Cross-cultural adaptation of the Chedoke Arm and Hand Activity Inventory (CAHAI)[1]

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Abstract: Introduction: The Chedoke Arm and Hand Activity Inventory (CAHAI) was developed in English and French (original version in both languages) for evaluation of the level of the upper limb activity in subjects with hemiparesis after stroke. Objective: To translate and cross-culturally adapt the manual of application and scoring of CAHAI to Portuguese-Brazil. Method: The process included seven steps: i) the translation process with two independent translation; ii) merging of the two translation; iii) layout, typography and grammar review; iv) two independent back-translations; v) meeting with the Committee of Experts; vi) sending the original version to the author , and vii) pre-testing of the CAHAI-Brazil version (raters: n=5; subjects: n=4). Results: The CAHAI-Brasil version had satisfactory results in the translation and adaptation, and appropriate index of concordance among raters (kappa between 0,76 and 1,00). Some expressions in the manual and some of the materials used for the test had to be adapted to Brazilian culture. Conclusion: This study shows the CAHAI-Brazil version was successfully translated and adapted.

Keywords: *Translating, Activities of Daily Living, Stroke, Upper Extremity.*

Adaptação transcultural do *Chedoke Arm and Hand Activity Inventory* (CAHAI)

Resumo: Introdução: O *Chedoke Arm and Hand Activity Inventory* (CAHAI) foi desenvolvido nas línguas inglesa e francesa, com versão original nos dois idiomas, para a avaliação do nível de atividade dos membros superiores em indivíduos com hemiparesia após Acidente Vascular Encefálico (AVE). Objetivo: Realizar o processo de adaptação transcultural do manual de aplicação e da folha de pontuação do CAHAI para a língua portuguesa-Brasil. Método: Constituído de sete etapas, o processo de tradução consistiu em: i) duas traduções independentes; ii) compilação das duas traduções, formando uma única tradução; iii) revisão do layout, da tipografia e da gramática; iv) duas retrotraduções independentes; v) reunião com Comitê de Especialistas; vi) envio para a autora da versão original, e vii) pré-teste da versão CAHAI-Brasil (avaliadores: n=5; sujeitos: n=4). Resultados: A versão CAHAI-Brasil teve resultados satisfatórios nas etapas de tradução e adaptação, e índices de concordância entre os avaliadores adequados (kappa entre 0,76 e 1,00). Houve necessidade de substituir alguns termos utilizados no manual e de adaptar alguns dos materiais utilizados no teste. Conclusão: Este estudo mostra que a versão CAHAI-Brasil foi traduzida e adaptada com êxito.

Palavras-chave: *Tradução, Atividades Cotidianas, Acidente Vascular Cerebral, Extremidade Superior.*

1 Introduction

Stroke is a common neurological syndrome, which includes motor impairments in 80% of cases, such as hemiparesis (ROGER et al., 2012; BRASIL, 2013). It is estimated that 63% of the individuals who presented severe paresis in the acute phase will have residual impairments, which may result in an inability to perform activities of daily living (HUNTER; CROME, 2002). Since many of these activities require the participation of both upper limbs (UL) for its implementation, residual deficits directly affects the limitations presented by individuals with hemiparesis in the activity domain, according to the International Classification of Functioning, Disability and Health (ICF) (HUNTER; CROME, 2002; LANGHORNE; COUPAR; POLLOCK, 2009; FARIAS; BUCHALLA, 2005).

UL assessment instruments are important in the rehabilitation process, guiding the treatment plan and providing realistic estimates of functional recovery for therapists, family members and patients (LANGHORNE; COUPAR; POLLOCK, 2009). The Chedoke Arm and Hand Activity Inventory (CAHAI) is an assessment instrument aimed to estimate the level of activity of the UL of individuals with hemiparesis after stroke. Thus, 13 bilateral functional tasks recognized by the World Health Organization (WHO) in the Activity domain of the ICF (BARRECA et al., 2004) are used to evaluate the use of the paretic upper limb (PUL) during the task.

However, this instrument was originally developed in both English and French, but it is known that the use of evaluation instruments developed in the original language of the target population has more reliable results. A simple translation of the text to use the instrument in a language other than the original language may distort the actual meaning of some items since the concepts are influenced by the local culture. This may lead to some aspects being more relevant in one country than in others (BARRECA et al., 2005; BEATON et al., 2000). Thus, the translation is insufficient for the proper use of an instrument, justifying the need for a structured process of translation and cross-cultural adaptation, according to the cultural aspects of each region (BEATON et al., 2000).

Transcultural adaptation of an instrument is a complex process (BEATON et al., 2000). This process increases the credibility of the instrument in the scientific area, qualifying international multicenter studies (GUILLEMIN; BOMBARDIER; BEATON, 1993) and favoring the formation of a scientific basis for communication between professionals and researchers, as well as documentation of the effectiveness of a treatment (MAHER; LATIMER; COSTA, 2007; SCHUSTER; HAHN; ETTLIN, 2010).

Currently, we are aware of the existence of two instruments that evaluate the capacity of the PUL available in Portuguese and that also include bilateral tasks. The *Teste de Habilidade Motora do Membro Superior* (THMMS) - the Brazilian version of the AMAT - has 13 tasks, six of which are bilateral (cutting meat, opening the jar, knotting a lace, putting on the jacket, putting on the shirt, extend the arm), and evaluates the ability and quality of the movement. It was developed to determine the effectiveness of Constraint-Induced Therapy (CIT) and does not differentiate the limb performing the task as a stabilizer or manipulator (MORLIN et al., 2006).

The *Test d'Évaluation des Membres Supérieurs des Personnes Âgées* (TEMPA) is an instrument that evaluates the function of the UL in eight standardized tasks that simulate the ADLs. Four out the eight tasks of the Brazilian version of TEMPA are bilateral (opening a pot and taking out a full spoon of coffee; unlocking a lock, picking up and opening a container containing pills; writing in an envelope and gluing a stamp; shuffling and distributing playing cards). Scores are based on the execution speed, functional graduation, and task analysis. As the AMAT, this instrument does not differentiate which member performs the task as manipulator or stabilizer, in bilateral tasks, and this limitation is identified by the authors (MICHAELSEN et al., 2008).

Considering the importance of the ability to perform bilateral tasks, it is relevant to have Portuguese instruments that assess this ability. Other tests of the MS activity such as ARAT (PAZ; BORGES, 2007), WMFT (PEREIRA et al., 2011), MAS (PEREIRA et al., 2012) and JTT (FERREIRO; SANTOS; CONFORTO, 2010) do not present any bilateral task. The AMAT and the TEMPA are not exclusively assembled with bilateral tasks and their scoring do not recognize the UL that acted either as stabilizer or manipulator during the task, and therefore may not present a real evolution of the PUL.

Considering that the number of individuals with hemiparesis in Brazil is large and that several studies

have been developed in the country directed to the PUL rehabilitation, it is necessary to carry out the process of cross-cultural adaptation of the CAHAI. Thus, our objective was to transcultural adapt both the application manual and the CAHAI score sheet to the Portuguese-Brazilian language.

2 Method

This study was submitted and approved by the Ethics Committee (protocol 131/2010). All participants in this research signed the Informed Consent Term, as well as a Consent Term for Use of Photographs and Videos.

2.1 Instrument

CAHAI was originally developed simultaneously in English and French (BARRECA et al., 2004). The selection of the tasks of the CAHAI began with a systematic review of the literature, based on articles on instruments of PUL evaluation in post-stroke individuals. The search was made at CINAHL, MEDLINE and EMBASE and articles between 1960 and 1997 were included. This search resulted in 44 articles and 21 evaluation instruments. Functional tasks were defined as current daily tasks and were enumerated in a total of 171 functional tasks, resultant from the 21 instruments found in the search. Also, a study was carried out with individuals affected by stroke to determine which tasks are relevant in their daily lives, through questions such as: "If your arm improves a little, which activity would you like to do?" or "What activities can you do now with your arm and your hand?" From the answers, the tasks were analyzed, resulting, in the end, in 13 bilateral functional tasks (BARRECA et al., 2004).

The original version of CAHAI was validated by the authors who developed it and this was applied in the population with stroke, presenting high inter-observer reliability, with an intraclass correlation coefficient (ICC) of 0.98 [95% confidence interval (CI), 0.96-0.99]. Strong correlations were obtained between the CAHAI and both ARAT and CSMA instruments when compared to the CMSA shoulder pain score (1-sided, P = 0.001). The areas under the ROC curves were: CAHAI, 0.95 (95% CI, 0.87-1.00); CMSA, 0.76 (95% CI, 0.61-0.92), and ARAT, 0.88 (95% CI, 0.76 -1.00) (BARRECA et al., 2005).

In a study by Schuster et al. (2010), the high reliability of the evaluators was calculated by the ICC for the four versions of CAHAI in the German version (CAHAI-G 13, 9, 8, 7), ranging between r = 0.96 and r = 0.99 (p <0.001). Correlation between the CAHAI-G and the subscales for hand and arm of the CMSA was r = 0.74 (p <0.001) and r = 0.67 (p <0.001), respectively. Internal consistency of CAHAI-G for all four versions ranged between α = 0.974 and α = 0.979.

The CAHAI is an instrument that uses the observation of the capacity of individuals with hemiparesis to perform bilateral tasks that reflect activities of daily living and, therefore, is a objectively-assessed outcome measure (OAOM). Contrarily to interviews or questionnaires, where the measure is based on the self-report of the patient, OAOM requires the participant to perform tasks and an examiner to determine the score based on previously established criteria (MORLIN et al., 2006).

According to the ICF (ORGANIZAÇÃO..., 2003), the CAHAI falls within the Activity domain. Four versions of CAHAI were formed according to the 13 tasks that comprise the instrument: CAHAI -7; CAHAI-8; CAHAI-9 and CAHAI-13. The subsequent number indicates the number of activities established in each version (BARRECA et al., 2004). For a more extensive evaluation, this study used the CAHAI-13 version, composed of 13 tasks.

The CAHAI comprises a scoring sheet with a PUL activity scale and a manual to conceptualize the score assigned by the evaluators. It includes a table of task components, determining the role of the PUL as a stabilizer or manipulator. After observing the function performed (manipulating or stabilizing, according to the specific table in the Manual) by the PUL, during the execution of the task, the score is assigned according to its degree of independence. The scoring scale ranges from 1 (when the PUL performs less than 25% effort to complete the requested task) to 7 (activities are performed safely, unmodified, without assistive devices or help, and within a reasonable time) (BARRECA et al., 2004; SCHUSTER; HAHN; ETTLIN, 2010).

2.2 Cross-cultural adaptation

Unlike simple translation, which usually involves only one person, cross-cultural adaptation involves a team, including translators, healthcare professionals who will use the instrument and researchers. This process involves the initial translation, the synthesis, the back-translation, the review by the committee of

experts, the pre-test and, finally, the evaluation of the psychometric properties (BEATON et al., 2000; GUILLEMIN; BOMBARDIER; BEATON, 1993; MORLIN et al., 2006; BARRECA et al., 2006; MAHER; LATIMER; COSTA, 2007).

In this study, the transcultural adaptation process of the CAHAI application manual followed seven of the eight steps proposed by Beaton et al. (2000). In Step 4 of the back-translated version by two translators, the study orientation of Beaton et al. (2000) was followed, according to which there must be one naive translator, different from the one proposed by Schuster et al. (2010), suggesting two translators with knowledge of the study objectives. The Expert Committee of Step 5 was composed of four physiotherapists with experience in Neurofunctional Physiotherapy. After the analysis of the back-translated version of CAHAI-Brazil by the author of the original version of the CAHAI, the Brazilian version of CAHAI, described below, was pre-tested. The last step, which describes the psychometric properties of the instrument, should be presented in a future study.

2.2.3 Pre-test

The pre-test aims to evaluate if the transcultural adaptation was efficient, so the instrument can be applied without doubts, both for the evaluator and for the patient. Also, the understanding of the criteria used for scoring is the part that must be impeccable with respect to translation and adaptation, so all evaluators have the same requirements when evaluating the patient.

The pre-test was performed in three stages:

Step 1 - Five physiotherapists applied the CAHAI-Brazil to evaluate the clarity of the manual allowing the application of the test and scoring the tasks through the observation of the ability.

Step 2 - An evaluator who participated on the translation process evaluated four patients with different motor impairments in the acute phase and in the chronic phase, to verify the difficulties and test of the materials that make up the CAHAI-Brazil kit. The sample was defined to be composed of subjects that characterized different types of motor impairment. Thus, a participant with mild, moderate and severe upper limb motor impairment (according to the three levels of motor impairment of the Fugl-Meyer scale) (MICHAELSEN et al., 2011), and one participant in the acute phase (time after

stroke ≤ 6 months) were recruited, totalizing four subjects. Participants were recruited through the Clinical School of Physiotherapy of CEFID/UDESC and the Extension Project "Attention to the health of patients with sequels of stroke". Also, for the inclusion of the individual in the study, Mini-Mental State Examination (MMSE) was used, considering the cut off score as suggested by Brucki et al. (2003): below to 20, 25, 27, 28 and 29, respectively for illiterates, 1 to 4, 5 to 8, 9 to 11, and 12 or more years of education. This instrument was performed to ensure that the individual's performance fully reflected his or her motor impairment, without interference from possible disorders of their mental state.

To assess motor impairment, grip strength and both manual and digital dexterity, the following instruments were applied respectively to characterize the sample: Fugl-Meyer Assessment Scale (MICHAELSEN et al., 2011); Jamar dynamometer (BELLACE et al., 2000); Box and Block Test (BBT) (MATHIOWETZ et al., 1985) and Nine Hole Peg Test (NHPT) (OXFORD et al., 2003).

Step 3 - Two evaluators, one trained (EvT - the same evaluator of step 2, who had access to the DVD provided by the author of the original manual) and another evaluator who used only the information in the manual (EvM), applied the CAHAI in the same two patients to identify any discrepancies in the judging of the score between the evaluators and possible difficulties of understanding the participants about the instructions provided by the evaluator.

To assess the clarity, five physiotherapists with experience in the neurofunctional area were invited to apply CAHAI in a subject with hemiparesis and to score all tasks, as well as to assign a concept regarding the clarity of all items of the score: (1) it is not clear; (2) somewhat unclear; (3) sufficiently clear; (4) highly clear. This step enabled the verification of the formulation and the adequacy of the components that composed the issues.

A letter was sent for the accomplishment of this step, specifying the criteria of evaluation, and the request for appreciation; a copy of the proposed instrument for data collection, and a sheet for evaluation of each item. None of them received information other than those contained in the Portuguese manual. The evaluators were also asked to note all their doubts and difficulties during the application of the instrument.

For this analysis, the Kappa Index was used to evaluate the agreement between the evaluators as

to the clarity of each of the tasks and to the clarity of each item of scores according to the assigned concept (POLIT et al., 2007).

3 Results

3.1 Translation

According to the first step of the process of cross-cultural adaptation from the original CAHAI manual, two independent translations were obtained, carried out by a physiotherapist and a non-trained translator in the health area. Both Portuguese language natives with knowledge of English have lived in an English language country. The physiotherapist who elaborated the translation version called T1 was aware of the objectives of the study, while the translator who elaborated the T2 version was not. It was recommended to the two translators to produce a report during the translation with information that they considered pertinent and that contributed, if in doubt, to the next steps of the process.

3.2 Compilation of the translations

After this first step of translation, the two translated versions T1 and T2 were compiled into a single T12 version. Divergences were checked by two physiotherapists. In the absence of a consensus on the terms of translations T1 and T2, for the same word, during the compilation, the translators were consulted (BARRECA et al., 2005).

In the part of the manual describing the materials to compose the CAHAI-Brazil, the researchers opted for an adaptation of their description so the objects could be easily recognized in Brazil and perform the same function as the original CAHAI objects.

Some items were replaced by others considered more receptive in the target culture, suffering a cross-cultural adaptation (Table 1).

3.3 Review

The third step was the orthographic correction and the grammar and typography review, by a bachelor's reviewer in the Portuguese language not involved in the translation process. This step was aimed at correcting possible misspellings and any incoherence of the sentences. There was a suggestion for the standardization of words referring to the same item if written in different terms. For example, in the task of "filling a glass with water", it sometimes appeared as a jar and sometimes as a glass. The same occurred with the words 'chart' and 'table', referring to the same item. In the analysis of the original version, the same occurrence was verified, the use of different words for the same item, explaining this fact present in the T12 version. The reviewer decided to keep the word "chart" throughout the manual and such a suggestion was accepted by the researchers in this study. Few sentences have changed verbal agreement, for a better understanding in the Portuguese.

3.4 Back translation

After the correction of the Portuguese, the manual and the scoring sheet were sent to the back-translation. Two translators with English as original language, the primary language of the instrument, and without knowledge of the original version of the CAHAI manual, performed the back translations. In the reports, some expressions were not comprehensible in English after the back-translation.

Some surveys were made regarding changing terms for the same expression, such as the "seven-point

Table 1. Description of words replaced after merging of T1 and T2.

Manual page	Manual Item	Original word obtained from the translation	Word Replaced
Throughout the Manual	Score	*Afetado*	*Parético*
Page 05	Score	*Aparelhos auxiliares*	*Dispositivos auxiliares*
Page 07	Equipment required	*Prato de Melamina*	*Prato de plástico duro*
Page 07	Equipment required	*Massa de vidraceiro*	*Massa de modelar*
Page 07	Equipment required	*Poncho de lã*	*Poncho de tecido*
Page 07	Equipment required	*Degraus normais*	*Degraus padrão*
Throughout the Manual	Multiple task items	*Mão sobre mão*	*"Mão sobre mão"*
Page 11	Score 2	*Ouvido*	*Próximo ao ouvido*
Pages 23 and 24	During Task 8	*Pasta de dentes*	*Creme dental*

activity scale", sometimes appeared as the "seven-point activity table", as noted in the previous step, when the Portuguese translator also suggested changes to some words. There is a table with the description of each item of punctuation and the criteria that must be considered, according to the respective task. The translator also suggests, within the item "required materials", to specify the type of glasses - instead of just glasses, to be eyeglasses, which would refer to prescription eyeglasses, specification not necessary in Portuguese.

The second translator suggested that instead of using the term "thickener", the "thickener material" should be used, translated as "thickener, the length of the utensil". Such modification is due to the use of the term only for the fork utensil used in the "cut modeling" task to increase the thickness of the fork cable, facilitating the grasping in the cable during the accomplishment of the task.

3.5 Expert Comittee

The Expert Comittee was composed of four physiotherapists with experience in the neurofunctional area, who met to discuss the differences between the T12, B1 and B2 translations. In the end, two meetings were needed to discuss the entire CAHAI manual and its scoring sheet. There was a first meeting lasting one and a half hour for the comparison and analysis of the first part of the manual, and a second meeting lasting two and a half hours ending the comparison and analysis, from the description of scoring of the first task until the end of the manual.

The Expert Comittee was concerned with choosing the best word or term to avoid divergence of words in the different translations, based on the original version of the instrument and seeking a conceptual equivalence between English and Portuguese.

The original version, the T12 version of the Portuguese translation, the version with layout correction, typography and grammar, and the back translated versions were all printed to analyze the comments made by both translators and reviewers. It started with the considerations made in the back-translation reports, already analyzing the changes made by the Portuguese reviewer, also comparing the back-translation with the original version of the manual (Table 2).

The words and phrases that the committee considered inappropriate or misinterpreted in Portuguese were rewritten even though they did not present divergences between the original version and the back translation.

3.6 Analysis of the author of the original version

After the translations, back translations and the analysis of the committee, a Portuguese version was originated and translated back into English. The final version in Portuguese and its back-translation were sent to the author of the original version of CAHAI for suggestions and criticisms, as well as for its approval. An accompanying letter explained why some terms were changed, such as "client" from the original version, which was translated into "patient" in Portuguese version, because it understands that in Brazil the word "client" gives a commercial connotation to the instrument.

The author made minimal settings, none of which compromised the meaning of the CAHAI-Brazil version, and it was not necessary to return to any of the previous steps, and the Portuguese version was approved.

3.7 Pre-test

In Step 1 of the pre-test, five physiotherapists were invited to apply the CAHAI-Brazil and evaluate the tasks and items of the score, and note the doubts about the application with the patient. The evaluators

Table 2. Examples of differences found and the decision by the Expert Comittee of which word or term is most appropriate.

Manual page	Original Version	Manual version Translated (T12)	Backtranslation Version B1 and B2	Decision of the Commission
2	Stroke	*Derrame*	Stroke	*Acidente Vascular Encefálico*
3	Scale	*Tabela*	Table	*Escala*
4	Completed	*Completados*	Completed	*Foram concluídos*
7	Pull-on vest	*Vestimenta*	Clothing	*Poncho de tecido*
17	Requires	*Necessita de*	Requires	*Requer*
In some tasks	Grasp	*Pega*	Grip	*Preensão*

had more than three years of experience in the field, being distributed as follows: one evaluator studying for a master's degree (evaluator 1 - Ev1), one Master evaluator (evaluator 2 - Ev2), two evaluators studying for a doctorate (evaluator 3 - Ev3 and evaluator 4 - Ev4) and a doctor evaluator (evaluator 5 - Ev5), all of them active in neurofunctional physiotherapy and having worked with post-stroke patients.

Ev1 found difficulty to evaluate the patient in task 1 when the patient performed the task with the UL supported on the table. According to the manual, it does not fit into the score number 7, but also does not fit scores number 6 and 5, getting a score well below what the patient could actually receive. The Ev1 also had doubts in defining the vest poncho used in the tasks 6 and 10. According to her, in its region, this term is not known. The Ev3 had doubt in task 5, for which the manual does not make it clear if the cloth should be totally twisted or only once. The same evaluator had difficulty in quoting task 6, since the patient was able to button the five buttons, but used the PUL as a stabilizer, which almost did not participate in the task. Ev3 also comments that in the instructions of task 9, it is not explicit that the patient should separate the cut pieces of dough. Ev4 considered that in tasks 1, 2,

3, 5, 8, 9 and 11, it could be stated that the arms and/or elbows should not be supported on the table. In task 4, there is no specification if the jar should be completely full. In task 7, Ev4 suggests that it may be given, as an instruction to the patient, to "dry the back completely on both sides", as in task 13, to indicate that the patient must hold the other hand in the bar to raise the stairs. Ev5 had no comments on task items and only pointed out to be in doubt in tasks 12 and 13 when the patient is wheelchair-bound and cannot perform the task (Table 3A).

All items achieved adequate clarity indices, in all cases. Items 1, 4 to 7 and 9 were evaluated with lower scores only by one evaluator and, therefore, judged as not compromising overall clarity.

In the evaluation of scoring items, whose notes are described in the table below (Table 3B), Ev2 questioned the fact that there is no space in the quote sheet to indicate when the paretic member does not act during the task. Ev3 says that the writing is clear, but in the manual, it is not clear that the score refers to the components of the task, which could be improved with a table attached to each task, with the components of the actions that must be performed. For example, the individual

Table 3. Evaluation of clarity for: (A) Tasks and (B) Scoring items.

ITEMS	Score					Kappa
	Av1	Av2	Av3	Av4	Av5	
A – Tasks						
1. Open a jar of coffee	2	3	4	3	4	0.76
2. Call 911	4	4	4	3	4	1
3. Draw a line with a ruler	4	4	4	3	4	1
4. Pour a glass of water	4	3	4	2	4	0.76
5. Wring out washcloth	4	4	2	3	4	0.76
6. Do up five buttons	4	4	2	4	4	0.76
7. Dry back with towel	4	4	4	2	4	0.76
8. Put toothpaste on toothbrush	4	3	4	3	4	1
9. Cut medium consistency putty	4	3	2	3	4	0.76
10. Zip up the zipper	4	4	4	4	4	1
11. Clean a pair of eyeglasses	4	4	3	3	4	1
12. Place container on table	4	4	4	4	4	1
B – Scoring						
1. Total assistance (PUL> 25%)	3	4	4	3	4	1
2. Maximal assistance (PUL = 25% - 49%)	3	4	4	3	4	1
3. Moderate assistance (PUL = 50% -74%)	3	4	4	3	4	1
4. Minimum assistance (PUL> 75%)	3	4	4	3	4	1
5. Supervision	3	4	4	3	4	1
6. Modified independence (technical assistance)	3	4	4	3	4	1
7. Complete independence (safely and in reasonable time)	3	4	4	3	4	1

4 = Highly clear; 3 = Clear enough; 2 = A little unclear; 1 = Not clear.

may be able to entirely complete the task, but if the PUL does not do a certain action, it would already characterize assistance, which is not clear in the manual. The Ev4 says that the score for each task is not totally clear without the help of the manual, suggesting that relying only on the score sheet, the clarity might be compromised.

The suggestions and difficulties reported by the clarity assessors were analyzed and the items reformulated, but they were not enough to change the understanding of the instructions and the score. All scoring items were evaluated as highly clear or clear enough, with an agreement between the evaluators presenting a Kappa = 1.00.

In Step 2, four individuals with hemiparesis, evaluated by the same evaluator, participated in the study. Individuals were representative of the different levels of motor impairment (including chronicity) characteristic of the stroke, with a mean age of 51 ± 14.3 years, consisting in three men and one woman. The assessment of motor impairment, grip strength and manual and digital dexterity is

described in Table 4. The duration of the CAHAI application was approximately 30 minutes.

For this step, the score given by the trained evaluator (EvT) and the evaluator only with access to the manual (EvM) is described in Table 5. Predominantly, EvT considered patients as needing minimal to moderate assistance, whereas EvM considered the same patients as having modified or complete independence. The tasks with more discrepant scores were the tasks "Wring out washcloth" and "Cut medium consistency putty"; the item "Carry bag up the stairs" was evaluated by EvT in an external environment. However, as there was no stairs within the assessment environment, EvM deemed it inappropriate to leave the internal environment and did not evaluate this item.

4 Discussion

Many instruments of evaluation for individuals with hemiparesis are originated in other languages and are mostly developed in English (REICHENHEIM;

Table 4. Description of the participants' characterization.

Subject	Gender	Time after stroke (months)	Level of motor impairment (FMA-UL)	Manual grip force NP/P (kgf)	Manual dexterity (BBT) NP/P (blocks/min)	Digital dexterity (NHPT) NP/P (seg)	CAHAI
1	M	1	Mild (55/66)	34/16	52/34	64/120	68
2	M	18	Mild (60/66)	36/32	50/27	30/78	77
3	F	15	Moderate (39/66)	21/0	42/15	44/120	31
4	M	20	Severe (29/66)	52/10	48/0	72/120	15

NP = non-paretic; P = paretic; sec = seconds; kgf = kilogram-force; blocks / min = number of blocks that the individual took and transported in one minute.

Table 5. Average scores of the two patients evaluated by each evaluator.

Task	Total EvT Average (SD)	Total EvM Average (SD)
1. Open a jar of coffee	3.0 (0.0)	4.0 (0.0)
2. Dial 911	3.5 (0.7)	6.5 (0.7)
3. Draw a line with a ruler	3.5 (0.7)	4.0 (0.0)
4. Pour a glass of water	2.0 (0.0)	5.0 (2.8)
5. Wring out washcloth	3.5 (0.7)	7.0 (0.0)
6. Do up five buttons	4.0 (1.4)	4.5 (3.5)
7. Dry back with towel	4.0 (1.4)	4.0 (0.0)
8. Put toothpaste on toothbrush	4.0 (0.0)	5.0 (2.1)
9. Cut medium consistency putty	2.5 (0.7)	6.5 (0.7)
10. Zip up the zipper	3.5 (2.1)	6.5 (0.7)
11. Clean a pair of eyeglasses	4.0 (1.4)	6.5 (0.7)
12. Place container on table	4.0 (0.0)	6.5 (0.7)
13. Carry bag up the stairs	4.0 (0.0)	NR
Total	45.5 (6.4)	66.5 (12.0)

EvT = Trained Evaluator; EvM = Evaluator with access to the Manual; NR = not rated.

MORAES, 2007). The use of instruments without a transcultural translation and adaptation process makes the results of research using these instruments doubtful. Culture and linguistics are divergent among countries, even those that use the same language (REICHENHEIM; MORAES, 2007; STREINER; NORMAN, 2003; MICHAELSEN et al., 2011). This entails expressions and concepts that may not be able to express facts in a given language. That is why instruments need to be adapted transcultural, even if this process is not so simple. Culturally adapt an instrument consists of much more than just translation (BARRECA et al., 2005; MORLIN et al., 2006; REICHENHEIM; MORAES, 2007; MICHAELNSEN et al., 2011). Analyze all content and identify how relevant aspects for the target population are needed.

This study carried out the cross-cultural adaptation of CAHAI to the Brazilian Portuguese language following the first seven steps proposed in the literature (BARRECA et al., 2005; BEATON et al., 2000; MORLIN et al., 2006). The evaluation of the psychometric properties will be carried out in a future study. All the steps were carried out in sequence, some of the difficulties, such as for the back-translation step, in which the literature requests two back-translators with English as their original language and knowledge in Portuguese language. There were difficulties in finding two back-translators following the criteria specified in the literature and due to the high costs charged by page, since the transcultural translation and adaptation steps were performed both for the quote sheet and for the application manual and score.

The last step performed by this study, the pre-test, sought to analyze the understanding of the application of the instrument as the understanding to perform the task by the patient. It was also observed the ease in acquiring the necessary materials for CAHAI application, and there were no difficulties.

There were adaptations in the materials used, such as the washcloth, which, in a literal translation, would be "bathing cloth" (*toalha de banho*). As this "bathing cloth" is little used in our culture, we replace it with a small cleaning cloth, which more adequately reflects the material used in the demonstration video and also facilitates the understanding of what material exactly will be needed for that task. This was possible because this study was not limited to making cross-cultural adaptation only for the instrument's scoring sheet, but also for the whole application manual, which is rarely observed in

studies for translation and cross-cultural adaptation of instruments that evaluate the population with hemiparesis (CONTE et al., 2009).

In the study by Michaelsen et al. (2008), the authors translated and adapted the *Test d'Évaluation des Membres Supérieurs des Personnes Âgées* (TEMPA). This instrument evaluates the quantity and quality of use of paretic UL in post-stroke population. Although the authors did not follow all the steps proposed by Beaton et al. (2000), had the concern to analyze and exclude the task of "putting on a scarf", evaluating that it is not an adequate task for the Brazilian population since our climate is tropical. Different from those found in the study by Michaelsen et al. (2008), in our study all CAHAI tasks seem to be significant for the Brazilian population.

Many aspects cited do illustrate the complexity of the process of cross-cultural adaptation. Researchers usually consider this process laborious and end up not understanding the importance of this adaptation, opting for the use of untranslated instruments (BARRECA et al., 2005; GUILLEMIN; BOMBARDIER; BEATON, 1993; MORLIN et al., 2006; BARRECA et al., 2006). Thus, the use of non-adapted instruments for the population to be studied will present results that do not adequately identify that population with unidentifiable biases (GUILLEMIN; BOMBARDIER; BEATON, 1993; MORLIN et al., 2006; BARRECA et al., 2006), dissemination of erroneous results and loss of time. These aspects highlight the complexity of the translation and adaptation process, which must be rigorous, making it central to responsible research. Even though it is a complex process, it is still easier than the development of a new instrument (BARRECA et al., 2006).

In the pre-test, the assessors drew their conclusions regarding the application of the CAHAI and scored the task and score items. Practically all the doubts that came from the evaluators during the application of CAHAI-Brazil are explained in the DVD of the original manual, both the scoring and the application of the task. However, the manual DVD in Portuguese is not yet available and the pre-test evaluators did not have access to the DVD of the manual in English since the purpose of the study was to verify the clarity of the translation of the manual. It is noteworthy that, as Ev2 concluded, the manual is clear, but some items are not explained in detail. In this sense, making a DVD in Portuguese, according to the information contained in the original DVD, would be a good solution, as well as

there could be footnotes in the manual, as requested by some of the comments made by the evaluators (for example, a note in the footnote defining the term "*poncho*").

After the test-retest with two patients, a great difference was observed in the patients' scores for EV1 and EV2. In both patients, the EV2 was less demanding, assigning higher marks to the EV1 scores. Even following all the steps proposed for the translation and adaptation of instruments, in the pre-test, there were differences between the evaluation of the evaluator who attended the DVD sent by the authors and the score of the evaluator who only read the translated version of the manual. Only the translation of the manual did not make clear the level of motor demand required for the accomplishment of the tasks by the patients. The evaluator who did not watch the DVD tended to assign a higher quote to the patients than the evaluator who had access to the DVD. Therefore, it is once more noted the need of having a DVD in Portuguese (BARRECA et al., 2004; SCHUSTER; HAHN; ETTLIN, 2010).

The time spent in the application of CAHAI-Brazil was on average, the time stipulated by the authors of the original CAHAI, approximately 30 minutes (BARRECA et al., 2004; SCHUSTER; HAHN; ETTLIN, 2010). In most individuals, this time varied about 15 minutes for individuals with mild hemiparesis and reached one hour for individuals with severe motor impairment. The time also varied according to the importance that the patient assigned to the use of the PUL, and some individuals with severe impairment did not try to use the PUL, performing all tasks with the other hand and taking less time than some individuals with moderate impairment, who insisted on being able to use the paretic limb during the task.

5 Conclusion

The results of this research showed that the process of cross-cultural adaptation of the application manual and the CAHAI scoresheet for the Portuguese-Brazilian language was carried out according to the pre-established steps. However, other psychometric properties need to be evaluated for their application in the Brazilian population. There was no conflict in terms of the translation that could not be discussed and resolved together with the committee of experts, which reinforces the importance of each step completed.

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Author's Contributions

Daniele Peres participated in study conception, the data collection and analysis, and manuscript writing. Júlia Macruz Garcia participated in data collection and analysis. Letícia Cardoso Rodrigues participated in data analysis, the committee of experts and the manuscript revision. Rodrigo José Knabben participated in data collection and manuscript review. Fernanda Romaguera participated in the translation of the manual and manuscript review. Stella Maris Michaelsen is the primary research and participated in manuscript writing and review. All authors approved the final version of the text.

Notes

[1] The publication is part of the Master's Thesis of the first author, held in the Post-Graduation Program in Physiotherapy of the Health Sciences Center of the State University of Santa Catarina - CEFID/UDESC.