

Spanish adaptation of four instruments to assess the theory of mind in children and adolescents

Adaptación al español de cuatro instrumentos para evaluar la teoría de la mente en niños y adolescentes



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Author
correspondence:
wpinada1@unisimonbolivar.edu.co
earistiz@uinorte.edu.co
juceossa@gmail.com
rubio1@unisimonbolivar.edu.co

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Wilmar Pineda-Alhucema - Rosmira Rubio

Universidad Simón Bolívar, Barranquilla, Colombia

Edith T. Aristizábal

Universidad del Norte, Barranquilla, Colombia

Julio Ossa

Universidad San Buenaventura, Cali, Colombia

Abstract

Introduction: The Theory of Mind (ToM) is one of the most important dimensions of Social Cognition (SC); it is of great interest for research in Developmental Psychology, Cognitive Psychology, Neuropsychology, and Social Neuroscience, as well as for clinical practice. It has stimulated the creation and validation of instruments to assess this dimension as a cognitive process, but there are few instruments like these in Spanish, not to mention the scarce instruments to evaluate children and adolescents.

Objective: This paper reports the adaptation into Spanish of four instruments to assess ToM: The Theory of Mind Battery, The Theory of Mind Inventory-2, the Reading the Mind in the Eyes Test and the Faux Pas Test.

Method: The adaptation process was conducted in two steps: translation and cultural adaptation. To verify the results, a pilot test was conducted in two groups, one with children aged 4 to 13 and another one with children and adolescents between 6 and 17.

Results: The Instruments adapted into Spanish are presented as results, highlighting the main adjustments made to each tool.

Discussion: The importance of creating a protocol with statistical validation to assess ToM is discussed.

Keywords: Theory of mind; Social cognition; Faux pas; Reading the mind in the eyes test; Assessment; Children; Adolescents.

Resumen

Introducción: La teoría de la mente (ToM) es una de las dimensiones de la Cognición Social más relevantes y de gran interés para la investigación en psicología del desarrollo, psicología cognitiva, neuropsicología y neurociencias sociales, así como en la labor clínica. Esto ha conllevado a la generación de instrumentos validados para la evaluación de esta función, sin embargo, en español son pocos los que hay y aún menos los adaptados para población infantil y adolescentes.

Objetivo: En el presente trabajo se presenta la adaptación de la Batería de la ToM, el inventario de la ToM, el test de paso en falso y el Test de la Mirada, cuatro instrumentos con tareas clásicas para evaluar la ToM.

Método: El proceso de adaptación se hizo en dos fases, una de traducción al español y una de adaptación cultural. Para verificar los resultados se hizo un pilotaje para todos los instrumentos con 20 participantes en edades entre 4 y 13 años y 20 participantes entre 6 y 17 años.

Resultados: Como resultados se presentan los cuatro instrumentos adaptados en español con los principales ajustes en cada uno de ellos.

Discusión: Se discute sobre la importancia de generar un protocolo de valoración de la ToM haciendo una validación estadística de estos instrumentos.

Palabras clave: teoría de la mente; cognición Social; faux Pas; test de las Miradas; Evaluación; niños; adolescentes.

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INTRODUCTION

The Theory of Mind (ToM) is the ability to comprehend one's intentions, desires, and beliefs, as well as those of others (Wellman, Cross & Watson, 2001; Wellman, 2014; Andrade Salazar, and Gonz, 2017). It is also a concept with greater relevance within the Social Cognition (SC) field of study, emerging as an independent domain inside the various classifications made on SC (Etchepare & Prouteau, 2017; Fiske & Taylor, 2013; Green, Horan & Lee, 2015; Happé, Cook & Bird, 2017; Ludwig, Pinkham, Harvey, Kelsven, & Penn, 2017; Seyfarth & Cheney, 2015). However, ever since the concept was proposed by Premack & Woodruff (1978), one of the major challenges, apart from its conceptual delimitation, has been how to measure it as a neurocognitive function.

One of the classic methods used for such measurements is the false-belief task, formulated in the 1980s from the typical and atypical development perspective (Barón-Cohen, Leslie, & Frith, 1985; Wimmer & Perner, 1983). According to this paradigm, ToM is presumed to exist when an individual attributes an incorrect mental state to a character in a given situation. Since then, this paradigm has been widely replicated in several studies with different types of populations (Navarra-Ventura et al., 2018; Şahin et al., 2018), devising different versions, such as the "Smarties" task (Mehta et al., 2011). The task was even altered to increase its complexity as it happens with second-order false beliefs wherein the tested individual must attribute a character (A) the false belief that this character can attribute another character (B) SOMETHING as in the story of the ice-cream man described in Tirapú-Ustarróz, Pérez-Sayes, Erekatxo- Bilbao, and Pelegrin-Valero (2007). Similarly, some ToM evaluation scales have been created on the basis of this paradigm, wherein attribution tasks of emotional states are also suggested (Martory et al., 2015; Wellman & Liu, 2004).

Proposing these tasks was critical for the study of ToM, and its use became popular in clinical populations. Nevertheless, having been designed for preschool children, it had an impact on clinical populations as demonstrated in patients with Asperger's Syndrome, who, due to the natural maturation process of other cognitive functions such as executive functions, after turning 6 or 8, could overcome challenges more easily (Slaughter & Repacholi, 2003; Turner & Felisberti, 2017). The same effect led to those tasks becoming non-functional in detecting ToM challenges in adolescents or adults, so new ways of measuring this function were developed. Therefore, tasks such as Happé's Strange Stories (Happé, 1994), the Hinting Task (Corcoran, Mercer & Frith, 1995), the Faux Pas Test (Barón-Cohen, O'Riordan, Jones, Stone, & Plaisted,

1999), and the Reading the Mind in the Eyes Test or Eyes Test (Barón-Cohen, Jolliffe, Mortimore & Robertson, 1997) were created.

These new forms of evaluating ToM, except for the Eyes Test, are based on an individual's ability to create attributes in a context of social interaction wherefrom the mental or emotional state of a character must be inferred correctly while interacting with others. For example, Happé's Strange Stories are situations in which a character makes ironic or sarcastic comments or lies with a specific intention that the evaluated person must detect (White, Hill, Happé, & Frith, 2009). In the Hinting Task, characters within stories indirectly imply an intention, desire, or belief. However, unlike the Strange Stories task, comments are not made sarcastically or ironically—characters only comment with an implicit meaning that the evaluated person must identify (Corcoran et al., 1995). In the Faux Pas Test, the evaluated individual must identify unguarded or inappropriate comments from a character engaged in a social situation (Barón-Cohen et al., 1999), such as telling someone about a surprise birthday party by mistake. Unlike the two previous tests, the message given by characters in this test is not implicit but, on the contrary, explicit. However, it is a social blunder, so the identification of the mistake functions as the ToM indicator. In contrast with the previous tests, the Eyes Test is not based on social contexts. The mental or emotional state attribution must be made from an image of the eye contours of a human face, so the interpretation of the expression in that look acts as the ToM indicator. It is considered an Advanced ToM since the evaluated person can only rely on the eye contours information and the attributions made are not only emotional states but also mental states and intentions, such as "willing to play," "thoughtful," or "pleased" (Barón-Cohen, et al., 1997; Sprung, 2010). Therefore, this is where it mainly differs from emotional recognition tests, which focus on individuals identifying the expression of emotions, ignoring desires, intentions, or mental states.

Scales and inventories are proposed as recent ways of evaluating the ToM, instruments that usually require children's caregivers to notify certain ToM-related behaviors, such as the ToM Inventory 2. It is a questionnaire administered to the evaluated children's caregivers based on behavior identification that demonstrates their capacity to attribute intentions, desires, and beliefs, but it also tests a child's ability to understand pragmatic language (Hutchins, Prelock & Bonazinga, 2012).

The aforementioned tests prove the major efforts made to evaluate ToM and its recurring use in multiple scientific articles with different population groups (Bottema-Beutel, Kim & Crowley, 2018; Pineda-Alhucema, Aristizábal, Escudero-Cabarcas, Acosta-López, & Vélez, 2018), which shows its relative success. Most instruments, however, are produced in English—

their source language—and although many have been translated into different languages, Spanish translations and adaptations are a minority. Except for some research done in Argentina and Spain on adult populations (Gil, Fernández-Modamio, Bengochea, & Arrieta, 2012; Román et al., 2012), the number of instruments available in Spanish is scant, especially when considering adaptations made for the child population. Therefore, this article introduces a Spanish adaptation of four instruments for evaluating ToM on child and adolescent populations—the ToM Task Battery (ToMB), the ToM Inventory 2 (ToMI-2), the Faux Pas Test, and the Reading the Mind in the Eyes Test (the Eyes Test).

Theory of Mind Task Battery (ToMB)

The *ToM Task Battery* (ToMB) is an instrument composed of 26 items consisting of 15 Theory-of-Mind problems, which we call evaluation items, and 11 control questions to regulate possible effects of memory failure or understanding of evaluation stimuli. The test was originally designed by Hutchins, Prelock, and Chace (2008), but the version used here is that revised by Hutchins and Prelock (2010). According to Hutchins and Prelock (2010), the ToMB assesses three overall levels of ToM development, divided into three subscales. The Early subscale, comprising five evaluation items and one control item, evaluates emotion recognition and attribution of desire-based emotions considering the ToM achievements of children aged 1 to 3.5 (Stories A and B). The Basic subscale, consisting of five evaluation items and two control items, assesses the point-of-view-taking process, the perception-based inference, and first-order false beliefs considering the ToM achievements of children aged 3.5 to 5.5. The Advanced subscale, consisting of five evaluation items and eight control items, evaluates the ability to assign emotions based on beliefs and reality, attributions of second-order emotions, inconsistency between message and desire, and second-order false beliefs. The third subscale assesses the ToM achievements of children aged 5.5 to 8. It should be noted that this subscale contains more control items than the previous two as stories are more complex owing to the ToM level being evaluated. The 15 evaluation items are embedded in nine ToM situations or tasks of increasing complexity presented in color pictures, with stories identified with letters from A to I. The ToMB has already been used in research, especially on populations with developmental disorders (Hutchins, Bonazinga, 2008; Hutchins, et al., 2015).

The Theory of Mind Inventory 2 (ToMI-2)

The *ToM Inventory 2* (ToMI-2) is a 60-item questionnaire for children between 2 and 13, administered by the evaluated child's caregivers. Designed by Hutchins, Prelock, and Bonazinga (2012), it emerged from a previous test called *Perceptions of Children's ToM Measure* (PCToMM) created by Hutchins, et al., (2008). The Hutchins, et al. (2012) version is

the first one adapted into Spanish (Pujals et al., 2015) and French (Houssa, Mazzone, & Nader-Grosbois, 2014), and it consisted of 42 items. The test was revised, however, and a second version was produced in 2016. This latest version has 18 additional items, resulting in 60 items, and it comprises six subscales: Early ToM, Basic ToM, Advanced ToM, the Emotion Recognition subscale, the Mental State Term Comprehension subscale, and the Pragmatics subscale (Hutchins & Prelock, 2016). The ToMI-2 has been mainly used on children with autism (Cheung, Siu, Brown, & Yu, 2018), attention-deficit disorder with hyperactivity (Miranda, Berenguer, Roselló, Baixauli, & Colomer, 2017), and hearing disabilities (Hutchins, Allen, & Schefer, 2017).

The Faux Pas Test.

The *Faux Pas Test* was created by Barón-Cohen et al. (1999). This instrument evaluates ToM based on the ability to detect social mistakes made accidentally; hence, it is also known as the blunder test. It consists of a series of 20 stories, in which a social blunder is present in one half and is missing in the other half, behaving as a control for the first half. The evaluated individual must identify stories wherein one character makes social blunders. The test has two versions—one for children (Barón-Cohen et al., 1999) and one for adults (Gregory et al., 2002). They mainly differ in the situations contained in each story, but the same number of stimuli is maintained. The test is widely used currently in different studies with clinical populations, such as populations with Autism Spectrum Disorder (Thiébaud et al., 2016; Tin et al., 2018; Zalla, Sav, Stopin, Ahade & Leboyer, 2009; Zalla & Korman, 2018), Attention-Deficit/Hyperactivity Disorder (Mary et al., 2015; Maoz et al., 2014), Schizophrenia (Croca et al., 2018; Hendriks et al., 2016; Peña et al., 2015), dementia (Duclos, Desgranges, Eustache, & Laisney, 2018; Poletti, Enrici, & Adenzato, 2012), and Behavior and Personality Disorders (Fonagy & Bateman, 2016; Fonagy & Sharp, 2015), to name only the most frequent conditions. Not many studies have been conducted regarding its cross-cultural validation and adaptation although it is often used in research. Nevertheless, we must mention Etchepare, et al. (2014) whose work on the French population, Mehta et al., (2011) whose work on the Indian population, Faísca et al., (2016) whose work on the Portuguese population, and Chen et al., (2017) whose work on the Chinese population with schizophrenia stand out.

The Eyes Test

The *Reading the Mind in the Eyes Task* (RME), also known as the *Eyes Test*, was designed by Barón-Cohen et al. (1997). Like the Faux Pas Test, it

was suggested as a measure for Advanced ToM to overcome limitations, such as the ceiling effect, displayed by classic first- and second-order false-belief tasks. According to this effect, 6-year-old children with normal intelligence could complete these tasks; even patients with high-functioning Asperger's Syndrome could do it, provided they had average intelligence (Wimmer & Perner, 1983; Turner & Felisberti, 2017). Therefore, ToM evaluation in adults and children aged 6 or older with average intelligence is not efficient enough only with the false-belief task. The Eyes Test consists of a series of items constituted by photographs of the eye region in a human face with different expressions and four possible answers, with only one being correct at describing the emotional or mental state represented by the picture. There are two versions of the test—one for adults, consisting of 38 stimuli, and one for children (Barón-Cohen, Wheelwright, Spong, Scahill, & Lawson, 2001) aged 6 or older, which is adapted from the adult's version and has 28 stimuli.

For study purposes, the following tests were chosen: 1) the ToM Task Battery, because it combines many of the ToM tasks that assess the most basic level of the skill, which emerges at preschool ages; 2) the ToM Inventory, since it is a measure taken from the perspective of the child observer, we consider it a supplemental measure; 3) the Faux Pas Test; and 4) the Eyes Test, for both have been more often used in research made on children and adolescents with typical and atypical development and are considered Advanced ToM distinctive of children aged 6 or older, adolescents, and adults (Sodian & Hülksen, 2005).

This study aims to adapt these four ToM evaluation instruments into Spanish; this article is the first in a macro-project that pursues the validation of different tests for ToM by producing normative data for the Colombian population. Conversely, this study may serve as a basis for future adaptations and standardizations in several Spanish-speaking countries.

METHOD

Instruments

Theory of Mind Task Battery (ToMB)

The version used in this study belongs to Hutchins and Prelock (2010), including nine stories identified with letters from A to I. Each story contains evaluation items; questions about the stories that assess the

ability to attribute first- and second-order desires, intentions, and beliefs; and a control item related to the content of the stories. From them, the evaluator ensures that the individual has a good understanding level and remembers the necessary elements to answer evaluation items. The battery has 15 evaluation items and 11 control items, totaling 26 items.

Theory of Mind Inventory 2 (ToMI-2)

The study was conducted with the [Hutchins and Prelock \(2016\)](#) version, a Likert-type questionnaire with 60 questions that evaluate three ToM levels—Early, Basic, and Advanced. In addition, it tests three other dimensions—Emotion Recognition, Mental State Term Comprehension, and Pragmatics. This instrument is administered by the evaluated individual's caregiver, and answers are rated on a scale from 0 to 20.

The Faux Pas Test

The test consists of 20 stories—10 stories with ToM problems (social blunders) and 10 control items (without social blunders) functioning as a control for the first 10 stories. Each story has its counterpart in each group; the only difference is that a character makes a social blunder in one story but not in its counterpart. For each story, the evaluated person must answer four questions—two are ToM questions and two are control questions. The latter two ensure that the tested individual understands the story. Stories will be deemed correct only if the subject answers all four questions correctly. The translated and adapted version used here is the [Barón-Cohen, et al. \(1999\)](#) version for the child population.

The Eyes Test

The [Barón-Cohen et al. \(2001\)](#) version, designed for children, has been translated and adapted. It has 28 stimuli—photographs of a human face's area of the eye expressing different cognitive and emotional states. Each stimulus is accompanied by four possible answers, with only one correct.

The ToMB and ToMI-2 were directly requested by their authors (Tiffany L. Hutchins and Patricia A. Pelock) through their website, in which they offer the instruments. The Faux Pas and Eyes Tests were downloaded from the website of the Autism Centre Research (ACR) at the University of Cambridge.

Procedure

Spanish Translation

The source language for all the instruments is English, so they were all

translated. However, for the ToMI-2, only 18 items were translated since the rest was already translated into Spanish in a previous version made by Pujals, et al. (2015). Although Spanish versions were available on the ACR website, the Faux Pas Test and Eyes Test were adapted to a sociocultural context different from the Colombian one, so new Spanish versions were translated from English. Characters' names were also changed to match the most common names used in Latin American contexts.

Recommended guidelines for adapting health-related instruments (Guillemin, Bombardier, & Beaton, 1993) were followed for the translation process, which have also been used in other processes of translating and adapting ToM instruments (Sanvicente-Vieira, Brietzke, & Grassi-Oliveira, 2012). The process included: 1) an initial translation into Spanish made by two Spanish-speaking freelance translators—a BA in Languages and translation expert and a Ph.D. in Psychology focused on Applied Cognitive Neuroscience; 2) once translations were finished, a unified Spanish version was agreed upon by a panel of experts in cognitive psychology and the Spanish language; 3) a back-translation of the unified Spanish version was performed by an expert English-speaking translator, and a new version in the source language was obtained; 4) items in the back-translated version were compared with items in the original English version to estimate similarities; 5) once both English versions were adjusted, changes were introduced into the final Spanish version; and 6) a pilot test of the new Spanish items was administered to a child population with normal development to assess the comprehension and clarity of the test.

Adaptation

Once Spanish items were obtained, the process of adapting the full instruments began. For the ToMB, the Eyes Test, and the Faux Pas Test, Spanish versions obtained in the translation stage were used. For the ToMI-2, items in Spanish from #1 to #41 produced by Pujals, et al. (2015) were used with the addition of the newly translated items #42 to #60. During the pilot implementation, all instruments were administered individually. The ToMB was applied to 20 children aged 4 to 12, and the ToMI-2 was applied to one of the parents of each child. The Faux Pas Test and the Eyes Test were applied individually to a group of children and adolescents aged 6 to 17. All instruments were administered to half of the children in each pilot group to check the quality and relevance of the items. Once readjusted, they were applied to the other half of the children to verify the modifications done. All the evaluated individuals in the pilot group were schooled, had good academic performance, and were selected conveniently.

Conflict of Interest

The authors claim to have no conflict of interest. The results of this document have not been fully or partially shared. APA's ethical standards were met when processing our data. In addition, we declare that the publication of this article pursues no financial interests.

RESULTS

Theory of Mind Task Battery (ToMB)

While first applying the instrument, children understood most items and stories correctly; however, adjustments for stories F, H, and I were required. In Story F, the first picture shows a boy (Antonio) reading a book, which he places on a table, and then, he leaves the room. Later, a girl (Andrea) comes in, takes the book from the table, puts it into a closet drawer, and leaves the room. The question for this story is: "Where will Antonio look for the book first?" The correct answer is "on the table" since he left the book there. An adjustment was done in the picture where Andrea puts the book into the closet drawer. In the original image, the drawer remained open (see Figure 1), but seven out of 10 children answered incorrectly to the evaluation question. When asked for a justification, they said that Antonio would look inside the drawer and not on the table where he left the book since he saw the drawer open and considered it suspicious. Therefore, a decision to have the closet drawer closed in the picture (Figure 2) was made, preventing biases. This item worked out better during the second application to children from the second pilot group, for no mistakes were made when answering about the drawer.



Figure 1. Taken from the original ToMB



Figure 2. Taken from the ToMB adapted version

In Story H, five out of 10 children failed the test. When exploring failure causes, the evaluator's observation and reports from the children determined that they had to remember too many story elements, which made it even more difficult due to its length. Accordingly, the item was modified by requesting the evaluator to ask the children where each bowl was in the picture that showed two pasta and salad bowls (Figure 3). Children had to answer immediately, favoring the memory of that information. This item worked out better after the adjustment when only one out of 10 children of the second pilot group failed.



Figure 3. Story H Picture.

Taken from the ToMB adapted version

Finally, in Story I, the evaluation item was fully modified as eight out of 10 children in the first pilot group could not understand it. In the story, it is Santiago's birthday, and his mother got him a bicycle. But as she wants it to be a surprise, when Santiago says he wants a bicycle for his birthday, his mother tells him she got him a pair of roller skates. However, when the boy is about to leave the house, he finds the new bicycle without his mother knowing it. The evaluation item of this story is marked by the boy's grandfather, who arrives at the party. The original item said:

Later, Enrique's grandfather arrives at the party and asks his mother: "Does Enrique know what he'll get for his birthday?"

What's Enrique's mother's answer?

Will she say Enrique believes he will get roller skates, a bike, a basketball, or a mitt?

With the said item, children asked the evaluator to clarify the question, as it included information that was not mentioned in the story, such as: How did his grandfather know what Santiago was going to get? Or... if the grandfather helped buy the bike, why is he bringing another gift? Given the difficulties of understanding those being evaluated, the item was adjusted as follows:

Later, Santiago's grandfather arrives at his birthday party, and asks his mother: "What does Santiago think you got for his birthday?"

What does Santiago's mother answer? (and the evaluator indicates the options)

After the said adjustment, the second pilot group immediately answered the question without asking for additional clarification, thus showing that the item could be understood more accurately.

Theory of Mind Inventory (ToMI)

Out of the 60 items composing this test, 18 were submitted to translation; the remaining 42 were already translated into Spanish. However, the entire inventory was applied for the adaptation. Table 1 shows the translated and adapted items. The first 42 items were well understood by the first pilot group (children's parents). In the 18 new items, the Spanish word *hijo*, a direct translation of the English word *child*, had to be adapted, given that in the Colombian context, the person in charge of a minor is not always his/her father or mother but another relative, such as a grandparent or uncle/aunt. Likewise, in Item 15, the word *cama* was used to replace *manta*, a direct translation of *blanket*, given that, in the Colombian context, it is not customary to have a blanket as a memory of the mother as it is in the English-speaking context, where the inventory was created (Chagas, 2012). In Item 16, pronouns were changed from the second to the third person. Following the protocol, the inventory was applied to the second pilot group, obtaining favorable results about the understandability of the items and indications of completion of the inventory.

Table 1

Item translation and adaptation

ITEM	ORIGINAL	TRANSLATION	BACK-TRANSLATION	ADJUSTMENT
1	If I looked up and stared in the sky, my child would also look up to see what I was looking at.	Si yo miro hacia arriba y miro hacia el cielo, mi hijo también miraría hacia arriba para ver lo que yo estaba mirando.	If I look up and look up at the sky, my son would also look up to see what I was looking at.	Si yo miro hacia arriba y miro hacia el cielo, mi niño/a también miraría hacia arriba para ver lo que yo estaba mirando.
2	If my child saw a strange new object, he/she would look to me and check my reaction before touching it.	Si mi hijo/hija viese un objeto nuevo extraño, él/ella miraría y comprobaría mi reacción antes de tocarlo.	If my child saw a strange new object, he/she would look and check my reaction before touching it.	Si mi niño/a viese un objeto nuevo extraño, él/ella me miraría y comprobaría mi reacción antes de tocarlo.
3	My child speaks differently to young children versus adults (e.g., uses simple language or a higher pitch when speaking to youngsters).	Mi hijo habla de una manera diferente hacia los niños que hacia los adultos (por ejemplo, utiliza un lenguaje sencillo o tono más alto cuando habla con los niños).	My child speaks differently to children than adults (for example, he uses simple language or a higher pitch when speaking with children).	Mi niño/a habla de una manera diferente hacia los niños que hacia los adultos (por ejemplo, utiliza un lenguaje sencillo o tono más alto cuando habla con los niños).
4	My child understands that it is possible to experience two conflicting emotions at the same time (e.g., being sad that a sick pet died but being happy that it is no longer in pain).	Mi hijo entiende que es posible experimentar dos emociones contradictorias al mismo tiempo (por ejemplo, estar triste porque un animal doméstico murió pero estar feliz de que ya no sufre).	My child understands that it is possible to experience two conflicting emotions at the same time (for example, being sad because a pet died but being happy, that he no longer suffers).	Mi niño/a entiende que es posible experimentar dos emociones contradictorias al mismo tiempo (por ejemplo, estar triste porque un animal doméstico murió, pero estar feliz de que ya no sufre).
5	My child understands that an unfamiliar adult can make good guesses about my child's likes and dislikes (e.g., an unfamiliar adult might correctly guess that the child does not like to clean his/her room).	Mi hijo entiende que un adulto desconocido puede hacer buenas conjeturas sobre los gustos y disgustos de mi hijo (por ejemplo, un adulto desconocido podría correctamente adivinar que al niño no le gusta limpiar su cuarto).	My child understands that an unfamiliar adult can make good guesses about my child's likes and dislikes (for example, an unknown adult could correctly guess that the child does not like to clean his room).	Mi niño/a entiende que un adulto desconocido puede hacer buenas suposiciones sobre los gustos y disgustos de él mismo sin conocerlo (por ejemplo, un adulto desconocido podría correctamente adivinar que al niño (mi niño/a) no le gusta limpiar su cuarto).
6	My child recognizes when others are sad.	Mi hijo reconoce cuando otros están tristes.	My son recognizes when others are sad.	Mi niño/a reconoce cuando otros están tristes.
7	My child recognizes when others are mad.	Mi hijo reconoce cuando otros están enojados.	My child recognizes when others are mad.	Mi niño/a reconoce cuando otros están enojados.
8	My child recognizes when others are scared.	Mi hijo reconoce cuando otros están asustados.	My child recognizes when others are scared.	Mi niño/a reconoce cuando otros están asustados.
9	My child recognizes when others are surprised.	Mi hijo reconoce cuando otros se sorprenden.	My child recognizes when others are surprised.	Mi niño/a reconoce cuando otros se sorprenden.
10	My child recognizes when others feel embarrassed.	Mi hijo reconoce cuando otros se sienten avergonzados.	My child recognizes when others feel embarrassed.	Mi niño/a reconoce cuando otros se sienten avergonzados.
11	My child understands the word "need".	Mi hijo entiende la palabra "necesitar".	My child understands the word "need".	Mi niño/a comprende la palabra "necesitar".
12	My child understands the word "want".	Mi hijo entiende la palabra "querer".	My child understands the word "want".	Mi niño/a comprende la palabra "querer".
13	My child understands when others feel guilty.	Mi hijo entiende cuando otros se sienten culpables.	My child understands when others feel guilty.	Mi niño/a entiende cuando otros se sienten culpables.
14	My child can accurately identify and reflect on his/her emotional states.	Mi hijo puede identificar y reflexionar con exactitud acerca de sus propios estados emocionales.	My child can identify and reflect accurately about his or her own emotional states.	Mi niño/a puede identificar y reflexionar con exactitud acerca de sus propios estados emocionales.
15	My child can predict his/her own emotions to better plan for the future (e.g., if spending the night away from Home, the child knows he will miss mom and so he brings his favorite blanket for comfort).	Mi hijo puede predecir sus propias emociones para planificar mejor el futuro (por ejemplo, si va a pasar la noche fuera de casa, el niño sabe que le hará falta su mamá así que él trae su manta preferida para comodidad).	My child can predict his or her own emotions to better plan the future (for example, if he is going to spend the night away from home, the child knows that he will need his mom so he or she brings his or her favorite blanket for comfort).	Mi niño/a puede predecir sus propias emociones para planificar mejor el futuro (por ejemplo, si va a pasar la noche fuera de casa, el niño sabe que le hará falta su cama así que él lleva su manta preferida para comodidad).

ITEM	ORIGINAL	TRANSLATION	BACK TRANSLATION	ADJUSTMENT
16	My child understands what people think and feel by connecting it to the situation (e.g., my child understands that crying because you lost a game is different than crying because you won an award).	Mi hijo entiende lo que las personas piensan y sienten conectándolo a la situación (por ejemplo, mi hijo entiende que llorar porque usted perdió en un juego es diferente que llorar porque usted ganó un premio).	My child understands what people think and feel by connecting it to the situation (for example, my son understands that crying because he or she lost in a game is different than crying because he or she won a prize).	Mi niño/a entiende lo que las personas piensan y sienten conectándolo a la situación (por ejemplo, mi hijo entiende que llorar porque perdió en un juego es diferente que llorar porque ganó un premio).
17	My child understands that people are happy when they get what they want.	Mi hijo entiende que las personas son felices cuando consiguen lo que quieren.	My child understands that people are happy when they get what they want.	Mi niño/a entiende que las personas son felices cuando consiguen lo que quieren.
18	My child understands that beliefs can cause emotions (e.g., understanding that Patty is happy because she thinks she is going to win an award).	Mi hijo entiende que las creencias pueden causar emociones (por ejemplo, entiende que Patty está feliz porque ella piensa que ella va a ganar un premio).	My child understands that beliefs can cause emotions (for example, he understands that Patty is happy because she thinks she is going to win a prize).	Mi niño/a entiende que las creencias pueden causar emociones (por ejemplo, entiende que Patty está feliz porque ella piensa que ella va a ganar un premio).

Faux Pas Test

The application of the translated items to the first pilot group produced, in general, difficulties in the understanding of the stories, given that, due to the direct translation from English, less context information was offered. An example of this is Story 1 in Table 2, where in the translated version, *Jane* only says: “*Ah bueno*” (“*Oh, okay*”). Given that the children in the first pilot group understood this as lack of interest by this character and that the reason for the interaction between the two actors was not well understood, the situation was changed, giving the story a dynamic more related to the school setting, such as asking about a classroom subject. After making the adjustments, the second pilot group evidenced a better understanding of the stories or value judgments that the children had not seen as an error itself. An example of this is Story 2 in Table 2, where the translated version read: “*de todos modos nunca me gustó, alguien me lo dio para mi cumpleaños*” (I never liked it anyway, someone gave it to me for my birthday). For the children in the pilot group, this was not seen as careless, as they assumed that because they were friends, the other character would not be offended, so the emphasis was added as follows: “*... de todos modos no me gustaba, era feo, no sé quién me lo regaló*” (“I never liked it anyway; it was ugly, I don’t remember who gave it to me”). Another adjustment was made in the application instruction, consisting of both the participant and evaluator, with each having a copy of the story to read. In this case, the evaluator read the story aloud and the participant followed his/her copy, controlling possible influences of lack of attention or short-term memory failures. Table 2 only shows four stories, for example, two assessment stories and their two equivalent control stories. The complete stories can be revised in the supplementary material.

Table 2.
Stories translated and adapted for the Faux Pas Test

	ORIGINAL	TRANSLATION	BACK TRANSLATION	ADJUSTMENT
1	<p>All of the class took part in a story competition. Emma wanted to win. While she was away from school, the results of the competition were announced: Alice was the winner. The next day, Alice saw Emma and said, "I'm sorry about your story". "What do you mean?" said Emma. "Oh nothing," said Alice.</p>	<p>Todos en clase participaron en un concurso de cuentos. Emma realmente quería ganar. Mientras ella no estaba en la escuela, los resultados de la competencia fueron anunciados: Alice fue la ganadora. Al día siguiente, Alice vio a Emma y dijo: "Lo siento por tu cuento". "¿Qué quieres decir?" Dijo Emma: "Oh nada," dijo Alice.</p>	<p>Everyone in the class participated in a story competition. Emma wanted to win. While she was not in school, the results of the competition were announced: Alice was the winner. The next day, Alice saw Emma and said: "I'm sorry for your story". "What do you mean?" Emma said. "Oh nothing," said Alice.</p>	<p>En un salón de clases, se hizo un concurso de cuentos y Emma, una estudiante, tenía muchos deseos de ganar. El día en que dieron los resultados, Emma no estaba presente y se dio la noticia de que la ganadora había sido Alicia, una compañera de Emma. Al día siguiente, Alicia vio a Emma y le dijo: "Qué lástima por tu cuento" y Emma le preguntó: "¿Qué quieres decir?" y María le respondió: "No, nada" y se fue.</p>
2	<p>All of the class took part in a poetry competition. Jane wanted to win. While she was away, the results of the competition were announced: Mary was the winner. The next day, Jane bumped into Mary. Mary said, "How are you feeling?" "Fine thanks?" said Jane, "Oh good," said Mary.</p>	<p>Todos en la clase participaron en un concurso de poesía. Jane realmente quería ganar. Mientras ella no estaba, los resultados de la competencia fueron anunciados: María fue la ganadora. Al siguiente día, Jane se encontró con María. María dijo: "¿Cómo te sientes?". "Bien gracias" dijo Jane, "Ah bueno" Dijo María.</p>	<p>Everyone in the class participated in a poetry competition. Jane wanted to win. While she was not there, the results of the competition were announced: María was the winner. The next day, Jane met María. María said: "How do you feel?" "Well, thank you", said Jane, "Oh good," said María.</p>	<p>En un salón de clases se hizo un concurso de poesía en el que todos participaron y Juana, una estudiante quería ganar. El día que dieron los resultados, Juana no estaba presente y se dio la noticia de que la ganadora había sido María, una compañera de Juana. Al día siguiente, María se encontró con Juana y le preguntó: "Hola, ¿hoy tenemos clase de matemática?" y Juana le respondió: "Sí claro", "ah bueno, gracias", le dijo María.</p>
3	<p>James bought Richard a toy airplane for his birthday. A few months later, they were playing with it, and James accidentally dropped it. "Don't worry" said Richard, "I never liked it anyway. Someone gave it to me for my birthday".</p>	<p>Jaime le compró a Ricardo un avión para su cumpleaños. Pocos meses después, ellos estaban jugando con él, y Jaime lo dejó caer accidentalmente. "No te preocupes", dijo Ricardo, "De todos modos nunca me gustó, alguien me lo dio para mi cumpleaños".</p>	<p>Jaime bought Ricardo an airplane for his birthday. A few months later, they were playing with it, and Jaime accidentally dropped it. "Do not worry" said Ricardo, "I never liked it anyway, someone gave it to me for my birthday".</p>	<p>Jaime le regaló a Ramiro un avión de juguete para su cumpleaños sin que Ramiro se diera cuenta. Unos meses después, los dos estaban jugando con el avión, cuando de pronto a Jaime se le cayó accidentalmente y lo dañó. Ramiro lo miró y le dijo: "No te preocupes de todos modos no me gustaba, era feo, no sé quién me lo regaló de cumpleaños".</p>
4	<p>Simón bought Robert a toy car for his birthday. A few months later, they were playing with it, and Simón dropped it. "Don't worry", said Robert, "It was only an accident".</p>	<p>Simón le compró a Roberto un juguete para su cumpleaños. Pocos meses después, ellos estaban jugando con él y Simón lo dejó caer. "No te preocupes", dijo Roberto, "Fue solo un accidente".</p>	<p>Simón bought Roberto a toy for his birthday. A few months later, they were playing with it, and Simón dropped it. "Do not worry," said Roberto, "It was just an accident".</p>	<p>Gabriel le regaló a Roberto un carro de juguete para su cumpleaños. Unos meses después, los dos estaban jugando con el carro, cuando de pronto, Gabriel lo dañó accidentalmente. "No te preocupes", dijo Roberto, "fue solo un accidente".</p>

Reading the Mind in the Eyes Test

This test consists of 28 stimuli, composed of 12 female faces and 16 male faces, plus a sample test stimulus of a male face. For each set of eyes, there are four answer options, with only one correct option. The answer options are words or short phrases that express a mental or emotional state that must be attributed to the subject. Table 3 shows the original answer options in English in the first column; the translation made by us in the second column; the back-translation of these items in the third column; and the answer options after adjustment following the application of the sample test to the pilot group in the fourth column. The presentation is made by answer options and not by stimuli, given that the stimuli themselves are the set of eyes, and what was adapted into Spanish are the answer options, randomly repeated between each stimulus, amounting to a total of 44 answer options, as shown in Table 3, divided into the 28 test stimuli. The back-translation confirmed 42 out of the 44 answer options translated; only options 8 and 41 ended up differently than the original version. However, this difference is not relevant, given that the back-translated words can be considered synonyms of the original versions. Another adjustment made was matching the gender of the word with the gender of the set of eyes; that is to say, in the case of a female set of eyes, the answer options were written in the female form, and in the case of a male set of eyes, in the male form. This was made because the test does not assess the person's ability to identify gender.

Table 3
Responses to the stimuli of the Reading the Mind in the Eyes Test

	INGLÉS	TRADUCCIÓN	RETROTRADUCCIÓN	TRADUCCIÓN AJUSTADA
1	A bit worried	Un poco preocupado	A bit worried	Un poco preocupado
2	Angry	Enojado	Angry	Enojado
3	Annoyed	Molesta	Annoyed	Molesta
4	Ashamed	Avergonzado	Ashamed	Avergonzado
5	Bored	Aburrido	Bored	Aburrido
6	Bossy	Mandón	Bossy	Mandón
7	Confused	Confundido	Confused	Confundido
8	Cross	Enojado	Annoyed	Enojado
9	Daydreaming	Soñar despierto	Daydreaming	Soñando despierto
10	Disgust	Asco	Disgust	Cara de asco
11	Disgusted	Asqueado	Disgusted	Cara de asco
12	Excited	Emocionado	Excited	Muy Feliz
13	Feeling sorry	Arrepentido	Felling sorry	Arrepentido
14	Friendly	Amigable	Friendly	Amigable
15	Guilty	Culpable	Guilty	Culpable
16	Happy	Feliz	Happy	Contento
17	Hate	Odio	Hate	Cara de odio
18	Hoping	En espera	To hope	Cara de querer algo
19	Interested	Interesado	Interested	Interesado

20	Jealous	Celoso	Jealous	Cara de envidia
21	Joking	Jocoso	Joking	Gracioso
22	Kind	Amable	Kind	Amable
23	Made up her mind	Decidida	Decided	Decidida
24	Making somebody do something	Haciendo que alguien haga algo	Making someone do something	Persuasivo
25	Nervous	Nerviosa	Nervous	Nerviosa
26	Not believing	Incrédulo	Incredulous	Desconfiado
27	Not pleased	No satisfecho	Not pleased	No satisfecho
28	Playful	Juguetón	Playful	Divertida
29	Pleased	Satisfecho	Pleased	Satisfecho
30	Relaxed	Tranquilo	Relaxed	Tranquilo
31	Remembering	Recordando	Remembering	Recordando algo
32	Sad	Triste	Sad	Triste
33	Scared	Asustado	Scared	Asustado
34	Serious	Serio	Serious	Serio
35	Shy	Tímido	Shy	Con pena
36	Sorry	Arrepentido	Sorry	Arrepentido
37	Sure about something	Seguro de algo	Sure about something	Seguro de algo
38	Surprised	Sorprendido	Surprised	Sorprendido
39	Thinking about something	Pensando en algo	Thinking about something	Pensando en algo
40	Thinking about something sad	Pensando en algo triste	Thinking about something sad	Pensando en algo triste
41	Unkind	Antipático	Unfriendly	Grosero
42	Upset	Molesto	Upset	Disgustado
43	Wanting to play	Queriendo jugar	Wanting to play	Con ganas de jugar
44	Worried	Preocupado	Worried	Preocupado

DISCUSSION

This work was aimed at adapting four tests into Spanish to assess ToM in children and adolescents aged 6 to 18. After application to two pilot groups, the understanding of the items and the sociocultural adjustment of each test to the Colombian context was confirmed. The importance of this study lies in representing a first step toward the generation of instruments that assess SC in children and adolescents, a population that has a high prevalence of neurodevelopment disorders, with compromised social functioning (Overton, Molenaar, & Lerner, 2015), and with very few instruments designed and validated to examine this component from the clinical and neurocognitive perspective, something that needs to be addressed immediately due to the relevance of approaching the cognitive processes from the cerebral functioning perspective and beyond that to promote healthy social integration (Escudero-Cabarcas, 2015; Vásquez-De la Hoz, Escudero-Cabarcas, Pineda-Alhucema, & Mercado-Peñaloza, 2015).

The importance of the language and cultural adaptation of psychological assessment instruments in any of its fields is fundamental, especially in the exploration of the functioning of new variables that may contribute to the understanding of a neurocognitive phenomenon. This is the case of ToM, an SC dimension broadly studied in English-speaking cultures and even considered in some neuropsychological assessment batteries, such as the NEPSY-II (Korkman, Kirk, & Kemp, 2007). However, for Spanish-speaking populations, there are very few SC assessment instruments adapted for children and adolescents, particularly for the Colombian sociocultural context.

The adaptation of the tests described in this work implied significant adjustments, such as in the case of the Faux Pas Test, where it was necessary to adjust the characters' expressions and add more context information, proving the importance of this type of work for the application of an instrument to a different culture than the one it was created in as stated by Borsa, Damásio, & Bandeira (2012).

For the adaptation of the tests described in this work, the fundamental criterion considered was that they had an important historical trajectory as instruments to measure the ToM, which is the case both of the Faux Pas Theory and the Reading the Mind in the Eyes Test. Even though it has not been broadly used in research, the ToMB is based on the well-known paradigm of attribution of first- and second-order false beliefs (Hutchins & Prelock, 2010). This paradigm was also the base used to propose other ToM

scales, such as the Scaling of Theory-of-Mind Tasks, formulated based on a systematic revision made by Wellman & Liu (2004) on the studies that have used different versions of the false-belief task. This scale consists of seven tasks of increasing complexity, namely, diverse-desire task, diverse-belief task, knowledge-access task, content false-belief task, explicit false-belief task, belief–emotion task, and the apparent–real emotion task. As can be noted, the scale is not only based on the attribution of beliefs but also involves knowledge and emotion attributions as the ToMB. However, this scale does not have standardized pictures, making the standardization process of the instrument more difficult. Another advantage of the ToMB is that it includes the ToM Inventory, a complementary measure of the behavioral observation of the functioning of ToM.

The ToM Inventory itself represents a recent attempt to make the assessment of ToM more ecological as this inventory is completed by the child’s caregivers, whereby behaviors associated with the functioning of ToM are reported. However, it is important to note that, given that this test is still in its early stages, it could be affected by the complexity of some of the items for low-schooling populations and their SC level. There are other initiatives such as this one that look for new alternatives to assess ToM, such as the Scaling of Advanced Theory-of-MindTasks (Osterhaus, Koerber, & Sodian, 2016), the Geneva SC Scale (Martory, et al., 2015), or the picture books that represent situations in which the attribution of mental states is necessary, such as the ToM-Story Book (Blijd-Hoogewys, van Geert, Serra, & Minderaa, 2008). In terms of questionnaires, the ToM Assessment Scale (Bosco et al., 2009) is a semi-structured interview applied to the subject that looks to overcome the informant’s schooling limitation. However, this instrument is still in the process of evaluation of its statistical properties.

The Faux Pas Test and the Reading the Mind in the Eyes Test have been the most widely used tests to research SC in order to assess ToM in different population groups, and especially for clinical studies, such as in Autism Spectrum Disorder (Thiébaud et al., 2016; Tin et al., 2018), Attention-Deficit/Hyperactivity Disorder (Mary et al., 2015; Pineda-Alhucema & Puentes, 2012), Schizophrenia (Etchepare & Prouteau, 2017), Dementia (Duclos et al., 2018; Poletti, Enrici, & Adenzato, 2012), Behavioral Disorders (Fonagy & Bateman, 2016), and even Eating Disorders (Leppanen, Sedgewick, Treasure & Tchanturia, 2018) and Child Maltreatment (Luke & Benerjee, 2013; Pineda-Alhucema, Aristizábal-Díaz, Escudero-Cabarcas, 2017). Nonetheless, the Eyes Test has been most widely changed, in terms of adaptations and validations, especially the adult version for the Brazilian (Miguel, Caramanico, Huss, & Zuanazzi, 2017), Italian (Preti, Vellante, &

Petretto, 2017), French (Prevost et al., 2013), Swedish (Söderstrand, & Almkvist, 2012), Polish (Jankowiak-Siuda et al., 2016), German (Pfaltz et al., 2013), Argentine (Román et al., 2012), and Spanish (Fernández-Abascal, Cabello, Fernández- Berrocal & Barón-Cohen, 2013) populations. The child-friendly version has also been validated and adapted to different populations although to a lesser degree when compared with the adult version, such as the work by Vogindroukas, Chelas, & Petridis (2014) in the Greek population, the work conducted by Rueda, Cabello, & Fernández-Berrocal (2013) in the Spanish population, and Hayward & Homer (2017) in the US population. However, adjustments and validations are scarce in the pediatric and adolescent populations for both tests.

On the other hand, these could be considered to mutually supplement each other; their ability to infer mental and emotional states lies in the detection of a social error within a context that facilitates understanding the situation. However, this requires suitable language development—especially the pragmatic one—given its importance for the understanding of implicit messages (Escudero-Cabarcas, Puentes-Rozo, & Pineda-Alhucema, 2017); therefore, patients suffering from difficulties in language comprehension may have problems with these tasks without necessarily indicating flaws in understanding mental states (Samuel, Durdevic, Legg, Lurz, & Clayton, 2019). These tests' language burden restricts their use in cases of patients with language disorders. To this end, the Reading the Mind in the Eyes Test can be understood as supplementary (but not secondary) as it considerably reduces the language burden, only restricting it to the understanding of the meaning of some specific words that denote mental or emotional states, which must be attributed to the expression of the eye area of a human face. Nonetheless, this test is not about social interactions, and that is why the Faux Pas Test is regarded as its supplement.

Finally, the suggestion is for all instruments adjusted herein to be part of a protocol to evaluate the different dimensions of ToM and its operating modes so that the ToMB and the ToMI are placed at the most elemental level, containing first- and second-order false-belief tasks, which usually reach a plateau around the age of eight. These have proven to be sensitive to disorders in which social functioning is severely affected, such as Autism Spectrum Disorder. For their part, the Faux Pas Test and the Reading the Mind in the Eyes Test are considered Advanced ToM tasks (Apperly, 2011) and may be used either with children older than 8 and adolescents facing social functioning difficulties, provided there is suspicion of core neurodevelopment disorders, such as Attention-Deficit/Hyperactivity Disorder (ADHD), or Behavioral Disorders, such as Dissociative Disorder, or

disorders that may involve the impairment or alteration of cognitive functions as in the case of psychoactive substance abuse (Acosta, Cervantes, Pineda-Alhucema, De la Torre, & Cárdenas, 2011). It is important to explain that, given the current lack of SC models and of course the shortage of operation models of the ToM, the application of these tests is comprehensively carried out as per protocol, rather than excluding one or another, since there is no clarity about whether the levels representing each test are overlapping or whether these indeed act as identified dimensions of a single construct.

The main limitation of this study is that only the adjustment level was achieved, so the validation process is pending in the second phase. Another limitation may involve the exclusion of very important tasks for ToM assessment in the pediatric population, such as Happé's Strange Stories Test. Nonetheless, the chosen ones are statistically strong in other studies, as referred to above, so these turned out to be the better candidates for our work.

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