

## YouTube as a service to support the population with autism spectrum disorder during the COVID-19 pandemic

*O YouTube como serviço de apoio à população com transtorno do espectro autista durante a pandemia da COVID-19*

*YouTube como servicio de apoyo para la población con Trastorno del Espectro Autista durante la pandemia de COVID-19*

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### ABSTRACT

With the suspension of in-person activities during the COVID-19 pandemic, YouTube may have become a source of support for the care of the autism spectrum disorder (ASD) population. This research aimed to characterize videos from channels that addressed ASD on YouTube. The characterization considered technical aspects (image and sound clarity; speech intelligibility and language adequacy; consistency between title, description and video) and content (contextualization, discussion, reference and reflection on the topic). The procedure consisted of: channel selection; examination and classification of videos (qualitative analysis of videos) that addressed one or more of the following topics: definition and description of ASD; COVID-19 pandemic; instructional purpose; rights and services. Twelve channels were selected and 40 videos were analyzed. The 40 videos met the pre-established technical and content criteria, indicating that YouTube can be a support service for the population with ASD and their caregivers.

**Keywords:** COVID-19 pandemic. Autism. Caregivers. YouTube.

### RESUMO

Com a suspensão de atividades presenciais durante a pandemia da COVID-19, o YouTube pode ter se tornado uma fonte de apoio para o cuidado da população com transtorno do espectro autista (TEA). Esta pesquisa buscou caracterizar vídeos de canais que trataram do TEA no YouTube. A caracterização considerou aspectos técnicos (nitidez de imagem e som; inteligibilidade da fala e adequação da

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linguagem; concordância entre título, descrição e vídeo) e de conteúdo (contextualização, discussão, referência e reflexão sobre o tema). O procedimento incluiu: seleção de canais; exame e classificação dos vídeos (análise qualitativa dos vídeos) que abordaram um ou mais dos temas: definição e descrição de TEA; pandemia COVID-19; objetivo instrucional; e direitos e serviços. Foram selecionados 12 canais e analisados 40 vídeos. Os 40 vídeos atenderam aos critérios técnicos e de conteúdo, indicando que o YouTube pode ser um serviço de apoio à população com TEA e seus cuidadores.

**Palavras-chave:** Pandemia COVID-19. Autismo. Cuidadores. YouTube.

## RESUMEN

Debido a la suspensión de las actividades presenciales durante la pandemia del COVID-19, YouTube puede haberse convertido en una fuente de apoyo para la población con Trastorno del Espectro Autista (TEA). Esta investigación buscó caracterizar videos de canales TEA en Youtube. Fueron considerados aspectos técnicos (claridad de imagen y sonido; inteligibilidad del habla y adecuación del lenguaje; concordancia entre título, descripción y video) y de contenido (contextualización, discusión, referencia y reflexión sobre el tema). El procedimiento incluyó: selección de canales; examen y clasificación de vídeos (análisis cualitativo de vídeos) que abordaron uno o más de los temas: Definición y descripción de TEA, Pandemia COVID-19, Finalidad didáctica, Derechos y servicios. Se seleccionaron 12 canales y se analizaron 40 videos. Los 40 cumplieron con los criterios técnicos y de contenido, lo que indica que YouTube puede ser un servicio de apoyo para la población con TEA y sus cuidadores.

**Palabras clave:** Pandemia del COVID-19. Autismo. Cuidadores. YouTube.

## INTRODUCTION

As a result of the COVID-19 pandemic, preventive measures were proposed and encouraged by agencies and institutions (Organização Pan-Americana de Saúde [OPAS], n.d.a), with a strong impact on the restructuring of the routine of the entire society. This scenario brought challenges to society, especially when considering vulnerable groups, such as those with autism spectrum disorder (ASD/autism).<sup>1</sup> One of the challenges was related to the characteristics of ASD, which could cause additional suffering for them and their caregivers with the change in routine (Brito *et al.*, 2020; SBP, 2020). Additionally, this resistance to sudden changes in routines and changes in sensory functions could make it difficult for people with ASD to adopt preventive measures, such as wearing a mask.

It is important to specify the characteristics of people with autism given that ASD is a neurodevelopmental disorder. The American Psychiatric Association (APA, 2014) reports that the fundamental characteristics are deficits in communication and social interaction in multiple contexts and restricted and repetitive behavior patterns. Added to these conditions is the fact that a central aspect of the disorder is the severity of the condition in people with ASD. The variation in the intensity of each person's characteristics implies the specificity of care, which also varies from individual to individual. Some people with ASD are able to live independently throughout their lives. Others have needs for different types of support and may require integrated intervention services across different areas, such as health, education, employment and social services (OPAS, n.d.b).

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1 In this work, the expressions "autism" or "ASD" will be used interchangeably.

For people with ASD who use intervention services, the suspension of in-person activities has had serious implications. Those who previously attended daycare centers/schools and/or in-person appointments with specialized professionals, for example, were no longer able to do so. In other words, in addition to their routine, the care that met their needs was also affected, adding a new challenge to the daily lives of families of people with ASD.

Given the implications of the interruption of services, it is possible that caregivers found support to continue providing care online. In other words, they could turn to different platforms, whether to learn something new, clarify doubts or receive tips. This search could even function as a protective factor, especially during social distancing, when the lack of guidance and specialized instructions from professionals is a stress factor for both caregivers and people with specific needs (Rose *et al.*, 2020).

In fact, digital technologies have taken on a central role in the pandemic context, ensuring communication, access to information and even remote teaching and work (Comitê Gestor da Internet no Brasil [CGI], 2021). In social media, specifically, it was estimated that in 2019 there were a total of 149 million active Brazilian users. The platforms most used by them were YouTube (95%), Facebook (90%), and WhatsApp (89%) (PagBrasil, 2019). During the pandemic, the Why Video survey, conducted in August 2020, indicated that 91% of Brazilians spent more time using YouTube and indicated it as their preferred video platform (Batista, 2020).

In light of these data, it is also worth considering the preference of social media users for a certain type of information vehicle. According to Kinast (2019), YouTube users tend to prefer watching instructional and tutorial videos rather than reading manuals and support texts.

The frequent searches on YouTube by people suggest that it is necessary to produce a systematic mapping of the topics broadcast on this social media and characterize them considering parameters of the topics covered. At the same time, it seems relevant to question the quality and basis of the content presented in the videos made available on YouTube. In the digital age, the collection of online data from existing materials, such as media produced by a user without any ties to the researcher, is already a type of methodology (Salmons, 2017).

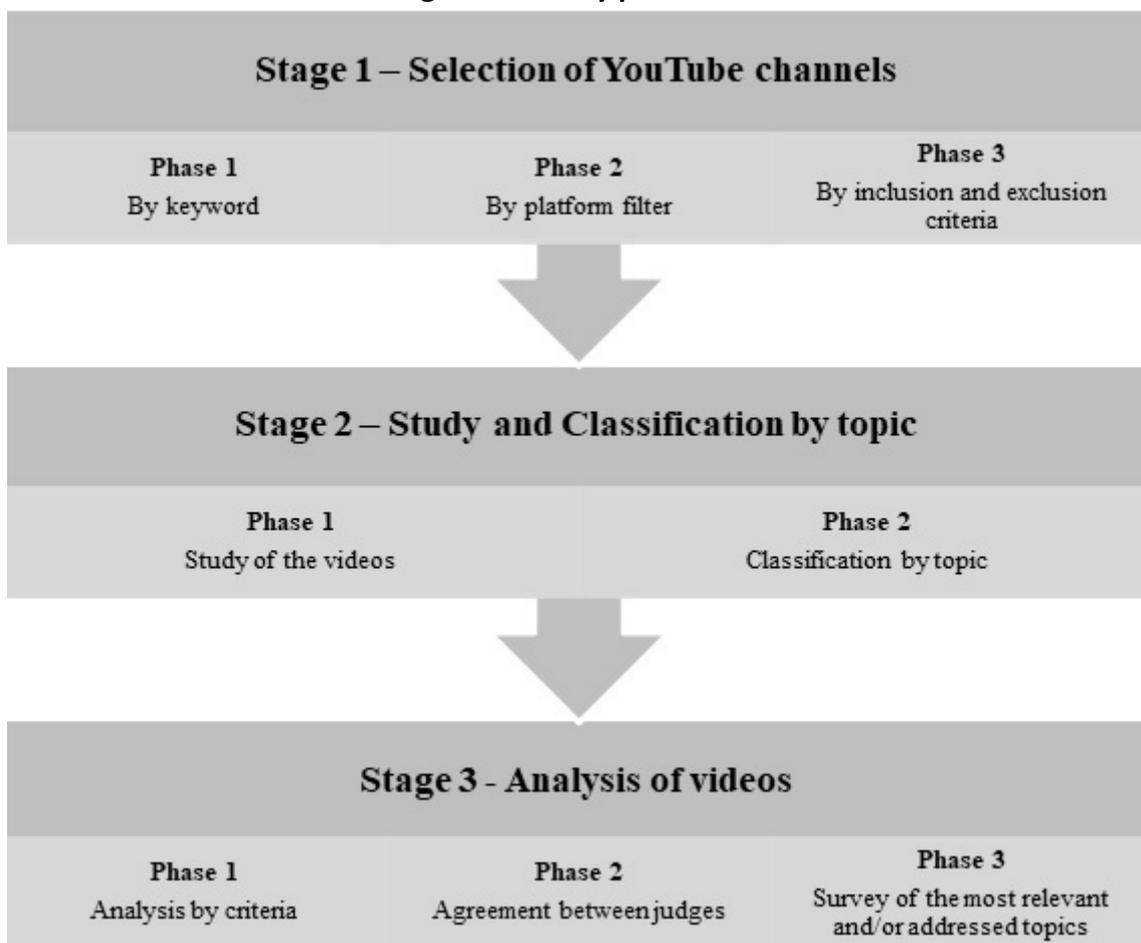
The suppression of in-person care for people with ASD, the challenges for caregivers and the possibility of seeking guidance in new media suggest the need to deepen knowledge of the material offered to adults who are responsible for people with autism. Therefore, the objective of this research was to characterize videos from channels that addressed ASD on YouTube. The characterization considered technical aspects (sharpness of image and sound; intelligibility of speech and appropriateness of language; agreement between title, description and video) and content (contextualization, discussion, reference and reflection on the topic).

## METHOD

This study was guided by the qualitative research method existing online (Salmons, 2017). In this type of study, data are collected from available material, created without interference, influence or request from researchers. The requirement is that the material to be analyzed be available on the networks without any direct contact between researchers and content producers and/or users of the networks (Salmons, 2017).

The general procedure was organized into three stages (Figure 1). Stage 1 consisted of three phases for the selection of YouTube channels. Stage 2 consisted of the study and classification of part of the videos from the selected channels according to the topics covered. In Stage 3, the videos from the channels selected in the previous stages were analyzed, considering technical aspects (sharpness of image and sound; intelligibility of speech and adequacy of the language used; agreement between title, description and video) and content (contextualization, discussion, reference and reflection on the topic). Figure 1 shows a diagram of the general procedure.

**Figure 1 – Study procedure.**



Source: prepared by authors (2020).

### STAGE 1: SELECTING YOUTUBE CHANNELS

Stage 1, selection of YouTube channels, was carried out in August 2020 and consisted of three phases: 1. search; 2. search refinement; and 3. selection of YouTube channels. To reduce bias or direction in the results, due to the search algorithms used by the platform, the search was carried out with the Google user logged out and using the anonymous internet browsing mode.

Phase 1—search—aimed to find channels that addressed the topic of autism. The keywords (autism, autistic, ASD) were used in the search engine provided by YouTube.

In Phase 2—search refinement—YouTube channels were selected, aiming to identify sources of dissemination of relevant information that addressed autism and served as a support for families, professionals and people with autism. The channels were chosen because they grouped together a set or series of videos, presenting organization of content, standardization of the language used and coherence between topic and objectives.

To this end, the type filter was applied to the results of the initial selection for the term autism, choosing the channel item and the relevance classifier. This classifier was chosen because it selects active channels, with a greater number of content updates and greater viewer engagement (likes, video viewing time and comments made on recent or old videos).

In Phase 3—selection of YouTube channels—the first 40 channels selected in the search were examined according to the following inclusion and exclusion criteria:

*Inclusion criteria:* channels in Portuguese (audio and subtitles); with more than ten videos posted (a smaller number of videos would make it difficult to assess the type of content, video format, line of work, and theoretical basis); that were active (i.e., had at least one video posted in August 2020 and at least one response to a comment in August 2020).

*Exclusion criteria:* channels that systematically replicated videos posted on other channels; with videos shorter than 5 minutes only; promotional videos.

After applying the inclusion and exclusion criteria, 26 channels remained, which made up the material used in Phase 2.

## STAGE 2: EXAMINATION AND CLASSIFICATION BY TOPIC

In Stage 2, four topics were listed to classify the subjects presented in the videos. They were selected based on their relevance to the objective of this study, namely:

- *Definition and description of autism/ASD:* videos about the definition, main characteristics and/or diagnosis of autism.
- *COVID-19 pandemic:* videos related to prevention, personal care, assistance with social isolation and information about the rights of people with autism during the pandemic.
- *Instructional objective:* videos that teach skills to people with autism, such as reading, personal hygiene or strategies for going to the dentist and walking around the mall, among other examples.
- *Rights and services:* videos that address any aspects of Brazilian laws related to people with autism, including the provision of systematized education and health services.

The videos were classified according to their topics by examining at least 25% of the total video time and reading the title and description for each selected video. The videos were examined one by one, on each channel, until at least one video on each topic was found. The order was from the most recent (published closest to August 2020) to the oldest (published furthest from August 2020), without considering a maximum publication date. Videos that addressed topics other than those listed were classified as "Other topics".

After the classification was completed, all channels that had a video on two or more of the topics listed were selected for the next stage. Thus, of the 26 channels studied, 12 were selected for analysis in Stage 3.

## STAGE 3: ANALYSIS OF VIDEOS

For each of the 12 channels selected in Stage 2, the video posted closest to August 2020 that addressed at least one topic was selected. Some of the channels did not have posts on each of the topics, so a total of 40 videos were analyzed.

To determine the suitability and quality of the channels, two independent judges analyzed each of the selected videos in relation to two categories: technical aspects and content.

The analysis performed by the judges consisted in watching the selected video in its entirety and assigning a score to the content. For each of the two analysis categories (technical aspects and content), scores from 1 to 3 were assigned, as follows: (1) when the video did not meet the criterion; (2) when the video partially met the criterion; and (3) when the video fully met the criterion. The score was recorded in a protocol and the average of the scores (sum of the analysis per item divided by the number of items) was calculated and used in the analysis. An example of the work performed is shown in Tables 1 and 2. Fictitious names were assigned to videos and channels to preserve any identification of authors or those responsible.

**Table 1 – Protocol for analysis of videos. Category Technical Aspects.**

Channel title – Studies on autism Analysis Judge 1 - Category Technical aspects					
Video title	Topic	Item 1	Item 2	Item 3	Mean
Autism or Asperger syndrome?	Definition and description	2.0	3.0	2.0	2.7
Hygiene care during the pandemic	COVID-19 pandemic	2.0	1.0	2.0	1.7
....	Instructional objective	--	--	--	--
Health insurance rules for autistic people	Rights and services	3.0	3.0	3.0	3.0

Source: prepared by the authors (2020).

**Table 2 – Protocol for analysis of videos. Category Content.**

Channel title – Studies on autism Analysis Judge 1 - Category content						
Video title	Topic	Item 1	Item 2	Item3	Item4	Mean
Autism or Asperger syndrome?	Definition and description	2.0	3.0	3.0	2.0	2.5
Hygiene care during the pandemic	COVID-19 pandemic	1.0	3.0	2.0	2.0	2.0
....	Instructional objective	--	--	--	--	--
Health insurance rules for autistic people	Rights and services	3.0	3.0	2.0	3.0	2.75

Source: prepared by the authors (2020).

It should be noted that the *Technical aspects* category considered the quality of the media, given that a quality video ensures that the content reaches the viewer without communication noise and/or distortions. The analyses were performed according to the following specifications:

- Item 1 — Image and sound: sharpness and framing of the image, sharpness of the sound and absence of noise.
- Item 2 — Speech and language: intelligibility of speech and appropriateness of the language used.
- Item 3 — Agreement between title, description and video: the three items must cover the same subject.

The *Content* category took into account the information conveyed in the videos according to the following specifications:

- Item 1 — Contextualization of the topic: presentation of an introduction and/or contextualization of the content covered.
- Item 2 — Discussion on the topic: existence of some type of analysis regarding the topic covered.
- Item 3 — Reference: presentation of literature references (articles, books) on the subject and/or the approach of examples of personal experience regarding the topic.
- Item 4 — Reflection: establishment of relationships between the topic presented and the life context of autistic people and/or their families.

During the viewing of the videos, topics that stood out were selected for discussion, either because of their relevance or their repetition in the videos watched.

## RESULTS AND DISCUSSION

In this study, 12 channels were selected for examination. Each video presented on the channel could be compatible with one or more topics. Of the total, seven videos had content that was compatible with the four established topics (Definition and description, COVID-19 pandemic, Instructional objective and Rights and services). Eleven of the 12 channels addressed the topic “Instructional objective”; ten presented “Definition and description”; ten dealt with “Rights and services”; and nine covered “COVID-19 pandemic”.

The analysis of the videos in each category suggests that all were evaluated as “partially compliant” (scores greater than or equal to 2) and “fully compliant” (scores equal to 3) (Table 3). These data indicate that the videos analyzed presented content consistent with their titles and topics.

**Table 3 – Minimum and maximum scores for the overall assessment of videos belonging to each topic.**

Category	Technical questions		Content	
	Minimum score	Maximum score	Minimum score	Maximum score
Definition and description	2.30	3.00	2.50	3.00
COVID-19 pandemic	2.30	3.00	2.25	3.00
Instructional	2.30	3.00	2.25	3.00
Rights and services	2.30	3.00	2.50	3.00

Source: prepared by the authors (2020).

Lower scores in the technical questions were attributed, in most cases, to videos that did not show an alignment between description, title and content, mainly due to inserting an advertisement in the video description space, instead of describing the topic addressed. Although less frequent, there were also cases where the sharpness of the video or audio image was compromised, leading to a decrease in the score awarded.

Below is a discussion of the results obtained from the analysis of the videos according to topic.

### DEFINITION AND DESCRIPTION

All videos that presented “Definition and description” mentioned the general characteristics of autism, with some noting it briefly and others in more detail. In the briefer mentions, the diagnosis of ASD was emphasized, presenting: how and by whom it is performed; what instruments professionals use; the importance of diagnosis in adult life (considering that the neurodivergent brain changes the functioning of the individual and their interaction with the environment) and the possible effects of post-diagnosis of autism in adults.

In the more detailed mentions, the characteristics were commented on along with warnings about common myths about the condition, according to what the channel owners most often heard someone say in some situation or read in comments published on the internet. The most frequently cited myths stated that individuals with ASD have high abilities, do not like social interaction, and do not communicate. Regarding ASD, they stated the following: it is curable; it cannot be diagnosed before the age of three; mild autism does not require treatment; it arises because of a lack of interaction with other children in childhood or excessive exposure to television.

In the videos, the information about the myths was sometimes based on studies, sometimes on personal experiences. In any case, there are data in the literature that may suggest some factors that favor the existence of ideas classified as myths. In general, ASD symptoms can be identified more consistently between 12 and 24 months (SBP, 2019). The results of Osterling and Dawson

(1994) indicate the possibility of identification in the first year of life. However, ASD is generally diagnosed around four or five years old (Siegel *et al.*, 1988; Fountain, King and Bearman, 2011; SBP, 2019; Maenner *et al.*, 2020). This late diagnosis may favor the myth that it can only be made at three years of age.

Another myth addressed by some videos was that people with ASD do not communicate and/or interact socially. This misconception can be transmitted by a set of difficulties resulting from deficits in shared attention (SA). SA is considered vital for the development of language, for understanding people's communicative intentions and for imitation with role reversal (Tomasello, 2003; Lampreia, 2007; Backes, Zanon and Bosa, 2017). When there are deficits in it, the child with ASD may be deprived of critical social experiences, impairing their typical symbolic (Dawson and Lewy, 1989; Mundy and Stella, 2000) and sociocognitive development (Tomasello, 2003).

When children have difficulty understanding others as intentional agents and operating with linguistic symbols, their understanding of the existence of a context and the difference in perspective between listener and speaker will also be impaired (Tomasello, 2003; Backes, Zanon and Bosa, 2017). Although they do not mention SA and the possibility that deficits in it are related to the myth about communication, the videos clarify that social difficulties can be modified and that not all autistic people present them to the same extent. In fact, there are three levels of severity of symptoms (APA, 2014).

Furthermore, the videos state that speech and writing are not the only forms of communication, mentioning touch as an example, in addition to reaffirming that other forms of communication can be learned. These observations are consistent with the literature, since ASD is not a degenerative disorder, it is common for learning and compensation to continue throughout life (APA, 2014). Thus, the videos highlight the importance of early identification of ASD, the advantages of which are also discussed in the literature. Among the advantages is the possibility of early and immediate intervention (Aiello, 2002), bringing significant gains in the child's cognitive and adaptive development (SBP, 2019), in addition to alleviating family stress and anguish (Filipek *et al.*, 1999).

Dawson (2008) and Dawson *et al.* (2012) even suggest that early and intensive intervention can prevent ASD from manifesting itself completely, as it coincides with a period of development in which there is greater brain plasticity, that is, greater possibility of modification in response to environmental experiences. With greater brain plasticity, learning can be optimized, side effects of the disorder can be prevented, and functional abilities and quality of life can be improved (Rogers and Vismara, 2014).

Some of the videos analyzed also highlighted that diagnosis can be made in adulthood, especially in cases of mild autism. The owner of one channel reported, based on her own experience, that accepting the diagnosis in adulthood is a challenge, since part of her life was spent without knowing about it. In this sense, the importance of treating ASD, even in mild cases, is reinforced. In addition, it is worth considering that late diagnosis can cause harm to the child's overall development, since intervention will also be delayed (SBP, 2019).

Another characteristic of ASD is fixed and highly restricted or perseverative interests, abnormal in intensity or focus (APA, 2014). Regarding the myth that all individuals with ASD are "geniuses", some videos mention hyperfocus, explaining that it can also occur in relation to unusual objects, such as rocks. However, if used functionally, such as in technology or music, it can be confused with high abilities. One of the videos also mentioned that the series *The Good Doctor* (2017) may have reinforced the misconception about genius. It also highlights that, in addition to autism, the protagonist Shaun Murphy also has savantism, a rare syndrome in which the person has great intellectual ability.

Regarding the fact that ASD is caused by a lack of interaction with other children in childhood or by excessive exposure to television, the videos warn that this is untrue, as there are even indications of a genetic influence. Indeed, the APA (2014) presents a range of risk factors, both nonspecific environmental (such as advanced parental age, low birth weight and fetal exposure to valproic acid), as well as genetic and physiological (through heritability, genetic mutations or polygenic risk, in which several genetic loci make small contributions).

Finally, regarding the existence of a cure for ASD, the videos warn that there are treatments to alleviate the symptoms, but that a cure has not yet been demonstrated. The warning is true and, just as there is no cure, there is also no universal treatment that can be applied in all cases (Bruna, n.d.). There are a variety of therapies aimed at treating ASD and each one meets a specific need, since there is a great variation in the clinical manifestation of the symptoms (Ministério da Saúde, 2000).

## COVID-19 PANDEMIC

Despite the impact of the pandemic on the daily lives of people with ASD and their caregivers, this was the least discussed topic on the channels selected for this study. Of the videos published, four were presented by directors or professionals from institutions, three by young or adult autistic people, and two by mothers of people with autism. The subtopics addressed considered different moments of the pandemic, dealing with school rules, hygiene care, and mental health care, and they were mostly based on experiences with students, patients, and children.

According to guidelines from the Ministry of Health (Ministério da Saúde, n.d.), given the situation created by the pandemic, many measures were adopted to prevent contamination and spread of the virus. Among these measures, social distancing may have been the most complex, since it restricted access to therapies, schooling, outings, and social interaction. For the population with ASD, social interaction is one of the areas that may be compromised (APA, 2014). Thus, social distancing can harm the development of people with ASD, especially those whose therapies were aimed at reducing harm in this area.

In the videos presented, the mother of a three-year-old child with ASD shares her personal experience with social distancing. She talks about the decisions she made when her child returned to in-person classes (August 2020), given her fear that social distancing would harm his development and the school's assurance that it was adopting health measures. In September 2020, the World Health Organization (WHO) released new instructions regarding the opening of schools. The document highlights the negative aspects of suspending classes, including the discontinuity of learning and harm to children's development. These points are consistent with the insecurities highlighted in the video. However, the document clarifies that even if health precautions are taken, there is no way to guarantee that there will be no risk of contamination (OMS, 2020).

Still on the subject of the risk of contagion, a video made by a professional to guide therapists who continued to provide in-person home care highlighted the importance of using the child's own toys and materials and avoiding taking the same materials from house to house. Care to prevent the spread of the virus is important not only in relation to the use of the child's materials, but also in the use of masks, social distancing and proper hand hygiene (whether with alcohol or soap), although it is not possible to guarantee zero risk of contamination (OPAS, n.d.a).

With regard to the total suspension of care, the recommendations in the videos generally indicated that parents and guardians should be cautious. Some parents sent questions to these channels, asking about the possibility of withdrawing their child from school, given that the private school was still being paid for and the child was not benefiting from online classes. One channel was assertive, referring to the legislation that guaranteed the right to schooling from early childhood education to high school, highlighting that withdrawal from school would be subject to legal penalties (Brasil, 2013). It also guided the dialogue, seeking discounts and solutions with the school faculty.

Regarding the difficulties encountered in remaining focused during online classes, the suggestions presented in the videos were for parents and guardians to try to reproduce the school environment at home. They recommended the following: that there be a table that resembled the school table; that the materials be arranged in a similar way; if the child brought a snack, that the lunch box be prepared as usual; and even that the child be dressed in the school uniform. All of these measures and precautions were suggested so that the environment would provide clues that, despite being at home, it was time to study. This recommendation is consistent with the guidelines of the alert note issued by the SBP (2020), which highlights the importance of organizing different environments, according to the activities, ensuring, as far as possible, the continuation of the routine.

The videos presented by autistic people raised questions about the loneliness caused by social distancing and its possible consequences, such as, for example, the increased incidence of depression. In one of the videos, an adult man with ASD says that, despite the difficulty in interacting, the loneliness of social distancing brings feelings of sadness. In another video, an adult woman with ASD reports, based on her experiences, that the increase in depression occurs because of drastic changes in routine and uncertainty. In the study carried out by Maia and Dias (2020) with university students, the results indicated an increase in the rates of depression, anxiety and stress during the pandemic period.

## INSTRUCTIONAL OBJECTIVE

Regarding the “Instructional objective”, more than 70% of the selected videos presented tips based on the most frequently asked questions by the channel’s followers. In addition to tips for training social skills, strategies were presented on how to help children with ASD in different daily activities, such as putting away toys, holding a pencil, oral hygiene, and wearing a mask.

Common strategies were found in the videos for the different activities. They were generally based on pairing activities with reinforcers in modeling and shaping. One of the videos even makes it clear that these are techniques derived from behavior analysis.

A reinforcer is a stimulus presented contingent on a behavior and maintains it or increases the frequency of its occurrence in the future (Cooper, Heron and Heward, 2019). Pairing an activity with objects or situations of interest favors its performance. Although only one video mentioned the term “reinforcer”, it can be recognized in the suggestions of the other videos. To help with children’s oral hygiene, for example, it is suggested that hygiene be paired with something that pleases them, such as the presence of a toy. It is then explained that the child will be more motivated to brush their teeth because when they do so, it is in the presence of something (i.e., something is presented) that they enjoy and, over time, the act itself becomes motivating.

Shaping is a procedure that consists in differentially reinforcing successive approximations of behaviors until a target behavior is reached, so that the result is a new behavior (Cooper, Heron and Heward, 2019). Differential reinforcement is presenting a reinforcer for responses that meet a specific criterion, but not for other similar responses (Cooper, Heron and Heward, 2019). When teaching how to use a mask, it is possible to use shaping or gradually introduce a condition to achieve a new behavior. For example, in a video that aimed to guide caregivers in teaching how to use a mask, the information was that the area of the face covered by the mask can be gradually increased. Along with the progressive increase in the area of the face covered by the mask, the child’s behavior of keeping the mask on is reinforced with each approach until, at a certain point, they feel comfortable wearing the mask when necessary.

Modeling occurs when someone does something that produces a consequence for the person who is called a model. The behavior of the model and the consequence produced works as an antecedent stimulus for the behavior of another person, who may have a behavior similar to that of

the model (Cooper, Heron and Heward, 2019). In other words, modeling happens when an individual observes and reproduces the behavior of someone they have observed.

In a video, modeling can be observed when the mother demonstrates how she was teaching her child with ASD to perceive the needs of others. She uses a doll that makes a crying noise when its belly is pressed and that laughs after being caressed or given a bottle. At the first sound of the doll crying, the child puts both hands over its ears. The mother then asks what the “baby” probably needs, drawing the child’s attention to the doll. Then, she says that the “baby” is hungry, that she wants affection and, in each condition, she tells and does with the doll what the child should do.

The child responds by placing the bottle in the doll’s mouth, caressing its face or hugging it, while the mother holds its hands and assists with its movements until they are appropriate. Appropriate because, the first time the child picks up the bottle, for example, instead of gently placing it in the doll’s mouth, she hit its face with it, in a movement similar to hammering.

This demonstration illustrates that the mother uses two different procedures: modeling and shaping. While modeling the child’s responses (who observes the doll laughing and stopping crying as a result of the mother’s caresses or the provision of the bottle), the mother also introduces shaping. This becomes clear when the child’s responses to the needs of the doll, which simulates the other, are gradually brought closer to what is socially expected. According to the literature, modeling can be an effective supplement to shaping, especially in teaching skills to children with ASD or other developmental delays (Secan, Egel and Tilly, 1989; Catania, 1999).

In addition to providing strategy tips, some videos warn that it is important to understand each child’s needs and take them to different professionals for an evaluation. This observation is consistent with the literature (Ministério da Saúde, 2000; OPAS, n.d.b). For example, when using a pencil, the video emphasizes that resistance to holding it may be due to sensory, motor or interest factors, and requires an evaluation. Based on the results, the professionals will be able to indicate the best intervention for each case.

There were also videos with tips based on the personal experiences of adults with ASD. One of them talked about preparing food, mentioning that its texture can make it difficult to eat, but that this can be made easier if the food is cooked. In another video, it was reported that changing routines was a challenge and that making small changes to simple daily activities helped in the acceptance that not everything will happen in a rigid and unchangeable way. Examples of simple changes were: watching different movies than the ones they always watched; reading books on different subjects, and trying to talk to other people, besides the most familiar ones.

## RIGHTS AND SERVICES

This theme was found in ten of the 12 channels examined in this study. The topics were discussed in reports and interviews with experts, such as doctors, lawyers, and psychopedagogues, among others. Of the ten videos on “rights and services”, four were conducted by professionals or directors of institutions, another four were conducted by people with autism, and two were conducted by the mother of an autistic child. The subtopics of the videos covered a variety of content, such as therapy methods, schooling, and labor market regulations. Two videos discussed applied behavior analysis (ABA), highlighting that it is a science that has shown numerous positive results when used with the population with ASD. In one of the videos, which was an interview with a doctor, there was a question about the advantage of the doctor who treats the child with ASD having knowledge of ABA. In the interviewee’s opinion, the doctor does not need to be an expert in ABA but should at least know the basics. In his speech, he argues that professionals involved in the child’s development process must work along the same lines of action, hence the need for knowledge, even if basic.

A third video also discussed resources offered by behavior analysis. The Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP) (Sundberg, 2008) was indicated as one of the main protocols for assessing children with autism used by professionals who work with ABA. This protocol assesses the development of the verbal repertoire of children based on 170 milestones, observed at three levels: 0–18 months; 18–30 months and 30–48 months (Martone, 2017). The professional who presents the instrument talks about the importance of identifying the repertoire for developing more assertive planning.

Considering models of services offered to people with ASD, the video produced by an adult man with ASD questioned the format of these offers: universal or planned according to the specificities of each person; he suggests that the objective of the service should be based on the preferences and abilities of each individual, avoiding a sequence of failures that can lead to discouragement. According to him, searching for areas of interest to develop intervention planning can lead to better engagement results for people with ASD.

Regarding early diagnosis, one mother warns other mothers of young children undergoing diagnosis about possible “false negatives”. She states that some pediatricians may be less familiar with the signs of autism and attribute delays to differences in development, as was the case with her child. However, as a comprehensive assessment was conducted with a multidisciplinary team, the ASD diagnosis was given before the child was three years old, allowing for immediate intervention. Early diagnosis and, therefore, early intervention are rights that enhance the development of children with ASD (Aiello, 2002; Dawson, 2008; Dawson *et al.*, 2012; SBP, 2019).

Aspects of school education were addressed in videos that dealt with formal guidance for individualized care for students with ASD, early childhood education, and the importance of teacher training. A public defender was interviewed by the mother of a child with autism. The interview addressed the importance of the Individual Development Plan (IDP) or Individualized Educational Plan (IEP). The document highlights the need for individual assessment and planning to be prepared by a multidisciplinary team, together with parents and school staff, to provide specific conditions for the development of students with ASD, for example. The design of the IEP or IEP should enhance the student’s development, setting teaching and assessment goals according to their specificities.

Regarding early childhood education, it was emphasized that, in this environment, signs of autism may stand out when observing behaviors emitted both in interaction with other children and when requesting and performing tasks. To this end, teachers and other professionals involved with children are advised to receive training that provides them with tools for observation, as well as access to protocols that guide assessment. This video considers the age range of 12 to 24 months, the initial period of early childhood education, which is not required by law in Brazil (Brasil, 2013). The review carried out by Camargo and Bosa (2009) points to the relevance of early childhood education in the development of all children. Even so, the authors emphasize that, with regard to children with ASD, the development of social competence skills depends on the adoption of a set of measures, such as teacher training and their appreciation as professionals.

Still on the subject of the right to education, a mother makes considerations about teachers being trained to conduct a broader assessment, which includes repertoires prior to academic content. She mentions the importance of the teacher recognizing how long the student can remain seated, whether they are hypersensitive to colors, noise, and crowding, among others. Hypersensitivity is a characteristic that may be present in a child with ASD (APA, 2014).

In the literature, studies indicate that planning assertive strategies can favor the inclusion process (Benítez *et al.*, 2017) and, for this, it requires specially trained professionals. The recognition of special education as an area of knowledge and teaching modality is important. The special education professional must work throughout the entire school education (Brasil, 1996).

The possibility of collaborative teaching stands out (Mendes, Vilaronga and Zerbato, 2014), in which the special educator and the regular classroom teacher plan the activities together, as an alternative to reduce barriers and promote accessibility. The job market was a subtopic considered in two videos. In one of them, the guidance refers to the celebration of the 29<sup>th</sup> anniversary of the creation of law 8213/91 (Brasil, 1991), which regulates the possibility of formal work for people with disabilities. The law does not specifically mention people with autism, but it increases the possibility of training for “people with disabilities”. The presentation recommends that people with ASD read the law, understand their rights and, in times of pandemic, seek more legal information that protects their labor rights.

A practical bias was adopted in another video about the job market. It was produced by an adult woman with ASD, dealing with the choice of whether or not to disclose the diagnosis in the job selection process. According to her, there is considerable prejudice. Therefore, she advises that the person evaluate whether or not to disclose, being aware of the pros and cons, regardless of the choice made. In the literature review carried out by Talarico, Pereira and Goyos (2019), the need for access to information about the specificities of people with ASD by employers was highlighted, as well as the need to expand knowledge about work rights, as a way of favoring the process of insertion in the market.

Although it does not constitute the majority, the material produced from the perspective of a person with ASD has, in addition to the theoretical contribution, the sharing of experiences lived in daily life. In this way, the content is produced including the understanding of the person with ASD about facing social barriers.

## FINAL CONSIDERATIONS

The present study aimed to characterize videos from channels that addressed ASD on YouTube, considering technical and content aspects. The inclusion and exclusion criteria adopted by the researchers allowed an initial view of the content on ASD made available to parents and caregivers on the platform’s channels.

The results showed that all the videos analyzed met the objectives for which they were intended. In other words, all the videos met the technical and content criteria previously established by the researchers. In addition, much of the information presented in the videos was compatible with data from specialized literature. The relevance of these findings is to demystify the understanding that the content of materials posted on the internet is always of dubious quality, especially when they are not linked to professional services or educational institutions. Furthermore, the study indicates the existence of a diversity of topics on ASD that, combined with the quality of their presentations, suggests that YouTube can be used as a support service for the population with ASD and their caregivers.

Considering the significant number of accesses to this media, especially during the COVID-19 pandemic, it is necessary that the quality of the material offered continues to be investigated. Therefore, it is suggested that future studies increase the number of channels, videos on each topic, and topics to be critically analyzed.

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**How to cite this article:** PEREIRA, Letícia Rinolfi; COVRE, Josiane Fernanda; PICHARILLO, Alessandra Daniele Messali; GIL, Maria Stella Coutinho de Alcantara. YouTube as a service to support the population with autism spectrum disorder during the COVID-19 pandemic. **Revista Brasileira de Educação**, v. 30, e300057, 2025. <https://doi.org/10.1590/S1413-24782025300058>

**Conflicts of interest:** The authors declare they don't have any commercial or associative interest that represents conflict of interests in relation to the manuscript.

**Funding:** The first author received support through a Scientific Initiation scholarship from PIBIC UFSCar/CNPq (128947/2020-9). This work was carried out within the framework of the National Institute of Science and Technology on Behavior, Cognition, and Teaching (INCT-ECCE), with support from: the Brazilian Federal Agency for Support and Evaluation of Graduate Education (Capes – 88887.136407/2017-00); the National Council for Scientific and Technological Development (CNPq – 465686/2014-1); and the São Paulo Research Foundation (Fapesp – 2014/50909-8).

**Authors' contributions:** Pereira, L.; Covre, J.; Picharillo, A.; Gil, M.S.: conceptualization, methodology, formal analysis, and writing – original draftwriting – review & editing.

**Data availability statement:** The research data are available from the corresponding author upon reasonable request.

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Received on May 24, 2022

Reviewed on April 16, 2024

Approved on May 29, 2024

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