

## **English as a Foreign Language (EFL) Reading Metacognition Awareness in Chilean learners with Autism Spectrum Condition: An Exploratory Study**

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### **Abstract**

Developing second/foreign language (L2) comprehension skills can represent a challenging endeavor for learners with autism spectrum condition (ASC) because their social and verbal cognition may be impaired in terms of abstract reasoning, organizing, and retelling events, inferring intentions, and identifying emotions contained in a text. Thus, it becomes relevant to explore how these learners experience metacognitive strategies when reading in a foreign language. Therefore, the purpose of this study is to explore how Chilean elementary learners with ASC perceive their metacognitive awareness and how they strategize their L2 reading. To this end, 27 elementary learners with ASC were asked to report on their perceptions of metacognition in L2 reading by means of a metacognitive awareness reading strategy inventory and semi-structured interviews. Findings revealed that participants displayed a medium level of awareness toward metacognition, with problem-solving strategies being the most frequently reported. The difficulties faced by these learners were related to an excessive focus on details rather than general ideas, concentration issues, avoidance of multitasking processes in reading, and not seeking help to ensure comprehension. Implications are discussed in terms of cognitive approaches to reading comprehension and the pedagogical need for nurturing a strategic approach to metacognition in L2 reading to increase autonomy and automaticity.

**Keywords:** autism spectrum condition, L2 reading awareness, metacognitive skills, English language learning

Developing reading comprehension skills is crucial for accessing information and acquiring vocabulary (Grabe, 2009). However, it can represent a challenging endeavor for learners with autism spectrum condition (ASC)<sup>i</sup>, as they require specific, systematic, and sustained support throughout their schooling. These learners generally display significant difficulties with social interaction and verbal communication, often focusing on very specific interests and details (American Psychiatric Association, 2013). Several studies have addressed how metacognition unfolds among learners with ASC and have reported first language (L1) reading comprehension difficulties in these individuals (Brosnan et al., 2015; Grainger et al., 2014; Nation et al., 2006). More specifically, learners with ASC have been found to struggle often with aspects of reading comprehension such as abstract reasoning, organizing, and retelling events, inferring intentions, and identifying emotions contained in a text (Randi et al., 2010). In the Chilean educational system, there are no databases that provide an accurate number of individuals with ASC (Toledo & Basulto, 2020). As of 2018, the number of students with ASC enrolled in educational institutions in Chile was 1838, representing 1% of the total number of students with special needs (Ministerio de Educación Chile, 2018).

There is a lack of studies addressing L2 reading metacognition in students with ASC, which calls for a better understanding of how learners with ASC could use metacognitive strategies and increase awareness of their own cognitive processes. Therefore, the purpose of the present study is to explore how young Chilean learners with ASC perceive their metacognitive awareness and how they strategize their L2 reading. The research questions that guided the study were as follows:

1. What is the nature of the self-reported reading metacognitive awareness and strategy use displayed by elementary learners with ASC?
2. What are the main perceived difficulties that these learners face when applying metacognition in their L2 reading?

## **Literature Review**

### **Metacognitive Processes in Language Learning**

The term “metacognition” was coined by Flavell (1976) to refer to an individual’s conscious ability to understand, control, and regulate his or her own cognitive processes to enhance learning. In other words, while cognition is necessary to perform a task—e.g., complete a reading task by translating, applying grammar rules, and guessing meaning from contexts (Khezrlou, 2012)—metacognition is essential for understanding how the task was performed (Garner, 1987). According to most authors in the field (Efklides, 2008; Jacobs & Paris, 1987), there are two main dimensions rooted in metacognition: Metacognitive knowledge (i.e., the knowledge of cognition), and metacognitive regulation (i.e., the regulation of cognitive processes). Metacognitive knowledge entails three broad subcategories: Declarative knowledge (what a learner knows), procedural knowledge (how the learner uses what she/he knows), and conditional knowledge (when and why a learner uses specific strategies). Metacognitive regulation encompasses planning (selecting the most suitable strategies to perform a task, activating previous knowledge, and setting goals), monitoring (controlling progress, checking, and modifying plans and strategies), and evaluation (assessing the ongoing process). Consequently, reading before activities (planning), checking one’s learning progress (monitoring), and reflecting on the strategies being used (evaluating) are actions that can be

taken to enhance L2 reading (Anderson, 2008). L2 readers make use of metacognitive knowledge and awareness to apply strategies to reading tasks, which will advance their L2 literacy (Li & Wang, 2010). Metacognitive strategies are crucial for achieving reading comprehension and promoting learners' autonomy when reading (Khezrlou, 2012) but they need to be developed in learners. Once learners are trained to use and manage these strategies, they will likely require less effort and their use will become more automatic. Afflerbach et al. (2008) emphasized the difference between reading strategy and reading skill. While the former is related to the reader's deliberate process of controlling and directing their efforts when reading a text, the latter entails automatic operations that result in reading efficiently and fluently without the reader's awareness. The more the learner consciously practices with strategies, the more skillful at reading they become. In this respect, evidence from research has suggested that adequate training on reading strategies can help learners become fluent and skilled L2 readers (Zhang et al., 2014).

### **Autism Spectrum Condition and Reading Comprehension: A Cognitive Perspective**

Autism spectrum condition (ASC) is a neurological developmental condition of the brain. It exists within a spectrum, so it has variable manifestations across the lifespan, gender, intellectual level, and language ability (Happé, 2011). Still, these diverse manifestations may share common elements, as individuals with ASC typically face challenges regarding social interaction, restrictive activities, and repetitive behavior (Rosello et al., 2020). Moreover, individuals with ASC may experience sensory processing difficulties concerning sound, vision, touch, taste, and smell, which include hypersensitivity, hyposensitivity, and general sensory overload (O'Neill & Jones, 1997). This may prompt individuals with ASC to resort to "stimming" (repetitive movements or sounds) as a form of self-regulation when feeling overwhelmed by certain stimuli.

Language ability has been linked to reading comprehension in neurotypical children as well as learners with ASC. Word reading and oral language abilities have predicted reading comprehension in ASC children who display average and above-average nonverbal cognition (Davidson et al., 2018; McIntyre et al., 2017). Moreover, the variability in the reading profiles of ASC children regarding word recognition and decoding skills and their relationship with reading comprehension has been documented in the literature (Henderson et al., 2014). Meta-analyses have reported that semantic knowledge (based on receptive vocabulary) and decoding skills (assessed by means of nonword/single word tests and sentence reading accuracy and reading rate) can predict reading comprehension (Brown et al., 2013), in line with a simple view of reading proposing that "successful reading comprehension depends upon proficient word-level decoding and linguistic comprehension" (Henderson et al., 2014, p. 780).

From a cognitive perspective, learners with ASC exhibit comprehension issues that are related to language processing, communicative output, and repetitive behavior (Williamson et al., 2012). More specifically, there are three cognitive factors that may explain the deficit in their reading comprehension abilities. First, the Theory of Mind, put forward by Baron-Cohen (1989, 2001), established that identifying and understanding behaviors are key cognitive skills to understanding one's mental states and the mental states of others, as they allow individuals to make predictions regarding others. In individuals with ASC there is a deficit in this regard, as intentional communication, pretend play, inferring others' emotions and beliefs, and differentiating facts from fiction are behaviors that are typically underdeveloped. The

development of the Theory of Mind involves an emerging linguistic sophistication that can be evidenced by mastery of complement sentences such as “John said/thought that aliens landed in his backyard,” and the explicit reasoning between beliefs and reality (Durrleman et al., 2017, p. 2). A lack of such mastery in ASC children results in difficulties regarding a range of reading comprehension tasks, which includes recognizing and understanding emotions, incorporating pragmatic language skills, determining characters’ goals in stories, recognizing false beliefs, and understanding trickery (Westby, 2004).

The second factor that can explain reading comprehension issues in learners with ASC is the weak central coherence hypothesis, which states that individuals with ASC may fail to integrate detail into a global perspective (Quill & Stansberry, 2017), likely paying more attention to the parts rather than the whole; therefore, they display remarkable visual-spatial skills and process information better in a visual way than in other formats. Weak central coherence is associated with difficulties in integrating background knowledge to facilitate text comprehension, a crucial factor in achieving metacognition (Wahlberg & Magliano, 2004).

Finally, a third factor that explains the deficit in individuals with ASC is related to executive functions. A deficit in executive functions, as Pennington and Ozonoff (1996) stated, signifies a struggle to complete complex tasks such as organizing actions or events, following multi-step directions, planning, and combining information from several sources to solve a problem. Impaired metacognitive monitoring abilities (the ability to correctly represent one’s own mental state) might play a role in these processes. Grainger et al. (2016) found that these abilities are significantly reduced in learners with ASC and that although executive control processes are not impaired, these learners display reduced accuracy in their judgments of confidence (a task involving metamemory monitoring and control processes) and use monitoring to oversee executive control processes less frequently than neurotypical children. It must be noted that while we acknowledge that reading comprehension in learners with ASC may be affected by many linguistic and cognitive components (Davidson, 2021) and that not every ASC individual will display the full range of difficulties identified by the Theory of Mind, weak central coherence, and executive function issues, it is relevant to consider these cognitive aspects when designing interventions, accommodating strategies, and choosing instructional practices that match students’ needs. This approach will likely result in better comprehension outcomes (Chang et al., 2020).

### **Studies Addressing learners with ASC and Reading Comprehension**

Evidence has indicated that aspects related to the Theory of Mind and central coherence such as perspective taking, making inferences, relating to past experiences, finding context clues, and generalizing to other contexts can influence reading comprehension processes in learners with ASC (Carnahan et al., 2011). These skills are crucial for text comprehension and require the use of social knowledge and direct instruction. Since learners with ASC may encounter difficulties in learning rules and strategies as well as breaking down information (Goldstein et al., 2001), they can navigate these difficulties by adopting problem-solving strategies such as re-reading (Howard et al., 2017). Another aspect to consider is the challenges that individuals with ASC face regarding organization and coherence. In this respect, Diehl et al. (2006) found that when ASC children were asked to retell a story in their own words, they preserved the order of events in the story but with no reference to causal explanations in it. Furthermore, learners

with ASC may present challenges in understanding non-literal language in texts (Suh et al., 2014).

With respect to metacognitive development in reading, several studies have suggested that individuals with ASC display a deficit (Brosnan et al., 2015; Grainger et al., 2016). Nguyen et al. (2015) argue that in order to enhance the comprehension and metacognitive processes of learners with ASC effectively, they require visual, concrete materials, and questions that are brief and straightforward. The authors go on to identify a series of steps that can be followed to help learners with ASC through the reading process. These steps include pre-reading, while-reading, and post-reading activities, providing access to prior knowledge, making connections between ideas, engaging in congruent discussions, and summarizing the understanding of a given text. Indeed, a strategic approach to reading can provide learners with ASC with a clear orientation to accomplish the task (Asaro-Saddler & Saddler, 2010). In this respect, Rebolledo et al. (2021) assessed reading comprehension, meta-comprehension skills, motivation for reading, and strategy use in 41 Chilean high school students with ASC. The performance of learners with ASC was compared with neurotypical learners' questionnaire scores in those variables, and a think-aloud protocol was carried out to characterize the strategies reported. Results suggested that learners with ASC performed as well as neurotypical students in reading comprehension measures but displayed poor performance in the pragmatic aspects of reading, such as recognizing the characters, acknowledging their social, cultural, and historical context, and understanding the social functions that were embedded in the text. Metacognitive comprehension, motivation for reading, and the use of comprehension strategies were found to be significant predictors of reading performance. However, low-level strategies (i.e., paraphrasing) were more prominent in the reported strategies of these learners with ASC.

Regarding L2 reading development in learners with ASC, most studies have addressed how ASC can affect bilingual language learning—that is, the performance of learners who are exposed to more than one language from a very early age. The literature suggests that bilingualism does not seem to negatively impact language development for children with ASC (Drysdale et al., 2015) and that encouraging the use of more than one language by the parents can facilitate opportunities for sharing meaning in communication (Soto & Yu, 2014). In an English L2 context, Barletta (2018) reported a case study of a six-year-old child with high-functioning autism learning English upon arrival in the U.S. Through observations and recorded tutorial sessions, the author found that the child's language development was very similar to the phases that typically developing children go through, but that some autistic features (impaired social interaction skills) hindered L2 learning. The author also reported metalinguistic awareness (by means of L1 comments about salient linguistic features) and heightened interest in details displayed by the learner, behaviors that are in line with the weak central coherence model. The intense focus on salient features has been shown to help learners with ASC to learn new words by means of L2 teaching approaches focused on total physical response, which requires learners to repeat the words verbally and in action (Sari et al., 2021). In sum, the findings discussed in this section highlight the relevance of metacognitive approaches in L2 reading comprehension, and the need to document the perceptions of learners with ASC toward metacognitive awareness in L2 reading settings.

## Methodology

This exploratory study aimed to gather the perceptions of the metacognition of students with ASC in L2 reading. To this end, a mixed-methods sequential explanatory design was selected, which is characterized by the collection and analysis of quantitative data in a first phase, followed by the collection and analysis of qualitative data that builds on the results of the previous stage (Creswell & Creswell, 2017). Thus, the metacognitive awareness of 27 learners with ASC was quantitatively measured by means of an adapted survey – the revised Metacognitive Awareness of Reading Strategies Inventory (MARSIR) – developed by Mokhtari et al. (2018). Then, semi-structured interviews conducted with 11 participants provided a deeper qualitative exploration of their attitudes and perceptions toward L2 metacognitive reading. The main objectives of the study were outlined in the research questions: to describe the perceived use of learners with ASC metacognitive strategies when reading texts in L2, and to explore specific difficulties that these learners encountered when reading in L2.

## Participants and Context

Twenty-seven ASC children (21 males and 6 females aged 9-14 years old) participated in the study. The participants attended public and private elementary educational institutions in several cities in Chile, some of which implemented special education needs programs in their curricula. The participants' parents were contacted through several formal and informal ASC organizations in social media, following a convenience sampling approach to data collection. Most of the participants' parents reported receiving support from specialists, such as psychological therapy, pedagogical support, and occupational therapy support. All the participants' parents reported that their children had level 1 autism, which was diagnosed with tools such as ADOS, WISC-III, and M-CHAT. Eleven participants reported other diagnoses linked to ASC, such as attention deficit disorder, sleep disorder, and mixed anxiety-depressive disorder. None of the participants reported taking part in metacognitive strategy training courses prior to data collection.

In order to provide a measure of control for reading comprehension skills, the Step 1 section of the TOEFL Primary Test (Educational Testing Service, 2019) assessing reading comprehension for ages 8 and above was administered to the participants. The test contains 36 multiple-choice items assessing recognition of simple vocabulary, understanding short descriptions and formulaic expressions, and finding information in signs, forms, and schedules (Baron & Papageorgiou, 2014). Out of a group of 31 participants, 27 participants obtained scores within 1 standard deviation from the mean ( $M = 33.62$ ;  $SD = 2.26$ ) and were thus included in the study sample. The high mean score revealed that these participants' performance reached a reading comprehension level of A2 according to the Common European Framework of Reference (CEFR; Council of Europe, 2001), and were able to understand short descriptions and messages, locate information contained in signs, and infer information (e.g., unfamiliar words) from longer sentences.

Table 1 displays the background information of the 11 participants (with pseudonyms) that were randomly selected for the interview process, including age, reported associated diagnoses, type of diagnostic tool used, type of educational institution attended, and their level of metacognitive awareness in L2 reading based on the MARSIR.

**Table 1. Interview Participants' Information.**

Pseudonym	Age	Associated diagnoses	Diagnostic tool	Type of school	MARSI-R (L2)
Carlos	14	ADHD	ADOS	Private	Medium
Mariela	13	Sleep/anxiety disorders	ADOS	Public	Medium
Mario	13	None	ADOS	Public	Medium
Luciano	13	ADHD	ADOC-WISC	Private	Medium
Sergio	12	ADHD	ADOS	Public	Low
Miguel	12	None	ADIR-ADOS	Public	Low
Vicente	12	None	ADOS	Private	Medium
Andrea	11	None	ADOS	Private	Low
Francisca	11	None	ADOS	Private	Low
Ignacio	11	None	ADOS	Public	Medium
Camila	9	None	WISC	Public	Medium

## Instruments

**Revised metacognitive awareness for reading strategies inventory (MARSI-R).** An adapted version of the MARSI-R questionnaire (Mokhtari et al., 2018) was administered to assess metacognitive awareness and strategy use in L2 reading. Mokhtari et al. (2018) revised Mokhtari and Reichard's (2002) version of the instrument by means of confirmatory factor analysis. They reduced the number of items from 30 to 15 (5 items per factor) to represent a better fit for the components. This was done because several strategy statements referred to similar reading strategy constructs. These were taken out, and five strategy statements were linked to three latent factors, which displayed a good Cronbach's alpha value (.85). The reduced version of the instrument also seemed appropriate for the selected research context because learners with ASC typically do not maintain high levels of attention and display absent-mindedness when working on a task for long periods of time (Bieberich & Morgan, 2004). The instrument (Appendix A) assesses three dimensions: (a) global reading strategies, which are oriented toward a global analysis of a text (e.g., determine what to focus on while reading), (b) problem-solving strategies, which refer to strategies applied to tackle complex texts (e.g., re-reading), and (c) support reading strategies, which are related to external strategies such as using reference materials (e.g., dictionaries), taking notes, and underlining. The original version of the instrument included a 5-point scale with statements addressing the frequency of use of a strategy, ranging from 1: "I have never heard of this strategy before" to 5: "I know this strategy quite well, and I often use it when I read." The instrument was translated into the participants' L1 (Spanish) to prevent L2 proficiency from interfering with item comprehension. Google Forms were used to gather the data due to COVID-19 restrictions.

**Semi-structured interviews.** Interviews can help researchers characterize children's awareness of reading strategies and assess the value and frequency of their use (Paris & Flukes, 2005). To this end, Zoom interviews were held with 11 ASC children from the sample. To

gather qualitative data from ASC children, Rasmussen and Pagsberg (2019) suggest that matching expectations between researcher and child, staying open to communication forms, and posing precise questions are essential when conducting interviews. This approach can reduce potential issues with engaging young ASC children in conversations/interviews due to the verbal and social challenges connected to this condition (Lewis, 2009). Since preparing ASC children for the unfolding of future events is a key aspect of these learners' cognitive processes (Baron-Cohen, 2001), the interview scenario required predictability and preparation for them to understand the interview process. In addition, the researchers gathered knowledge of the characteristics of autistic learners and their potential reactions to an interview setting, as well as background information including their interests and associated conditions. The interview questions were based on the three dimensions of the MARSIR questionnaire. ASC children were aided with texts to enhance visual aids and a PowerPoint presentation that included visual elements such as GIFs and photos displaying themes related to the questions and participants' interests. A sample of the questions included in the interview (conducted in the participants' L1) can be seen in Appendix B.

## **Procedures**

**Pilot Procedures.** The MARSIR questionnaire and the semi-structured interviews were piloted to evaluate the validity of these instruments when administered to ASC children. First, the MARSIR instrument was translated into Spanish by the researchers. Then, the translated version was discussed with two other researchers to identify potential comprehension issues with the wording of the items. Next, the instrument was piloted with three ASC children, who pointed out comprehension issues with the rating scale used. The options in the rating scale (e.g., "I have heard of this strategy, and I think I know what it means") were found to be confusing due to the excessive wording and the additional meanings attributed to it. Thus, the phrasing of the rating scales was modified and replaced with single-frequency adverbs (Never, Rarely, Sometimes, Often, Always). The items in the MARSIR were also modified to fit this change (Appendix A). Furthermore, the rating scale for indicating the frequency of use for each strategy was represented visually by means of thermometer graphs, to make it easier for participants to understand the notion of frequency. In addition, the pilot participants suggested adding images to better illustrate the meaning of each item. A sample of the visual changes applied to the questionnaire items can be seen in Appendix C. The modified version of the instrument was piloted again with two ASC children, who both reported very positive reactions regarding the visual support provided in the questionnaire and a thorough understanding of the rating scale and items.

As for the semi-structured interviews, once the interview protocol was discussed with another researcher to tackle general comprehension issues, two ASC children were interviewed in the pilot stage. They did not report any major comprehension issues with the format and prompts selected. Following Rasmussen and Pagsberg (2019), the researcher interviewing the children asked herself exploratory questions after each pilot interview was conducted to reflect on the interview outcomes. These self-reflective questions included the following: What challenges did I face in the conversations? When did the conversations succeed in having the child address everyday life matters? What methods or approaches seemed useful/not useful with this child? What type of questions and researcher roles motivated the child to talk? The questions helped the researcher identify the aspects that would prompt valid responses in the semi-structured interviews.



**Data Collection.** Once the instruments were piloted, parents/guardians were contacted via e-mail and social networks (e.g., Chilean ASC communities on Facebook). They received the Google Forms link with information outlining the study and the ethical handling of the data (anonymity and confidentiality), together with a parent’s/guardian’s consent form. The link also included a section requesting learners’ background information regarding the type of support the child received and other diagnosed conditions associated with ASC. Once this information was provided by the parent/guardian, participants were administered the adapted version of the MARSIR instrument and the TOEFL Primary reading test. With respect to the semi-structured interviews, the parents/guardians of the 11 participants gave their consent in the same way described for the MARSIR instrument.

Since an interview context can represent a highly demanding and intimidating environment for individuals with ASC (Cridland et al., 2014), the measures taken to anticipate potential misunderstandings were essential. Parents/guardians were asked to inform their children’s specific requirements for the interview (which included reduced eye contact, visual aids, and fidget toys as a source of emotional support) as well as their level of interest in a given topic. The PowerPoint slides explained the interview process to both parents/guardians and participants, and the researcher made sure that each household had the required technology to carry out an online interview (i.e., computer with internet access, Zoom account). There is considerable evidence suggesting that children and adolescents with ASC are at increased risk of suffering anxiety disorders (van Steensel et al., 2011). Therefore, it was relevant to inform parents and participants that the interviews were going to be recorded and that parents could turn the cameras off if they believed that this would interfere with their child’s well-being at any point in the interview. The interviews lasted between 30 and 40 minutes.

**Data Analysis.** Descriptive statistics were provided for the MARSIR data. Means and standard deviations were displayed by component and for the total scores of participants. Following Mokhtari et al. (2018), the level of metacognitive awareness in L2 reading was described as (1) a high level of awareness ( $M = 3.5$  or higher), (2) a moderate level of awareness (between  $x = 2.5$  and  $M = 3.4$ ), and (3) a low level of awareness ( $M = 2.4$  or lower). Then, data from the semi-structured interviews were transcribed and categorized by means of qualitative content analysis (Creswell & Creswell, 2017), with a focus on codes and themes emerging from the components in the MARSIR questionnaire.

## Results and Discussion

### Quantitative Results and Discussion

Table 2 presents a descriptive statistics analysis for the MARSIR instrument data.

**Table 2. Descriptive Statistics MARSIR.**

	N	Minimum	Maximum	Mean	Std. Deviation
Global reading strategies	27	1.40	4.00	2.72	.68
Problem solving strategies	27	1.60	4.60	3.28	.76
Support reading strategies	27	1.00	4.60	2.14	.83
Total scores	27	1.67	3.72	2.70	.50

The overall scores for these participants ( $M = 2.7$ ;  $SD = .50$ ) suggest that they possessed a moderate level of awareness toward reading strategies. Regarding specific components, the highest mean was found in Problem-solving strategies ( $M = 3.28$ ;  $SD = .76$ ), followed by Global reading strategies ( $M = 2.72$ ;  $SD = .68$ ). These two components displayed a moderate level of awareness. The least frequently used component was Support reading strategies ( $M = 2.14$ ;  $SD = .83$ ), with participants displaying a low level of awareness. The trend in the results displayed is in line with studies in typically developing L2 learners. For example, Kuo and Yu (2014) found that advanced L2 learners (Chinese L2) displayed higher frequency scores for problem-solving strategies, followed by global and support strategies. The preference for problem-solving strategies may be explained by the nature of the strategies included in this component (e.g., regaining focus after being distracted, guessing the meaning of unknown words, adjusting reading pace, re-reading, stopping reading to reflect on the text). These actions are at the forefront of a strategic approach to reading complex and extensive texts, as they can help learners construct meaning and purpose.

It has been reported that learners with ASC may frequently struggle with problem-solving strategies. Although they may have a great capacity to learn rules and procedures, they struggle with processing abstract information and developing strategies to adjust to the new information (Tsatsanis, 2005). However, these results in the present study are in agreement with Howard et al. (2017), who found that ASC readers tend to adopt re-reading as a compensatory strategy for checking understanding. This is confirmed by the scores on the item addressing re-reading (When a text in English gets difficult, I re-read it to understand it better.), which was the second highest in the problem-solving strategies component ( $M = 3.42$ ).

Learners seemed to use global reading strategies less frequently than problem-solving strategies. A weak central coherence may negatively impact the way in which learners with ASC make use of these strategies, as they can experience issues with summarizing, predicting, or identifying the main idea or purpose of a text, and bringing details to a central context (Williamson et al., 2012). In addition, the use of global strategies may be impaired by poor executive function processes, since learners with ASC typically struggle with planning and organizing information in more complex ways (Pennington & Ozonoff, 1996), and reduced metacognitive monitoring abilities (Grainger et al., 2016) can prevent them from selecting strategies that help them identify what to focus on when reading.

Finally, the low scores for support reading strategies were influenced by these learners' attitudes toward seeking help from others to aid their learning. For example, the item "I discuss what I read in English with others to check my understanding" displayed low scores ( $M = 2.37$ ), suggesting that these learners chose not to involve peers in their learning process. This behavior can be related to the difficulties learners with ASC possess regarding social cognition (Boutot, 2016), which can prompt them to resort to technology and applications to solve their queries or to use problem-solving strategies that are more individualistic, such as guessing the meaning and regaining focus when distracted. Other support reading strategies scores such as taking notes ( $M = 1.52$ ) or underlining important information ( $M = 1.89$ ) also received low scores, which shows overall limited use of these types of strategies in these learners.

## Qualitative Results and Discussion

In the following sections, interview data related to the three subcomponents in the MARSI-R instrument—namely, global reading strategies, problem-solving strategies, and support reading strategies—will be presented and discussed.

### Global Reading Strategies

Visualization in reading was frequently reported when discussing global reading strategies. Indeed, the use of mental imagery helps readers to understand and remember what they read more effectively than when they do not visualize (Armbruster et al., 2003). Learners with ASC usually display high levels of visualization, which is in line with what was reported by these participants. For example, Mariela had a positive attitude toward reading and reported she was able to visualize events in interesting texts. When she was asked to read a poem, she was able to visualize through mental imagery:

Mariela: I understand everything, I already read it...I understand everything.

Interviewer: Super! So...imagine a pig....

Mariela: Yes, I can imagine a pig.

Interviewer: And what else?

Mariela: In a...wig, in a big purple wig....

Interviewer: Excellent! And what else?

Mariela: I imagine a car in the shape of a star.

Other participants also reported creating mental images of what they read, to a certain extent. However, difficulties with maintaining concentration and a lack of interest in a topic may not contribute to achieving adequate visualization. Francisca seemed to struggle with visualizing, as her attention span appeared to be short, “Mmm...sometimes [I can’t imagine]...because I lose focus.” Vicente reported re-reading as a strategy that helped him visualize and organize events as he read. For example, he said, “If I read [the same text part] constantly, then I begin to imagine.”

Learners who struggle with comprehension—including learners with ASC—are faced with challenges in their ability to construct mental models (De Kooning & Van der Shoot, 2013). Training them to construct mental images while they read can improve their ability to organize and recall information, working memory, inferential skills, integration of text with prior knowledge, and attentional and motivational processes (Woolley, 2010). Educators can boost ASC learners’ remarkably strong visual processing, which is a recognized strength in individuals with this condition (Kunda & Goel, 2008). Visualization and comprehension are aided by means of concrete visual input such as pictures or drawings (Nguyen et al., 2015). Presenting visual aids to students helps them process lexical items faster, which reduces reaction times and facilitates comprehension (Losh & Capps, 2003). When asked about the inferences they make about a text title after being exposed to one, participants tended to highlight the need for concrete visual imagery when reading in the L2.

Camila: [I understand only] a little bit because [the text] is in English...with images I would know a bit more what it was about.

Sergio: [Images are necessary] because I start by looking at the pictures and...I try to guess.

Participants were asked what they did when finishing reading a text, and the responses were varied. For example, Vicente reported confirming the purpose of the text by going back to the beginning, “I reflect on the beginning of the text because that is how I remember all the things that I have been thinking about the text, and I confirm them.” Similarly, Miguel stated that once he finished reading, he needed to verify if he understood everything by reading the text again, “I read it again to make sure everything is fine...” Miguel reported that he critically evaluated the information read (a global reading strategy) by adopting a problem-solving strategy (re-reading the text).

In order to achieve appropriate reflection, learners with ASC need to recall the text, connect it with their previous knowledge and experiences, and then retrieve a message or main idea from the text (Randi et al., 2010). This series of steps requires a good level of executive functioning that allows learners with ASC to complete complex mental processes to solve a problem (Pennington & Ozonoff, 1996). Learners with ASC must be able to monitor their own mental states and select appropriate strategies to ensure adequate executive functioning when completing complex reading tasks.

In line with the weak central coherence hypothesis (Quill & Stansberry, 2017), ASC children typically direct more attention to details of interest than to the main idea of a text, which makes them hold those smaller details in working memory (Frontera-Sancho, 2010; Williamson & Carnahan, 2010). This focus on details while reading was reported by the participants:

Mariela: The general idea [of a text] is built based on the small details of the text.

Vicente: The details give you a closer view than the general idea.

Carlos: Most of the time, whenever I read a text, I focus on the details....Every time I focus on the details, I get to know the text by heart. I know what happened.

Regarding their ability to synthesize and explain what they read in their own words, participants stated that it was challenging and reported forgetfulness and loss of focus when carrying out this task. Carlos, for instance, mentioned that because of his anxiety and haste, he would usually want to finish reading earlier than his classmates.

“I read fast to finish early and be the first to finish....Most of the time I get stuck, although most of the time it is easy for me to explain the text.”

Mariela claimed that some readings such as historical texts or articles are the ones that have more complexity due to the diversity of perspectives inherent to the texts.

“It depends, because if it is like...eh...a science fiction saga, I can usually explain it well as a single version...but if it is something about history, in which there are different ways of looking at it and I have already read about it, it is a bit difficult for me.”

Miguel and Andrea apparently found it difficult to summarize, as they feel nervous or get distracted when attempting to do it.

Miguel: I don't know how to explain it well...It makes me a little nervous.

Andrea: I don't know where to start and, in the end, I never start...And when I want to start (summarizing) I get distracted.

Since ASC children tend to process details rather than global meaning, they may struggle with summarizing and extracting the main ideas from texts, and to differentiate what is relevant from what is not (Frontera-Sancho, 2010). The extracts reviewed confirm the presence of executive function issues impinging upon global reading strategies (Pennington & Ozonoff, 1996), as these learners with ASC seem to struggle with organizing and summarizing the information being read.

### **Problem Solving Strategies**

When the participants were asked about ways to access unknown word meanings in a text, two of them reported that they would guess the meaning of the unknown word by looking at the context.

Vicente: Well, I read and focus on the way it is being written and I try to translate it into Spanish.

Mariela: I see the context of the word, what is next to it.

Cain et al. (2003) emphasized the need for learners with and without language comprehension difficulties to use the surrounding context to infer the meaning of unfamiliar words, which can favor understanding and inferencing skills. Likewise, topic familiarity will likely boost meaning-making that is taken from the context, while a heightened interest in a topic can increase engagement with the text. In this respect, several studies have indicated that attentional issues and lack of motivation represent academic challenges for learners with ASC (Koegel et al., 2010; Mayes & Calhoun, 2007). Sounds of people talking, children playing nearby, people shouting and talking loudly in class, and the tapping of school supplies on the table may disrupt the concentration of learners with ASC and make them lose interest in the reading activity. When asked about the strategies they used to regain focus on reading, the participants reported re-reading the entire text and picking up from the point where they left off. Extracts from Miguel, Andrea, and Vicente illustrate the importance of re-reading the text to achieve comprehension and break down information (Howard et al., 2017).

Miguel: When someone tries to talk to me, I lose focus....To be attentive again, I remember the last word I read.

Andrea: When my classmates are making noise....I just re-read the text.

Vicente: What I do is I try to remember the last word I read, try to find it. If I can't find it, I go back to the beginning.

Participants also reported taking breaks to reflect on the text. Mariela made reflective pauses, especially when the text was appealing.

Mariela: "Ehmm yeah....it depends. Sometimes I do it when I'm reading stuff for pleasure like Percy Jackson....Uh, yeah, I stop and think...but when I'm reading serious stuff and I stop, I get distracted."

Mariela's remarks suggest that taking breaks to reflect on the text when reading for pleasure is less disruptive than doing so when reading assigned texts, perhaps due to the motivational component of the activity. If interests are included when selecting reading topics, learners with ASC can improve their motivation to read and, as a result, their reading comprehension (El Zein

et al., 2016). Furthermore, the learner's level of interest in a particular topic has been related to reading comprehension gains and detail recall (Lee, 2009) since it can increase learner focus.

Mario and Vicente admitted not taking breaks to reflect on the text when reading but identified the benefits of doing so.

Mario: I guess [taking breaks is useful] to process the information better.

Vicente: [Taking breaks is useful] to think about what is happening.

These learners seem to be aware of the strategy to some extent, even when they do not apply it in their reading. This suggests that a more principled approach to using the strategy would increase its frequency and impact.

### **Support Reading Strategies Component**

Individuals with ASC show a strong preference for visual stimulation over auditory, which implies that word processing in reading may be easier for them to achieve when compared to verbal communication (Akin & MacKinney, 2004). In line with this, participants were asked whether they liked to read on their own silently, have someone else read the text for them, or read aloud the text on their own. Participants reported a marked preference for reading silently on their own and regarded reading aloud as an upsetting activity.

Camila: Well, I like silent reading very much....it's like reading in my mind. Reading aloud makes me feel embarrassed.

Sergio: I don't read aloud since I don't want anybody to listen.

Other participants mentioned a potential loss of focus when reading aloud.

Mario: I do silent reading....I think that reading aloud doesn't work for me....I can't focus.

Miguel: It distracts me, and I don't remember where I should be reading in the text.

The reported distractions caused by reading aloud are in contrast with the literature suggesting that learners with ASC who read aloud are more likely to maintain focus and improve their reading comprehension, which is achieved despite the distractions caused by the additional oral input they generate (Myles et al., 2002). Reading aloud can prompt the child to use prosody to appropriately chunk groups of words into meaningful phrases or sentences, following the syntactic features of a text (Schwanenflugel et al., 2004). Moreover, beginning readers who produce a more "natural" prosodic fluency while reading aloud have been found to display higher reading comprehension (Breen et al., 2016). However, the accounts produced by the participants revealed that they tend to avoid reading aloud since they find this distracting due to the additional input. These participants have not been trained to use support reading strategies such as reading aloud and may avoid using the strategy if they become anxious and lose focus.

The low scores that strategies such as underlining and circling relevant ideas received in the MARS-R were confirmed in the interviews, as these learners did not value the behavior.

Ignacio: "I don't use them because I read in a hurry"

Camila: "I don't use them....[Using them] takes longer than necessary."

Overall, participants reported that these types of strategies were not necessary or that they only used them because the teacher would request it. Interestingly, some participants are aware of what annotating entails, and its benefits.

Ignacio: Well, [circling] helps me to see where the answers to the questions are.

Mariela: It is useful to highlight ideas....Especially if they seem interesting to me.

Luciano: The strategies can be helpful so that I do not forget what I have to see or read.

However, most participants did not report using annotation while reading:

Mario: I think I have underlined [ideas] only a few times....but I don't do it too often

Andrea: I really don't use those strategies.

Luciano: I don't use any of those strategies because I seldom read and at school either ... unless they force me.

Wilkinson et al. (2010) reflected on the difference between the ability to understand metacognitive knowledge and the ability to use and regulate that knowledge. The authors explain that while the former can be taught, the latter demands active involvement and tracking of the information by the learner. The reported lack of circling, underlining, and highlighting may be due to the inability of learners with ASC to perform multitasking (Rajendran et al., 2011). Since their cognitive flexibility is impaired and easily affected by distractions (Artigas, 2000), learners tend to be hyper-focused on a single activity. This finding can also be related to note-taking behavior, as participants reported that when they do take notes, they mainly focus on specific words, such as keywords they do not understand, and names of characters.

Francisca: “[I take notes of] some details, or the names of the main characters.”

Miguel: “I take notes on the words that help me understand the text and the ones that I don't understand, so I can translate them later.”

Other participants stated that they seldom took notes because it was not necessary for them, they did not feel like performing the activity, or felt distracted in doing so.

Sergio: I feel extreme loss of focus [when I take notes].

Carlos: I've rarely done it ... [I do it] in case I forget something.

Andrea: I would not say that taking notes is difficult for me....It's just that I'm lazy.

Finally, regarding searching for external help to overcome difficulties in reading, some participants agree that they typically ask the teacher for clarification, rather than their classmates.

Sergio: [I ask for help] from the teacher. Only from the teacher....I feel ashamed.

Francisca: [I ask for help] from the teacher, not my classmates.

Some participants seemed to avoid asking people for help altogether. For example, Mariela resorts to technology to solve comprehension issues.

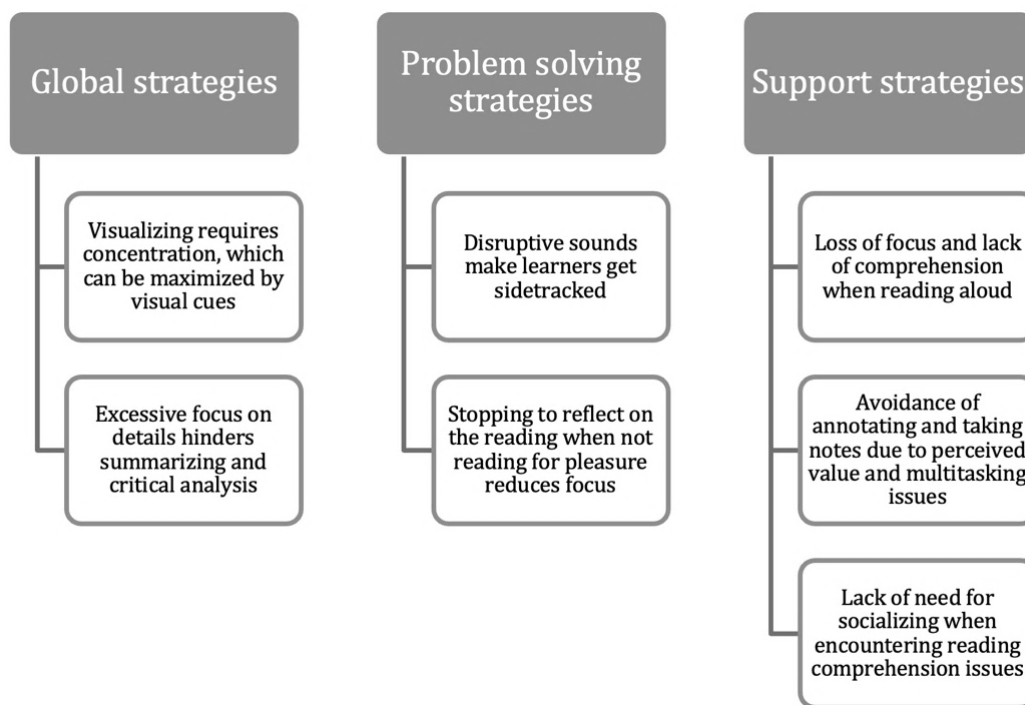
“[I get help from] Google assistant...It's a Google feature where you take a photo of the text and translate it....I'm ashamed to ask the teachers for help. It's my friends who ask me for help. I don't ask anybody.”

Likewise, Mario frequently relies on technology to solve his problems, and reported a lack of need for socializing his reading comprehension issues.

“I don’t ask for help from anyone in the class, nor from my mother because she knows less [English] than I do... Maybe [I ask] my sister sometimes but most of the time I only [use] Google.”

These statements are in line with the literature evidencing that most people with autism exhibit a natural affinity for technology and a good disposition toward learning using computers (Lin et al., 2013), as it presents a structured, comfortable, and predictable environment for them to organize their learning. In addition, individuals with ASC struggle with relationships with peers and find it difficult to participate in reciprocal conversations, group cooperation, games, and collective activities (Boutot, 2016), which influences their behaviors toward reading. The complications faced by these learners when socializing their reading seemed in line with the difficulties predicted by the Theory of Mind, in relation to the cognitive effort needed to identify and understand other people’s behaviors (Baron-Cohen, 1989, 2001).

Failure to access the mental states of other individuals prevents learners with ASC from making predictions regarding others and can prompt them to rely on their own resources, which seem more predictable for them. Instances where intentional communication, pretend play, and inferring others’ emotions and beliefs can be developed are thus kept to a minimum. In other words, developing support reading strategies such as asking for help will involve a degree of social cognition to be developed by learners with ASC. This approach can help the individual to make more accurate assumptions regarding beliefs and reality, and can also increase linguistic sophistication, as stated by the Theory of Mind (Durrleman et al., 2017). To sum up, the main difficulties reported by the participants are presented in Figure 1.



**Figure 1. Main Difficulties in Using Reading Strategies as Reported by Participants**



## **Conclusion**

The main goals of the present study were to explore how learners with ASC experienced metacognition in their EFL reading processes and to understand better the strategies they use when reading in their L2. The first research question addressed the nature of the self-reported reading metacognitive awareness and strategy use displayed by elementary learners with ASC. They reported a lower medium level of awareness toward metacognition, with the most frequent type of strategy being problem-solving, followed by global and support reading strategies. Overall, they did not display high levels of metacognitive awareness toward reading, although they seemed to be aware of their importance.

The second research question sought to characterize the main perceived difficulties that learners with ASC face when applying metacognition in their L2 reading. In relation to global reading strategies, these learners reported visualization difficulties while reading, which were related to their lack of ability to construct mental models. In this sense, visual stimuli were found to aid in visualization, making abstract processes more concrete and accessible to these learners. Summarizing represented a potential significant challenge when recalling information, as these learners tend to focus on details rather than general ideas.

A lack of adequate executive functioning can impinge upon the mental processes undertaken by learners with ASC when using global strategies. These learners could benefit from monitoring their own mental states and selecting appropriate strategies to support a reflective stage in reading. Problem-solving strategies were the most frequently used by these learners, who reported that disruptive sounds hindered their concentration and made it difficult for them to regain focus. In addition, stopping to reflect on the reading when not reading for pleasure reduced the focus on the ideas in the text. Finally, the limited use of support reading strategies reported in the MARSIR was confirmed in the semi-structured interviews. Participants reported reduced focus and lack of comprehension when reading aloud, avoided multi-tasking activities such as annotating and taking notes, and relied on technology and their own cognitive resources rather than asking for help to ensure comprehension. These issues were found to be in line with the difficulties identified by the Theory of Mind in relation to the cognitive effort needed to identify and understand other people's behaviors (Baron-Cohen, 1989, 2001).

The findings in this exploratory study contribute to a better understanding of the strategies learners with ASC use and the difficulties they face when reading, which may pave the way for discussion on how these strategies can be nurtured in these learners. The extracts analyzed suggested that metacognition in reading may be a process that requires accompaniment (hand-holding, guidance) and instruction so that the learner can perform appropriate strategies in a more autonomous and automatic manner.

## **Limitations**

Due to COVID-19 restrictions, it was not possible to carry out interventions that included a treatment based on L2 reading metacognition instruction. In addition, the number of participants with ASC that were reached was somewhat reduced, and the range of tests that were conducted was also limited. A more complete lexical and syntactic profile of these learners would have enriched the discussion on the role of bottom-up skills in metacognition and strategy use. An experimental approach to metacognitive reading comprehension strategies may need to include information about the vocabulary and syntactic skills of the autistic children, to assess how bottom-up processes influence reading comprehension. Furthermore, the sensible

apprehensions that their parents had toward the study prevented the researchers from reaching more participants and separating the data by gender. This would have yielded interesting insights into the diverse cognitive and behavioral features between males and female learners with ASC (Hull et al., 2017). Further research may benefit from including this variable as part of an experimental study.

### **Implications for Pedagogy**

Rethinking the way in which metacognitive reading strategy instruction is delivered in EFL classrooms can benefit both neurotypical and learners with ASC. As Wire (2005) stated, it is vital to recognize that each child as well as each type of difficulty differs from others. In order to acknowledge those differences, it may be important to provide accessible information for all educators. The lack of studies addressing metacognitive reading strategies for learners with ASC is a telling sign in this respect. Over the last 10 years, some authors (Sanhueza, 2012) have emphasized the urgent need to implement a methodological design in the Chilean context that allows for strategy learning and use.

As Osses and Jaramillo (2008) stated, to educate metacognitive students, it is essential to have metacognitive teachers, which is in line with reports suggesting that explicit or formal instruction of metacognitive strategies can improve learner performance (OECD, 2020). This represents an invitation for all educators worldwide to recognize metacognition as a key tool in strategy instruction for both L1 and L2 learners. Finally, the reported findings may help teachers design reading activities and strategies for enhancing L2 reading comprehension skills their students with ASC while understanding the difficulties that are inherent to their condition. Learning an L2 can be beneficial in this respect by helping learners with ASC improve their mental flexibility, think more abstractly, and nurture verbal intelligence by adopting a metacognitive approach to reading and learning in general.

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## Appendix A. Adapted items from Mokhtari et al.'s (2018) MARSII-R instrument.

### Global reading strategies

1. Cuando me entregan un texto en inglés, antes de leerlo me pregunto por qué es importante que lo lea y lo que podré aprender de él.  
*When I am handed a text in English, before reading it I ask myself why it is important that I read it and what I will be able to learn from it.*
2. Antes de leer el texto en inglés lo miro rápidamente para ver de qué se trata.  
*Before reading the text in English I skim through it quickly to see what it is about.*
3. Después de mi lectura, confirmo si el texto cumple con lo que opiné de él al comienzo (por ejemplo, confirmé por qué era importante, confirmé lo que aprendí de él).  
*After my reading, I confirm if the text is similar to what I thought about it at the beginning (e.g., I confirm why it was important and I confirm what I learned from it).*
4. Cuando leo un texto en inglés, utilizo ayudas presentes en él (por ejemplo, letras en negrita, cursiva, subrayado) para identificar la información importante.  
*When I read a text in English, I use the text aids in it (e.g., bold letters, italics, underlining) to identify important information.*
5. Evalúo críticamente la información presentada en el texto. Me pregunto a mi mismo/a si el texto en inglés tiene sentido, si está bien organizado, o si es muy complejo.  
*I critically evaluate the information in the text. I ask myself if the English text makes sense, if it is well organized, or if it is very complex.*

### Problem-solving strategies

6. Cuando estoy leyendo en inglés y luego me desconcentro, intento volver a concentrarme.  
*When I'm reading in English and then lose focus, I try to refocus.*
7. Puedo leer más rápido o lento, dependiendo de lo que lea en inglés.  
*I can read faster or slower, depending on what I read in English.*
8. De vez en cuando me detengo y pienso acerca del texto que estoy leyendo en inglés.  
*Every now and then I stop and think about the text I am reading in English.*
9. Cuando un texto en inglés se pone difícil, vuelvo a leer para entenderlo mejor.  
*When an English text becomes difficult, I re-read to understand it better.*
10. Cuando leo en inglés trato de adivinar el significado de palabras o frases que no conozco.  
*When I read in English I try to guess the meaning of words or phrases that I do not know.*

### Support reading strategies

11. Mientras leo en inglés, tomo notas para ayudarme a entender la información en el texto.  
*As I read in English, I take notes to help me understand the information in the text.*
12. Leer en voz alta me ayuda a entender la información de los textos en inglés.  
*Reading aloud helps me understand the information in English texts.*
13. Discuto con otras personas sobre lo que leo en inglés para asegurarme que entiendo.  
*I discuss with other people what I read in English to make sure I understand.*
14. Subrayo o encierro en círculos la información más importante del texto en inglés.  
*I underline or circle the most important information in the English text.*
15. Uso materiales de ayuda (por ejemplo, diccionario inglés-español) para entender lo que leo.  
*I use support materials (e.g., an English-Spanish dictionary) to understand what I read.*

## **Appendix B. Sample interview questions.**

### Global reading strategies

- Do you preview the text to see what it is about?
- When you finish reading a text, what do you do? What do you think about?

### Problem solving strategies


- Imagine that you must read a long text and you have very little time to do it. What would you do to get organized?
- What can make you lose focus on what you read? What do you do then?

### Support reading strategies


- How do you prefer to read? Silently, out loud or have someone read to you?
- Do you take notes while reading a text? Why?

## Appendix C. Visual layout of sample items in the MARSII-R.


1. Cuando me entregan un texto en inglés, antes de leerlo, me pregunto por qué es importante que lo lea y lo que podré aprender de él.




Opción 1

 NUNCA


Opción 2

 RARA VEZ


Opción 3

 A VECES


Opción 4

 MUCHAS VECES

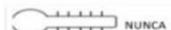
Opción 5

 SIEMPRE


2. Antes de leer el texto en inglés, lo miro rápidamente para ver de qué se trata.




Opción 1

 NUNCA


Opción 2

 RARA VEZ


Opción 3

 A VECES

Opción 4

 MUCHAS VECES

Opción 5

 SIEMPRE

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<sup>i</sup> The autism spectrum will be referred to as a condition rather than a disorder, since the latter term is inherently medical (Dudas et al., 2017) and carries with it a stigmatization of the condition.

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