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Translation and cross-cultural adaptation of the Brazilian version of the Adapted Borg CR10 for Vocal Effort Ratings

Tradução e adaptação cultural e linguística da Adapted Borg CR10 for Vocal Effort Ratings para o português brasileiro

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Keywords

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ABSTRACT

Purpose: To develop the cultural and linguistic adaptation of the Brazilian version of the Adapted Borg CR10 for Vocal Effort Ratings. **Methods:** The instrument Adapted Borg CR10 for Vocal Effort Ratings was translated into Portuguese by two Brazilian bilingual speech-language pathologists, whose translations were compiled into one version. Back-translation into English was performed by a third bilingual Brazilian speech-language pathologist who did not participate in the previous stages. After translation and back-translation, the items of the translated version were compared with the original instrument and discrepancies were modified by consensus of a committee composed of three speech-language pathologists, resulting in the version translated into Brazilian Portuguese entitled *Escala Borg CR10-BR adaptada para esforço vocal*. For cultural equivalence of the Portuguese version, the option "not applicable" was added to the categorical scale and 15 individuals with dysphonia, with otorhinolaryngological medical diagnosis, responded to the *Escala Borg CR10-BR adaptada para esforço vocal* after reading the perceptual-auditory evaluation protocol CAPE-V phrases. **Results:** During the process of translation and cultural adaptation, no item was changed and/or eliminated from the questions. The *Escala Borg CR10-BR adaptada para esforço vocal* kept the same structure as the original, with a scale ranging from 0 to 10, with 0 being "no vocal effort at all" and 10 being "maximum vocal effort". **Conclusion:** The Brazilian version of the Adapted Borg CR10 for Vocal Effort Ratings, entitled *Escala Borg CR10-BR adaptada para esforço vocal*, presents cultural and linguistic equivalence to the original instrument.

Descritores

Voz
Teste de Esforço
Protocolos
Inquéritos e Questionários
Fonoaudiologia

RESUMO

Objetivo: Desenvolver a adaptação cultural e linguística da versão brasileira da *Adapted Borg CR10 for Vocal Effort Ratings*. **Método:** O instrumento *Adapted Borg CR10 for Vocal Effort Ratings* foi traduzido para a língua portuguesa por duas fonoaudiólogas brasileiras bilíngues, cujas traduções foram compiladas em uma versão; posteriormente, foi realizada a retrotradução para o inglês por uma terceira fonoaudióloga brasileira, bilíngue, que não participou das etapas anteriores. Após a tradução e retrotradução, realizou-se a comparação dos itens com o instrumento original, sendo as discrepâncias modificadas por consenso, por um comitê composto por três fonoaudiólogos, chegando-se a uma única versão traduzida para o português brasileiro denominada Escala Borg CR10-BR adaptada para esforço vocal. Para a equivalência cultural da versão em português, a opção "não aplicável" foi acrescida na chave de respostas e 15 indivíduos disfônicos, com diagnóstico médico-otorrinolaringológico, responderam à Escala Borg CR10-BR adaptada para esforço vocal após a leitura das frases do protocolo de avaliação perceptivo-auditiva CAPE-V. **Resultados:** No processo de tradução e adaptação cultural, não houve modificação e/ou eliminação de nenhuma das questões. A Escala Borg CR10-BR adaptada para esforço vocal reflete a versão original do inglês, com uma escala com variação de 0 a 10, sendo 0 "nenhum esforço vocal" e 10 o "máximo esforço vocal". **Conclusão:** A versão para o português brasileiro da *Adapted Borg CR10 for Vocal Effort Ratings*, intitulada Escala Borg CR10-BR adaptada para esforço vocal, apresenta equivalência cultural e linguística em relação ao instrumento original.

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INTRODUCTION

Voice production depends on several factors, including the balance between the aerodynamic and myoelastic forces of the larynx, in addition to the phonatory system[1]. Overall, a healthy voice should be produced in an effective manner, without effort, and sound interesting and clear in order to retain the attention of the listener[2]. When muscular harmony is maintained, listeners hear a so-called good quality sound produced without difficulty or discomfort on the part of the speaker[1].

Some aspects may influence vocal production and entail greater vocal effort, such as: competing sounds, the individual's need to project their voice into the distance, the presence of a vocal or larynx disorder, or excessive voice use[3]. When vocal effort becomes chronic or excessive, speakers may experience discomfort, which hinders communication performance and leads them to seek professional treatment[4].

The sensation of vocal effort is individual and may be perceived differently by different patients – it is worth noting that it is impossible to measure and compare these individual sensations[5]. The mechanisms contributing to vocal effort are multifold and complex; they may be influenced by cognitive-behavioral or physiological factors[6]. Therefore, measuring vocal effort requires analysis of the clinical evaluation data as well as individuals' reported perception.

Currently, there is no assessment instrument for self-reported vocal effort[7] in place. However, one finds in the literature a scale developed by Gunnar Borg, which reiterates the importance of using standardized instruments to assess subjective and psychophysical symptoms – the Borg Scale (CR10)[5]. Although it does not directly address vocal effort, it associates psychological and physiological responses of the human body with physical stress. Since vocal effort is a subjective, perceptive, and individual phenomenon, the Borg CR10 instrument is a useful psychometric scale that supports its assessment[7].

Other researchers have proposed the Borg CR10 as a powerful tool to measure vocal effort. It has also been suggested for future directions[4,8], informing much research on voice and adding a new self-reporting instrument to the clinical practice of speech-language pathology. The Borg CR10 has been successfully used in clinical research to classify vocal effort[6,8,9].

Voice self-assessment protocols are valuable in clinical practice, as they help patients to understand and perceive the impact of dysphonia in their life, consequently improving adherence to treatment. Protocols measure vocal symptoms; however, phonatory effort, a common complaint, has not been specifically studied. Thus the importance of a robust instrument that contributes to this perception. The vocal effort self-assessment protocols provide a number of benefits, as they allow patients to identify the phenomenon themselves and the factors triggering it in order to seek, alongside the speech-language pathologist, both in research and in clinical practice, devices and techniques to prevent further harm to phonation, thus contributing to a more effective communication.

Taking into consideration the need for a Brazilian instrument to support self-assessment of vocal effort, this study aimed to produce a culturally equivalent version of Adapted Borg CR10 for Vocal Effort Ratings[7] in Brazilian Portuguese by means of the translation and cross-cultural and linguistic adaptation of the instrument.

METHODS

This study was approved by the Research Ethics Committee of UNITAU – Universidade de Taubaté (CAAE: 80142517.5.0000.5501 and protocol n.º 2488373, from February 6, 2018). All participants have signed the Informed Consent. The original version of the Adapted Borg CR10 for Vocal Effort Ratings was translated into Brazilian Portuguese by two bilingual speech-language pathologists (Translator 1 - T1 and Translator 2 - T2). The final version of the translated instrument (Version in Portuguese – VP) was achieved by combining the two translations, taking the cultural equivalences into consideration, with a subsequent revision by researchers and a committee composed of three speech-language pathologists specialized in voice. The final translated version of the protocol was back-translated by a third Brazilian bilingual speech-language pathologist who had not taken part in the previous stages. The back translation was compared to the original version of the protocol, thus allowing for the Brazilian Portuguese version entitled *Escala Borg CR10-BR adaptada para esforço vocal*.

Like the original protocol, the Adapted Borg CR10 for Vocal Effort Ratings (BR) maintained a scale from 0 to 10, where 0 means "no vocal effort at all", and 10 "maximum vocal effort". As vocal effort relates physiological and psychological responses of the body to physical activity, before applying the protocol, the performance of a pre-established task is required.

For the cross-cultural adaptation of the Adapted Borg CR10 for Vocal Effort Ratings (BR), 15 dysphonic individuals with prior medical-otorhinolaryngological diagnosis participated in the study. The task established by the researchers, in consensus, was the reading of the sentences in CAPE-V – Consensus Auditory-Perceptual Evaluation of Voice[10] – a protocol designed by speech-language pathologists and specialists in human perception who are part of SID3 – ASHA 2003. Immediately afterwards, the participants answered the Adapted Borg CR10 for Vocal Effort Ratings (BR).

The option "not applicable" was added to the answer sheet for each item of the Adapted Borg CR10 for Vocal Effort Ratings (BR). This addition was intended to identify sentences that were potentially obscure or inadequate for the population, so that the question could be later edited or deleted as necessary.

The inclusion criterion for the study was the presence of dysphonia confirmed by a medical-otorhinolaryngological diagnosis, regardless of the severity or type. Adult individuals of both genders without neurological, cognitive and/or psychiatric disorders, and/or illiteracy – to allow for application of the instrument – were included.

RESULTS

In the process of translation and cross-cultural adaptation, none of the participants marked the option "not applicable" in any of items of the Adapted Borg CR10 for Vocal Effort Ratings (BR). Therefore, no items were modified nor excluded. The final composition of the Adapted Borg CR10 for Vocal Effort Ratings (BR) (Appendix A), following cross-cultural and linguistic adaptation, is similar to the original instrument. It presents a scale ranging from 0 to 10, where 0 corresponds to "no vocal effort at all", and 10 to "maximum vocal effort"; items 5 and 6 correspond to a single intensity, "severe vocal effort", as well as items 7 and 8, which correspond to "very severe vocal effort". Chart 1 shows the process of translation and cross-cultural and linguistic adaptation of the scale.

Chart 1. Process of translation and cross-cultural adaptation into Brazilian Portuguese of the protocol Adapted Borg CR10 for Vocal Effort Ratings[7]

Items of the original version in English[7]	Translation into Brazilian Portuguese	Back translation of VP into English	Committee of Speech-Language Pathologists: cross-cultural and linguistic equivalence	Final version, translated and culturally adapted
SEVERITY	INTENSIDADE	SEVERITY	INTENSIDADE	INTENSIDADE
No vocal effort at all	T1 - Nenhum esforço vocal T2 - Nenhum esforço vocal VP - Nenhum esforço vocal	*No vocal effort*	Nenhum esforço vocal	Nenhum esforço vocal
Very very slight vocal effort (just noticeable)	T1 - Mínima sensação de esforço vocal (apenas percepção de esforço) T2 - Mínimo esforço vocal (quase imperceptível) VP - Mínima sensação de esforço vocal (apenas percepção de esforço)	*Minimum vocal effort sensation (only sensation of vocal effort)*	Mínima sensação de esforço vocal (apenas percepção de esforço)	Mínima sensação de esforço vocal (apenas percepção de esforço)
Very slight vocal effort	T1 - Esforço vocal muito leve T2 - Pouquíssimo esforço vocal VP - Pouquíssimo esforço vocal	*Very low vocal effort*	Pouquíssimo esforço vocal	Pouquíssimo esforço vocal
Slight vocal effort	T1 - Esforço vocal leve T2 - Pouco esforço vocal VP - Esforço vocal leve	*Low vocal effort*	Esforço vocal leve	Esforço vocal leve
Moderate vocal effort	T1 - Esforço vocal moderado T2 - Moderado esforço vocal VP - Esforço vocal moderado	*Moderate Vocal effort*	Esforço vocal moderado	Esforço vocal moderado
Somewhat severe vocal effort	T1 - Esforço vocal quase intenso T2 - Grande esforço vocal VP - Grande esforço vocal	*High vocal effort*	Grande esforço vocal	Grande esforço vocal
Severe vocal effort	T1 - Esforço vocal intenso T2 - Intenso esforço vocal VP - Esforço vocal intenso	*Intense vocal effort*	Esforço vocal intenso	Esforço vocal intenso
Very severe vocal effort	T1 - Esforço vocal muito intenso T2 - Esforço vocal muito intenso VP - Esforço vocal muito intenso	*Very intense vocal effort*	Esforço vocal muito intenso	Esforço vocal muito intenso
Very very severe vocal effort (almost maximum)	T1 - Esforço vocal extremamente intenso (quase máximo esforço) T2 - Esforço vocal extremamente intenso (quase máximo) VP - Esforço vocal extremamente intenso (quase máximo esforço)	*Extremely intense vocal effort (almost maximum of effort)*	Esforço vocal extremamente intenso (quase máximo esforço)	Esforço vocal extremamente intenso (quase máximo esforço)
Maximum vocal effort	T1 - Máximo esforço vocal T2 - Máximo esforço vocal VP - Máximo esforço vocal	*Maximum of vocal effort*	Máximo esforço vocal	Máximo esforço vocal

Caption: T1 = translator from English into Portuguese 1; T2 = translator from English into Portuguese 2; VP = version in Portuguese generated from a compilation of T1 + T2

DISCUSSION

Voice self-assessment protocols are valuable in clinical practice, as they help patients to understand and perceive the impact of dysphonia in their life, consequently improving adherence to treatment.

Cross-cultural equivalence is an important and essential stage allowing for the use of an instrument originally designed in a different language[11], in order to eliminate the barriers between the instrument and its target population[12]. This cross-cultural adaptation methodology has been used in the Speech-Language Pathology subareas for translation and validation of other instruments into Brazilian Portuguese[12-14].

Many of these protocols measure vocal symptoms[13,14], but phonatory effort, a common complaint, has not been specifically addressed in research. Therefore, the Adapted Borg CR10 for Vocal Effort Ratings (BR) is a specific instrument for self-assessment of vocal effort following a specific task, which may contribute both to research and clinical practice.

The process of cross-cultural adaptation of the Adapted Borg CR10 for Vocal Effort Ratings (BR) did not cause any changes to the protocol, which indicates the cultural and linguistic equivalence of the instrument in Brazilian Portuguese.

CONCLUSION

The version of the instrument translated into Brazilian Portuguese, entitled *Escala Borg CR10-BR adaptada para esforço vocal*, is linguistically and culturally equivalent to the original Adapted Borg CR10 for Vocal Effort Ratings.

REFERENCES

1. Behlau M, Madazio G, Feijó D, Pontes P. Anatomia da laringe e fisiologia da produção vocal. In: Behlau M, editor. Voz: o livro do especialista. Rio de Janeiro: Revinter; 2004. p. 1-51. vol. 1.
2. Vieira AC, Behlau M. Análise de voz e comunicação oral de professores de curso pré-vestibular. Rev Soc Bras Fonoaudiol. 2009;14(3):346-51. http://dx.doi.org/10.1590/S1516-80342009000300010.
3. Stepp CE, Sawin DE, Eadie TL. The relationship between perception of vocal effort and relative fundamental frequency during voicing offset and onset. J Speech Lang Hear Res. 2012;55(6):1887-96. http://dx.doi.org/10.1044/1092-4388(2012/11-0294). PMid:22615477.
4. Chang A, Karnell MP. Perceived phonatory effort and phonation threshold pressure across a prolonged voice loading task: a study of vocal fatigue. J Voice. 2004;18(4):454-66. http://dx.doi.org/10.1016/j.jvoice.2004.01.004. PMid:15567047.
5. Borg G. Psychophysical scaling with applications in physical work and the perception of exertion. Scand J Work Environ Health. 1990;16(Suppl 1):55-8. http://dx.doi.org/10.5271/sjweh.1815. PMid:2345867.
6. Vinney L. The role of self-regulation in the modification of vocal behavior during reading and speech [dissertation]. Madison: University of Wisconsin; 2013.
7. Ford Baldner E, Doll E, van Mersbergen MR. A review of measures of vocal effort with a preliminary study on the establishment of a vocal effort measure. J Voice. 2015;29(5):530-41. http://dx.doi.org/10.1016/j.jvoice.2014.08.017. PMid:26186811.
8. Van Mersbergen M, Patrick C, Glaze L. Functional dysphonia during mental imagery: testing the train theory of voice disorders. J Speech Lang Hear Res. 2008;51(6):1405-23. http://dx.doi.org/10.1044/1092-4388(2008/06-0216). PMid:18664709.
9. Van Leer E. Effect of social cognitive variables in voice therapy outcomes [dissertation]. Madison: University of Wisconsin; 2010.
10. Behlau M. Consensus auditory-perceptual evaluation of voice (CAPE-V), ASHA 2003. Rev Soc Bras Fonoaudiol. 2004;9(3):187-9.
11. Aaronson N, Alonso J, Burnam A, Lohr KN, Patrick DL, Perrin E, et al. Assessing health status and quality-of-life instruments: attributes and review criteria. Qual Life Res. 2002;11(3):193-205. http://dx.doi.org/10.1023/A:1015291021312. PMid:12074258.
12. Rocha BR, Moreti F, Amin E, Madazio G, Behlau M. Cross-cultural adaptation of the Brazilian version of the protocol Evaluation of the Ability to Sing Easily. CoDAS. 2014;26(6):535-9. http://dx.doi.org/10.1590/2317-1782/20142014175. PMid:25590918.
13. Moreti F, Zambon F, Oliveira G, Behlau M. Cross-cultural adaptation of the Brazilian version of the Voice Symptom Scale: VoiSS. J Soc Bras Fonoaudiol. 2011;23(4):398-400. http://dx.doi.org/10.1590/S2179-64912011000400018. PMid:22231064.
14. Moreti F, Zambon F, Oliveira G, Behlau M. Cross-cultural adaptation, validation, and cutoff values of the Brazilian version of the Voice Symptom Scale-VoiSS. J Voice. 2014;28(4):458-68. http://dx.doi.org/10.1016/j.jvoice.2013.11.009. PMid:24560004.

Author contributions

MRMCC was responsible for data collection, tabulation, and analysis, in addition to writing the paper; FZ was responsible for the research proposal and conception, data analysis and proofreading of the paper; FM was responsible for the research proposal and conception, data analysis, and proofreading of the paper; MB was responsible for the research proposal and conception, data analysis, and final proofreading of the paper.

Appendix A. Version of the protocol Adapted Borg CR10 for Vocal Effort Ratings[7] translated and culturally adapted into Brazilian Portuguese, entitled *Escala Borg CR10-BR adaptada para esforço vocal*

Escala Borg CR10-BR adaptada para esforço vocal
Nome completo:_____
D.N.:___/___/___
Data de hoje:___/___/___

Assinale o número que corresponde à intensidade de esforço de voz após a realização da tarefa solicitada:

INTENSIDADE	ESCALA
Nenhum esforço vocal	0
Mínima sensação de esforço vocal (apenas percepção de esforço)	0.5
Pouquíssimo esforço vocal	1
Esforço vocal leve	2
Esforço vocal moderado	3
Grande esforço vocal	4
Esforço vocal intenso	5
	6
Esforço vocal muito intenso	7
	8
Esforço vocal extremamente intenso (quase máximo esforço)	9
Máximo esforço vocal	10