypes, echolalias and other inappropriate behaviors that, instead of facilitating learning, may impair, reverse and / or retard the acquisition of reading, writing and world understanding skills.

The therapeutic influence of Behavioral Analysis on the preschool environment of children with ASD was verified and they observed that students submitted to ABA had higher IQ scores and composite scores of adaptive behavior. Similar results, however, with a larger sample were found by the same authors in 2012. They observed that the high intensity of intervention promoted greater gains in IQ and adaptive behavior.²⁰⁻²¹

Where the intensity of supervision, along with the intensity of treatment, the therapeutic method used and the pretreatment functioning, have significantly contributed to the improvement of inappropriate behaviors and even the extinction of inappropriate ones.²²⁻²⁵

The indication of treatment to the person in the Autistic Spectrum will depend on their individual characteristics, their understanding of what is required, the available environments and the established functional capacities, that is, the repertoire of mandates, as well as responses in discrimination programs. listener function and verbal or non-verbal communication. Therefore, it is essential to create a registration system that can involve all the activities that it can perform, whether in the residence, school or other therapeutic and social environments, as well as the people around it.

In research conducted with 332 children who underwent IBI (Intensive Behavioral Intervention) program - which refers to the application of ABA principles in an intensive environment - it was found that at the exit of the program beliefs had reduced severity of autism behaviors , significant gains in cognitive and adaptive levels, as well as a doubling of the developmental rate of

children.²³

Similar result was in a study in (2012) where IBI reduced the severity of autism signs, greater adaptive functionality and higher cognitive skills.²⁴⁻²⁵

In this sense, as noted in the above studies, it is appropriate to consider that ABA is perfectly applicable to people in the Autism Spectrum, as it is a science that has strong constructs, a robust and understandable body of knowledge by parents/caregivers and teachers. provided they are properly accompanied by qualified professionals. In addition, the use of diverse instruments such as scales and even games can be very useful for acquiring skills essential to life in society and the installation of appropriate behaviors.

Final Considerations

Through the findings, it was observed that delays in the accurate diagnosis of children with ASD can contribute to family distress and limit access to intervention services, which many experts consider important to improve children's short-term and long-term outcomes. Although some children may have access to treatment through early intervention and medical systems while awaiting diagnostic confirmation, the number of intervention hours received without a diagnosis of ASD is generally substantially lower than many experts recommend, reducing the intensity of treatment. slows children's development and intensifies inappropriate behaviors.

There are currently several instruments for screening / screening children with suspected Autism Spectrum Disorders. This study highlighted the Ages & Stages Questionnaires; Assessment Protocol for Children with Suspected Autism Spectrum Disorders and Child Behavior Checklist. All of these tools have been used to screen patients with ASD in large studies and have been shown to be effective in behavioral analysis.

Moreover, ABA has proved to be a fundamental scientific process for identifying the functional relationships between observable behavior and the environmental context, and it can be said that the design of interventions based on this science can promote an improvement in social and personal welfare, gains cognitive, language and also learning.

Thus, it is understood that the use of ABA assumptions, combined with technology in mobile devices and educational methods aimed at the individuality of people with ASD, can be used in the inclusion and education of such individuals, providing them with greater capabilities and skills. skills, as well as saving time and resources for teachers, parents / caregivers and health professionals in obtaining and using educational tools.

This study does not exhaust the theme, which makes it clear that further research in this line can be conducted, both to improve and / or expand this work, as well as to develop new educational and behavior analysis tools that facilitate the socio-educational inclusion, autonomy and learning of people with ASD.

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