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Brief Communication
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Translation and cross-cultural adaptation of the Kaufman Speech Praxis Test for Children (KSPT) protocol

Tradução e adaptação transcultural do protocolo Kaufman Speech Praxis Test for Children (KSPT)

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Keywords

Oral Apraxia
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Translating

ABSTRACT

Purpose: To present the Kaufman Speech Praxis Test for Children - KSPT instrument, as well as its Brazilian cross-cultural adaptation. **Methods:** After obtaining permission to use the KSPT by the copyright holder, and compliance with ethical aspects, the instrument was translated and adapted into Brazilian Portuguese, preserving semantic, idiomatic, experimental and conceptual equivalences, when relevant. **Results:** After translation and cross-cultural adaptation procedures, there were no changes in Part 1 (Oral movement); in Part 2 (Simple Phonemic and Syllabic Level), 12 test words were excluded and 16 were included; and in Part 3 (Complex Phonemic and Syllabic Level), 13 test words were excluded as they failed to correspond to the characteristics of phonoarticulatory production (phonetic/phonological) in Brazilian Portuguese. In part 4 (Spontaneous Length and Complexity - subjective measure) there were no changes to the English version of the KSPT. After the process, the final version of the material was approved by the author and applied to children for usability and equivalences check. The application to a significant population in Brazil for the construction of psychometric criteria will be carried out at a future stage. **Conclusion:** The KSPT translation is completed with changes in test words from the application protocol to respect the cross-cultural characteristics of the Brazilian-Portuguese language. Semantic, idiomatic, experimental and conceptual equivalences were respected throughout the application manual, clinical test guide and test statements. This instrument is expected to integrate advances in the diagnosis and monitoring of intervention procedures, effectively contributing to the area.

Descritores

Apraxia
Dispraxia
Testes de Articulação da Fala
Transtornos da Articulação
Tradução

RESUMO

Objetivo: Apresentar o instrumento Kaufman Speech Praxis Test for Children – KSPT, bem como sua adaptação transcultural para o Brasil. **Método:** Após a permissão de utilização do KSPT pela detentora dos direitos autorais, e cumprimento dos aspectos éticos, o instrumento foi traduzido e adaptado para o português brasileiro, com manutenção de equivalências semântica, idiomática, experimental e conceitual, quando pertinente. **Resultados:** Após procedimentos de tradução e adaptação transcultural, não houve mudanças na Parte 1 (Nível de movimento oral); na Parte 2 (Nível silábico e fonêmico simples), 12 palavras-teste foram excluídas e 16 incluídas; e na Parte 3 (Nível silábico e fonêmico complexo), 13 palavras-teste foram excluídas por não apresentarem correspondência em relação às características de produção fonoarticulatória (fonético/fonológico) no Português Brasileiro. Na parte 4 (Extensão e complexidade espontânea - medida subjetiva) não houve alterações da versão em inglês do KSPT. Após todo o processo o material final foi aprovado pela autora e aplicado em crianças para a verificação da usabilidade e verificação de equivalências. A aplicação em população significativa no Brasil para a construção de critérios psicométricos será realizada em etapa futura. **Conclusão:** A tradução do KSPT está finalizada com mudanças em palavras-teste do protocolo de aplicação, para respeitar as características transculturais da língua portuguesa falada no Brasil. Foram respeitadas as equivalências semântica, idiomática, experimental e conceitual, no manual de aplicação, guia de teste clínico e nos enunciados das provas. Espera-se que este instrumento integre avanços para o diagnóstico e acompanhamento de procedimentos de intervenção, trazendo uma contribuição efetiva para esta área.

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INTRODUCTION

According to the American Speech-Language-Hearing Association (ASHA)[1], childhood apraxia of speech (CAS) is a neurological childhood speech sound disorder that includes a core impairment in planning and/or programming spatiotemporal parameters of movement sequences that results in errors in speech sound production and prosody in the absence of neuromuscular deficits.

For the diagnosis of CAS, it is important to analyze segmental (articulation groping, inconsistent changes in speech, greater difficulty with multisyllabic words, substitution errors, and larger number of errors on vowels) and suprasegmental (inconsistency in stressed syllables and observation of speech resonance) characteristics. Individuals with CAS also suffer from impaired voluntary oral movements and lack of diadochokinesis skills[2].

The Kaufman Speech Praxis Test for Children (KSPT)[3,4] is an instrument that assists with identifying and treating CAS by measuring the children's response through imitation and spontaneous conversation[5-8]. It is applied to children aged 2 years to 5 years and 11 months[4]. In Brazil, there are no instruments to assess CAS with psychometric properties[3].

Cross-cultural adaptation is a complex process that should be carried out rigorously and following a specific methodology. It consists in literally translating the instrument and adapting it respecting conceptual, idiomatic, semantic and cultural equivalence[9-12]. This process does not exclude the need to verify the reliability, validity, and accuracy of the instrument in the new language[9,12-15].

In this context, this study aimed to present the KSPT and its cross-cultural adaptation to Brazilian Portuguese.

METHOD

This brief communication reports the process of translation and cross-cultural adaptation of the KSPT without application to participants. This study is part of a master's degree research approved by the Research Ethics Committee of the Faculty of Dentistry of Bauru, University of São Paulo (FOB-USP) under protocol no. 2.976.849. Since the Ethics Committee waived the use of a Free and Informed Consent Form for the participating judges and translators, no documents of this nature will be presented at this time.

The authors were authorized by the copyright holder of the KSPT to perform its translation and cross-cultural adaptation to Brazilian Portuguese.

The KSPT is an instrument that aims to assist with the diagnosis and treatment of CAS, measuring the responses of individuals aged 24 to 72 months. It consists of an application manual, an evaluation protocol, and a clinical test guide.

The application manual describes the steps of the test, its psychometric properties, calculation and conversion of age into months, and normative tables for individuals with and without speech disorders.

The evaluation protocol is divided into four parts: Part 1. Oral movement level; Part 2. Simple phonemic/syllabic level; 3. Complex phonemic/syllabic level; Part 4. Spontaneous extension and complexity - subjective measure. The clinical test guide provides an overview and guidance on application and scoring considering each of the parts.

Part 1: 11 items that assess movements of the lips and tongue, such as protrusion, lateralization, alternation, among others.

Part 2: 10 subtests, namely, a) pure vowels (V); b) vowel to vowel movement (VV); c) simple consonant production (C); d) repetitive syllables (CVCV); e) consonant to vowel movement (CV); f) vowel to consonant-vowel movement (VCV); g) repetitive syllables with vowel change (CV_1CV_2); h) simple monosyllabics with assimilation (CVC); i) simple consonant synthesis (C/CVC/CVC); j) simple bisyllabics with consonant and vowel change ($C_1V_1C_2V_2$).

Part 3: six subtests, namely a) complex consonant production/ synthesis (C/CVC/CVC); b) blend synthesis (CCVC); c) synthesis of anteroposterior and posteroanterior movement(CAVCP/ CPVCA); d) complex bisyllabics (CVCVC); e) polysyllabic synthesis/sequencing (CVCVCV).

Part 4: Extension and complexity in spontaneous expression (subjective measure).

Translation stages

The translation stages followed the norms of Beaton et al.[9], with adaptations.

Translation (English-Portuguese) of the application manual and clinical test guide was initially performed by two professionals fluent in both languages that were aware of the objectives of the study, seeking semantic equivalence between the words and idioms in both languages.

As for the test words of the evaluation protocol, the phonetic transcription of each word was performed by a Language professional specialized in Linguistics and fluent in both languages. The phonemic characteristics and the complexity of the motor planning of each test word were analyzed. Then the original test words were replaced with Brazilian Portuguese words that presented equivalence to the aforementioned aspects, respecting as much as possible the criterion of high frequency of the word in Brazilian Portuguese for children.

After translation, the test was reviewed by two speech therapists, experienced in the field, who assessed the equivalence of the words and made any necessary modifications. This stage was followed by the KSPT author. Subsequently, the test was analyzed by a speech therapist and presented to a 63-month-old child with typical development to verify the complexity of application and their knowledge of the test words. The final product was discussed, reviewed, approved, and authorized by the KSPT author. After this stage, the KSPT was applied to a group of children with typical development. These results will be presented in a future study.

RESULTS

The new structure of the evaluation protocol is described below:

Part 1: No changes were made to the 11 items.

Part 2: Composed of 10 subtests as follows: a) pure vowels (V); b) vowel to vowel movement (VV); c) simple consonant production (C); d) repetitive syllables (CVCV); e) consonant to vowel movement (CV); f) vowel to consonant-vowel movement (VCV); g) repetitive syllables with vowel change (CV_1CV_2); h) simple consonant synthesis (C/CVC); i) simple bisyllabics with consonant and vowel change ($C_1V_1C_2V_2$), and j) simple trisyllabics with alternating vowels and consonants (CVCVCV). In this part, the simple monosyllabics with assimilation (CVC) proof and the last word structure of the simple consonant synthesis (C/CVC/CVC) were removed, since these word structures have no correspondence in Brazilian Portuguese, such as: "tot", "pop", and "dad". Even considering the occurrence of words with this structure in English, which undergo a process of incorporation into Portuguese, as for example in the case of "top" (meaning something of great value or position), the final /p/ is not pronounced as a deaf consonant but rather the voiced semivowel /y/ is added, which transforms it into a disyllabic word ("topi" /´tOpy/") in Brazilian Portuguese.

In Part 2, of the 63 test words from the original instrument in English, only 51 words were listed. Twelve words were excluded because they did not correspond to the characteristics of speech production in Brazilian Portuguese. It was also necessary to add 16 new words in order to contemplate all the possibilities of phono-articulatory productions in Brazilian Portuguese.

Chart 1 presents Part 2 - Simple phonemic/syllabic level - of the KSPT with examples of the changes that were made to cross-culturally adapt English to Brazilian Portuguese.

In Part 3, of the 91 original test words, only 78 words were listed. Thirteen words were excluded because they did not correspond to the speech production in Brazilian Portuguese. It was not necessary to add any test words to this part of the instrument.

Chart 2 presents Part 3 - Complex phonemic/syllabic level – of the KSPT with examples of the changes made in the cross-cultural adaptation from English to Brazilian Portuguese.

No changes were made in Part 4, as it refers to Spontaneous extension and complexity, which is a subjective measure.

After the review by speech therapists experienced in the area, some technical terms were changed aiming a clearer understanding in Portuguese: a) Length and complexity to Extension and complexity; b) Front to back and back to front synthesis to Synthesis of anteroposterior and posteroanterior movement.

Finally, the test was organized and produced in a graph format identical to that of the original version for application. The graphic work was performed by a professional graphic designer.

Chart 1. Examples of substitution of test words for the Simple phonemic/syllabic level of the KSPT

KSPT - Part 2: Simple phonemic/syllabic level		
	English	Brazilian Portuguese
A. Pure vowels (V)	/a/ "father" – [ˈfɑðər]	/a/ "lá" – [la]
B. Vowel to vowel movement (VV)	/o/ "boat" – [ˈboʊt]	/ou/ "vou" – [vˈoɯ]
C. Simple consonant production (C)	/m/	/m/
E. Consonant to vowel movement (CV)	/du/ (do)	/du/ (duro)
D. Repetitive syllables (CVCV)	"mama" – [ˈmɑmə]	/mama/ "mamá" – [mamˈa]
F. Vowel to consonant-vowel movement (VCV)	"apple" – [ˈæpəl]	/uma/ "uma" – [ˈumɐ]
G. Repetitive syllables with vowel change (CV_1CV_2)	/mami/ "mommy" – [ˈmɑmi]	/boba/ "boba" – [bˈobɐ]
H. Simple consonant synthesis (C/CVC/CVC)	/m/ " man" – [mən]	/m/ "mau" – [mˈaw]
I. Simple bisyllabics with consonant and vowel change ($C_1V_1C_2V_2$)	"happy" – [ˈhæpi]	"topa" – [tˈɔpɐ]
J. Simple trisyllabics (CVCVCV)	Not present in the original test	"batata" – [batˈatɐ]

Caption: C = Consonant; V = Vowel
Note: Phonetic transcriptions follow the International Phonetic Alphabet.
Source: Prepared by the authors

Chart 2. Examples of substitution of test words for the Complex phonemic/syllabic level of the KSPT

KSPT - Part 3: Complex phonemic/syllabic level		
	English	Brazilian Portuguese
A. Complex consonant production/synthesis (C/CVC/CVC)	/k/ "cup" – [kʌp]	/k/ "cor" – [koɾ]
B. Blend synthesis (CCVC)	"green" – [grin]	"grito" – [gɾˈitu]
C. Synthesis of anteroposterior and posteroanterior movement (C_AVC_P/ C_PVC_A)	"duck" – [dʌk]	"duque" – [dˈukɘ]
D. D. Complex bisyllabics (CVCVC)	"zipper" – [ˈzɪpər]	"parar" – [paɾˈaɾ]
E. Polysyllabic synthesis/ sequencing (CVCVCV/ CVCVCVCV)	"cantaloupe" – [kʌntalup]	"palhaço" – [paʎˈasu]
F. Extension and complexity	"can" – "cannon" – "cannonball"	"um" –"uma" – "umidade"
	[kæn] – [ˈkænən] – [ˈkænənˌbɔl]	[ũ:] – [ˈumɐ] – [umidˈadɘ]

Caption: C = Consonant; V = Vowel $_A$ = Anterior; $_P$ = Posterior
Note: Phonetic transcriptions follow the International Phonetic Alphabet.
Source: Prepared by the authors

DISCUSSION

The KSPT was cross-culturally adapted following the process stages recommended by Beaton et al.[9] with adaptations, mainly due to the specificity of this instrument, which requires knowledge in the area of linguistics so that equivalence regarding the sequential production of sounds and their meanings can be achieved for child vocabulary.

After the forward translation, back translation and revision procedures, the Brazilian version of the KSPT is as follows: There were no changes in Part 1, referring to the performance of movements of the phono-articulatory organs. In this part, simple and sequential movements of the lips and tongue are performed. Changes were made in Part 2 and Part 3, as they involve the production of words. Thus, to respect the particularities of Brazilian Portuguese, Part 2 and Part 3 have 67 and 78 words, respectively. Some words were excluded because they present no correspondence to speech production in Brazilian Portuguese, e.g., "big"; "mouth". There were no changes in Part 4, as it refers to the subjective analysis of spontaneous speech.

Thus, unlike in other instruments, semantic equivalence of the KSPT test words was not performed, but the characteristics of sound production were respected, as it can be observed in Charts 1 and 2. However, the semantic, conceptual, idiomatic, and cultural equivalence was maintained in the cross-cultural adaptation of the application manual, listed in the registration sheet and clinical guide of the test. Previous studies have shown the importance of these matters[9-15].

There is no controversy about the need for research aimed at the standardization of assessment instruments worldwide, or over the adaptation of tests and scales used, standardized, and validated in other countries, given the cultural differences[3,9,12,13,15].

The translation, adaptation, and standardization of instruments can be considered more feasible than the preparation of completely new instruments, since it enables the realization of cross-cultural studies using the same previously validated assessment instruments[12,15].

Studies have shown that the KSPT is one of the most commonly used instruments in international research conducted with child populations[3,5,6].

Studies[3,5-7] have reported that the KSPT presents some evidence of criterion and content validity for the North American population. Regarding reliability, a study[6] showed that the KSPT obtained good reliability coefficients; however, for the group of individuals with disordered speech, they were not described in terms of age and severity. According to the definition provided by ASHA[1], the main impediment of CAS is manifested in the planning and/or programming of spatiotemporal parameters of movement sequences that results in errors in speech sound production and prosody. Similarly, McCauley and Strand[6] reported that the changing nature of speech disorders over time is a challenge faced by examiners in this area. Thus, while prosodic abnormalities can be observed in children with CAS who have reached a certain speech production skill, they may not be apparent in children who are more severely affected and present limited speech production.

Regarding psychometry, there is need to review the psychometric characteristics considering the Brazilian reality. In this study, the number of items of the instrument needed to be changed because of differences in phonetic characteristics, as well as to verify the normative criteria for the Brazilian reality. With the changes in the test words, the instrument needs to be verified in a representative sample of the Brazilian population. Thus, in a further stage, statistical analysis will need to be conducted for a representative sample of the Brazilian population. All participating children must be videotaped for analysis of the instrument's internal consistency and external intelligibility, with the participation of experienced speech therapists, appointed as judges, in order to verify the validity and reliability evidence for the psychometric values of the Brazilian Portuguese version of the KSPT. Review of the psychometric characteristics involves the critical assessment of evidence that the test works as intended for the purposes and populations for which it was originally developed[6,9].

It is worth mentioning that the KSPT was shown to be sensitive to determine whether abnormalities in fine motor function can be detected in children with speech sound disorders as well as to verify whether there is a correlation between imitation of oral motor skills and fine motor function[4,5]. This instrument should be understood as a favorable means to support the diagnosis and intervention in children with speech disorders in general, including those with CAS.

CONCLUSION

The KSPT was translated with changes in test words so that application of the protocol respects the cross-cultural characteristics of Brazilian Portuguese. Semantic, idiomatic, experiential and conceptual equivalence was respected in the application manual, clinical guide, and statements of the test.

With the translation and cross-cultural adaptation of the KSPT to Brazilian Portuguese and with the revision of the psychometric criteria for the Brazilian population, this instrument is expected to add advances to the diagnosis and monitoring of intervention procedures, effectively contributing to this study area.

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Author contributions

NHMBS: preparation of the study initial proposal, organization and application of all the procedures, and analysis of the results; GCFD: study adviser, organization of the method procedure, and adaptation of the KSPT; DACL: study adviser, organization of the method procedure, and analysis of the results. All authors contributed equally to the manuscript preparation.