Translation and cross-cultural adaptation into Brazilian Portuguese of the *Children’s Communication Checklist-2*

**ABSTRACT**

**Purpose:** To translate the Children’s Communication Checklist-2 (CCC-2) into Brazilian-Portuguese, to make its cross-cultural adaptation and to assess its internal reliability. **Methods:** The translation and cross-cultural adaptation followed the recommendations of the International Society for Pharmacoeconomics and Outcomes Research. The test was administered to 20 parents or caregivers of individuals with autism in order to investigate the level of understandability of the object under study. **Results:** After implementing the necessary adjustments, the final version of the Brazilian-Portuguese CCC-2 was achieved. Parents and/or caregivers did not make any suggestion for its adaptation. The final version was certified by the author of the original instrument and by the publisher responsible for marketing the CCC-2. Reliability of the instrument is acceptable, with values of internal consistency of its subscales ranging from 0.75 to 0.90. **Conclusion:** The instrument can be used in the clinical evaluation of children with autism and developmental language disorder. However, further studies are needed to assess the reliability and validity of the instrument in Brazil.

**RESUMO**

**Objetivo:** Traduzir o *Children’s Communication Checklist-2* (CCC-2) para o idioma português brasileiro, realizar sua adaptação transcultural e avaliar sua consistência interna. **Métodos:** A tradução e a adaptação transcultural seguiram as recomendações da *International Society for Pharmacoeconomics and Outcomes Research*. O teste foi aplicado em 20 responsáveis ou cuidadores de indivíduos com autismo a fim de averiguar o grau de compreensibilidade do objeto e sua consistência interna. **Resultados:** Após os devidos ajustes, chegou-se à versão final em português brasileiro do CCC-2. Os pais e/ou cuidadores não fizeram sugestões para a adaptação do teste. A versão final recebeu a chancela da autora do instrumento original e da editora responsável pela comercialização do CCC-2. A confiabilidade do instrumento é aceitável, com valores de consistência interna das subescalas variando de 0,75 a 0,90. **Conclusões:** O instrumento pode ser utilizado como recurso para avaliação clínica de crianças com autismo e transtorno do desenvolvimento da linguagem, porém ainda há necessidade de estudos que avaliem a validade do instrumento no Brasil.

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**Conflict of interests:** nothing to declare.
INTRODUCTION

Autism spectrum disorders are mainly characterized by qualitative impairment in social interaction and communication \(^{1,2}\). Furthermore, echolalia, verbal and motor stereotypes, performance of rituals, and very restricted patterns of interest are common. The classic autism has been associated with a delay or absence of verbal language. However, pragmatic language alterations occur in all cases of autism \(^{3,4}\).

The pragmatic language relates the social meaning of language with the semantic content and meaning; therefore ensuring the effective and functional use of language. Pragmatic alterations cause difficulties in interpreting the actions of others and/or adequately expressing wishes and intentions, thus featuring impairment in language expression and comprehension \(^{5}\).

There are few clinical questionnaires available that emphasize the pragmatic aspects of language. The Children’s Communication Checklist-2 (CCC-2) was developed by Bishop et al. \(^{6}\) and has 70 items to verify aspects of communication such as speech, vocabulary, sentence structure, and social language skills of children and adolescents who use sentences in their speech \(^{3,4}\).

The test is divided into two phases. The first phase consists of 50 questions assessing difficulties that children and adolescents might face to communicate; the second phase consists of 20 questions that relate to the strengths that children and adolescents might have when they communicate with others \(^{3,4}\).

During the test, each question is individually rated. Each question should be scored from 0 to 3, where:

- 0 = less than once a week (or never);
- 1 = at least once a week but not every day (or occasionally);
- 2 = once or twice per day (or frequently); and
- 3 = several times (more than two) a day (or always).

Ten subscales ranging from A to J are considered on the test analysis as follows: A = discourse, B = syntax, C = semantics, D = coherence, E = inadequate initiation, F = stereotyped language, G = use of context, H = non-verbal communication, I = social relations, and J = interests. These scales can be divided into three groups of which four questions are related to different aspects of the pragmatic use of language, four others evaluate the structural aspects of language use, and two assess non-linguistic domains.

The test aims to identify children with pragmatic language disorder as an interesting assessment instrument to identify autism spectrum disorders \(^{3,4,6}\), particularly when there is no deficit in intellectual abilities (high functioning autism and Asperger syndrome) \(^{6}\).

The aim of this study was to translate and culturally adapt the CCC-2 into Brazilian Portuguese as well as to evaluate its internal consistency.

METHODS

This study was approved by the Ethics and Research Committee of Universidade Federal de Minas Gerais (UFMG) under number ETIC0008.0.203.000-11. All participants signed an informed consent form. The approvals from Bishop and Pearson Assessment and Information were obtained for the execution of translation and adaptation.

The translation and cultural adaptation followed the recommendations of the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) \(^{7}\):

- Preparation – authorization from the original test and collaboration to review the back-translation were requested in order to verify the reliability of the translated version.
- Translation – two independent translations were carried out by two different translators who were fluent in English, generating versions T1 and T2. These professionals have had no contact with each other to perform the translations.
- Conciliation – versions T1 and T2 were compiled by a third person, generating T3 version-translation of the consensus.
- Back-translation – T3 test version was translated back into English in order to be compared with the original version and to have its reliability verified. The translation was carried out by a fourth person who had no contact with the previous versions.
- Review of back-translation – the author of the original test helped in revising the test for translation reliability.
- Application of the test in its final version.

Guardians and/or caregivers of individuals with autism were consecutively recruited at the Autistic Disorders Outpatient department of the Psychiatric Service of Hospital das Clínicas, UFMG. The following inclusion criteria were used: participants should have Portuguese as their native language and be parents of children and adolescents diagnosed with autism aged between 4 and 16 years, regardless of gender, ethnicity, socioeconomic status, or education. Participants would be excluded if their children had hearing loss or were unable to combine words into sentences. In cases of hearing loss and no ability to combine words into sentences, the test could not be applied. This procedure was performed because it was part of the original test, even though the research focus was to investigate only the comprehension of each test question.

At first, the instrument was administered to ten participants. A researcher (VBSC) followed the reading of each of the individual questions by the participants to ensure comprehension, given the low educational level of some study participants. If the participant did not understand what was being asked, the examiner explained the question and requested suggestions to improve the comprehensibility of the same.

The second phase of the study aimed to evaluate the degree of comprehensiveness and internal consistency of the final version of the instrument. The sample size calculation for this step considered a probability of type I error of 0.05, a power of 0.9, and a desired value of 0.7 of Cronbach’s alpha. Considering that the subscales of the CCC-2 have 7 items, a minimum sample of 19 participants was estimated. After the final version of the instrument was completed, the CCC-2 was administered to 20 participants. To evaluate the
responsiveness of the instrument, participants answered the following question: “Did you understand what was asked?”(8). Responses ranged on a Likert scale: 0=I did not understand it; 1=I understood it just a little, 2=I understood it more or less, 3=I understood almost everything, but I have some doubts, 4=I understood almost everything, and 5=I understood it perfectly and I have no doubts. Mean and standard deviation were calculated for these values. Statistical analyzes were performed using the program Statistical Package for Social Sciences (SPSS) version 19.0.

RESULTS

During the review of back-translation, the researchers discussed with Bishop and the other specialists, those terms appearing in the CCC-2 which could not be literally translated into Portuguese. It was found that in particular, questions 4, 17, 24, and 44 of the conciliation translation needed extra care during cross-cultural adaptation (Chart 1).

For example, item four of the original instrument questions whether the child has “false starts”, which is little understood in Brazil even among specialists. The author was asked to explain the meaning of this item with more clarity. The author explained that the item questions the difficulty faced by the individual in starting sentences, where sentences appear to be “broken”, but without any characteristic hesitation or stuttering. Item 17 of the test questions pronoun confusion. Some commonly confused English pronouns cannot be easily translated into Portuguese (e.g. him or her). With respect to items 24 and 38 (dealing with childish pronunciation and trouble pronouncing long words, respectively), the words in Portuguese should possess similar characteristics and should make sense in the Brazilian reality (e.g. this was not the case for the word “chimney”). Finally, item 44 questions the difficulty faced by the individual to pronounce certain phonemes. Examples in English correspond to phonemes of the English language (/th/or/w/), which also underwent a linguistic adaptation. These phonemes are just an example of a possible replacement of phonological problem or articulatory difficulty. In Portuguese, the following phoneme exchanges were selected /l/ to /k/ and /t/to/s/, but the item in the questionnaire had to be marked as positive if other substitutions were present (e.g. /t/to/k/).

After the necessary adjustments were made in the translated version, the instrument was applied to the participants. During the application of the questionnaire, it was observed that parents/caregivers with a lower educational level had difficulty understanding some questions and/or provided responses that were out of context to the questions asked. However, it was observed that these participants had difficulty understanding written questions, but had reasonable understanding when questions were orally repeated. Having doubts in some written questions, the parents and/or caregivers were not able to make appropriate suggestions for the adaptation of the test.

<table>
<thead>
<tr>
<th>Question</th>
<th>Original version</th>
<th>Consensus translation</th>
<th>Final version in Brazilian Portuguese</th>
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<tbody>
<tr>
<td>4</td>
<td>Makes false starts, and seems to search for the right words (e.g., says “I can I can I can I can I can I can I have an - have ice cream”)</td>
<td>Faz início falsos (hesita ou gagueja no início das frases) e parece procurar as palavras certas (por exemplo, diz “eu posso-eu posso-eu posso-eu posso-eu posso-eu posso-ter um - ter sorvete?”)</td>
<td>Tem dificuldades em iniciar as frases, apresentando quebras na fala, como se procurasse as palavras certas (por exemplo, diz “eu posso-eu posso-eu posso-eu posso-eu posso-tomar um - tomar sorvete?” ou “eu, eu, eu, eu, eu, eu quero um sorvete”)</td>
</tr>
<tr>
<td>17</td>
<td>Gets mixed up between he/him or she/her (e.g., says “him is working” rather than “he is working; or ‘her has a cake’ rather than ‘she has a cake’)</td>
<td>Fica confuso com eu/mim (por exemplo, diz “mim estou trabalhando” em vez de “eu estou trabalhando” ou “mim tenho um bolo” em vez de “eu tenho um bolo”)</td>
<td>Fica confuso com eu/mim (por exemplo, diz “mim estou trabalhando” em vez de “eu estou trabalhando” ou “mim tenho um bolo” em vez de “eu tenho um bolo”)</td>
</tr>
<tr>
<td>24</td>
<td>Pronounces words in a babyish way (e.g., “chimbley” for “chimney” or “bokkie” for “bottle”)</td>
<td>Pronuncia palavras de um modo infantilizado (por exemplo, “chachorro” para “cachorro” ou “dedeira” para “mamadeira”)</td>
<td>Pronuncia palavras de um modo infantilizado (por exemplo, “pepeta” para “chupeta” ou “dedeira” para “mamadeira”)</td>
</tr>
<tr>
<td>38</td>
<td>Makes mistakes in pronouncing long words (e.g., says “vegetable” instead of “vegetable” or “trelistope” instead of “telescope”)</td>
<td>Faz erros ao pronunciar palavras longas (por exemplo, diz que “marronada” em vez de “macarronada” ou “trelistópio” em vez de “telescópio”)</td>
<td>Faz erros ao pronunciar palavras longas (por exemplo, diz que “marronada” em vez de “macarronada” ou “trelistópio” em vez de “telescópio”)</td>
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<tr>
<td>44</td>
<td>Mispronounces th for s or w for r (e.g., “thoap” instead of “soap” or “wabbit” instead of “rabbit”)</td>
<td>Pronuncia errado ch para s ou t para c (por exemplo, “chabão” em vez de “sabão” ou “toelho” em vez de “coelho”)</td>
<td>Pronuncia errado t para s, ou f para r (por exemplo, “tapo” em vez de “sapo”, ou “balata” em vez de “barata”)</td>
</tr>
</tbody>
</table>
and the adjustments were made by the researchers according to the doubts presented by the parents and/or caregivers.

Finally, the final version of the instrument was checked for its comprehensiveness in the second phase of the study. The comprehensiveness of the instrument was good (mean=4.7, standard deviation=0.3), and the questions were generally completely understood (Table 3). With regard to internal consistency, the Cronbach’s alpha values ranged from 0.75 to 0.90 (Table 2). The alpha value for the CCC-2 was 0.93.

The full instrument could not be published in this article for reasons of copyright. The final version can be purchased through the publisher of the CCC-2 (Pearson Assessment and Information).

**DISCUSSION**

Individuals with autism spectrum disorders present major communication difficulties that are mainly related to pragmatic aspects. Language skills are the best predictors of future performance with regard to adaptive skills, academic success, and independence in adulthood. Furthermore, it is known that the autism spectrum disorders should be identified as early as possible in order to enable that therapeutic interventions are initiated as soon as possible.

Unfortunately, instruments to assess this language aspect are scarce in Brazil. For this reason, the CCC-2 was chosen for this research. Being a very sensitive test, it detects failures in pragmatic language that are not detected in most communication tests. The process of translation and cultural adaptation of the CCC-2 into Brazilian Portuguese described in this paper makes this instrument available to Brazilian clinicians and researchers working with autism.

The CCC-2 is a fairly complete test that evaluates various aspects related to language, mainly at the pragmatic level. Moreover, it is an easy-to-apply test which is fast and shows good sensitivity, particularly when there is comorbidity with mental retardation. Because of its sensitivity, some authors consider the CCC-2 as an important screening tool, especially for detecting possible language alterations related to autism spectrum disorders.

The author of the original instrument and the publisher that owns the copyright on the CCC-2, approved the final version of the test. Considering the good responsiveness of the Brazilian version of the CCC-2, the test may prove to be clinically useful even for professionals who serve populations with a low educational level, as long as the completion of the questionnaire is supervised. Furthermore, the test showed good internal consistency. Previous studies have shown variable internal consistency on the subscales of the CCC-2, with some studies observing low internal consistency. This variability has been attributed to the small number of items of the subscales, which often adversely affect the calculation of the Cronbach’s alpha. Furthermore, the use of the instrument in populations of normal children can also adversely affect its internal consistency. The suitable values observed in this study can be justified by the fact that it was applied to the clinical population targeted by the instrument. Future research should evaluate other measures of instrument reliability and validity of the Brazilian version of the CCC-2.

**CONCLUSION**

Instruments for the screening and diagnostic evaluation of autism are still scarce in Brazil despite the growing national literature in this field. Therefore, it is important that good screening tools are available to Brazilian professionals. This paper introduced...
the process of translation and cultural adaptation of the CCC-2, an internationally acclaimed instrument in the evaluation of autism and one that is particularly high-functioning. However, there is still a need for validation of the Brazilian version of the CCC-2 in order for the test to be widely used in clinical and research settings.

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* VBSC, EH, VOMR and AK were in charge of translating the instrument; VBSC was responsible for collecting and formatting, as well as for supervising data collection; VBSC and EH collaborated with data analysis and elaboration of the manuscript; AK was in charge of the project and study design, as well as general guidance of the stages of execution.

REFERENCES