

# Translation, cross-cultural adaptation and reliability of the clinical utility scale of Tyson and Connell

*Tradução, adaptação transcultural e confiabilidade da escala de utilidade clínica de Tyson e Connell*

*Traducción, adaptación intercultural y fiabilidad de la escala de utilidad clínica de Tyson y Connell*

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**ABSTRACT** | This study aimed to translate and adapt the Clinical Utility Scale of Tyson and Connell into Brazilian Portuguese, in addition to evaluating intra- and inter-rater reliability. The process of cross-cultural translation and adaptation was developed in five stages: translation, synthesis of translations, retro translation, evaluation by the committee of experts and testing of the pre-final version. To evaluate the intra- and inter-rater reliability of the Clinical Utility Scale of Tyson and Connell, 20 assessment instruments were independently assessed by two examiners (inter-rater reliability). In addition, one of the examiners performed all assessments at two different times with a 30-day interval (intra-rater reliability). The translation and cross-cultural adaptation were performed in a systematic way, following the proposed criteria, and only minor changes in two items were necessary to make the scale more useful to all instruments currently available in the literature. Regarding the inter-rater reliability of the Clinical Utility Scale of Tyson and Connell, the value found was ICC=0.85 (IC 95%, 0,79-0,87), while for intra-rater reliability the result was ICC=0,89 (IC 95%, 0,85-0,93). The results of this process indicated an adequate degree of semantic, conceptual and cultural equivalence. In addition, intra- and inter-rater reliability measures were considered adequate. These findings have shown the scale is adequate to assess the clinical utility of evaluation instruments usually applied to patients. Therefore, it must be incorporated into clinical practice and research when choosing the best evaluation instrument to be used.

**Keywords** | Translations; Reproducibility of Results; Physiotherapy.

**RESUMO** | O objetivo deste estudo foi traduzir e adaptar a escala de utilidade clínica de Tyson e Connell para o português brasileiro, além de avaliar sua confiabilidade interexaminador e intraexaminador. O processo de tradução e adaptação transcultural foi desenvolvido em cinco estágios: tradução; síntese das traduções; retrotradução; avaliação pelo comitê de especialistas; e teste da versão pré-final. Para avaliação da confiabilidade intra e interexaminador da escala, 20 instrumentos de avaliação foram analisados de forma independente por dois examinadores (confiabilidade interexaminador). Além disso, um dos examinadores fez todas as avaliações, em dois momentos distintos, com um intervalo de 30 dias entre uma e outra (confiabilidade intraexaminador). A tradução e a adaptação transcultural foram realizadas de forma sistemática, seguindo os critérios propostos, de modo que houve apenas pequenas alterações em dois itens para tornar a escala mais útil a todos os instrumentos disponíveis na literatura. Em relação à confiabilidade interexaminador da escala de utilidade clínica de Tyson e Connell-Brasil, o valor encontrado foi CCI=0,85 (IC 95%, 0,79-0,87), enquanto para a confiabilidade intraexaminador o resultado foi CCI=0,89 (IC 95%, 0,85-0,93). Os resultados deste processo indicaram adequado grau de equivalência semântica, conceitual

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e cultural. Além disso, as medidas de confiabilidade intra e interexaminadores foram consideradas adequadas. Esses achados demonstraram que a escala é adequada para avaliar a utilidade clínica de instrumentos de avaliação comumente utilizados em pacientes. Dessa forma, deve ser incorporada na prática clínica e em pesquisas para a escolha do melhor instrumento.

**Descritores** | Tradução; Reprodutibilidade dos Testes; Fisioterapia.

**RESUMEN** | El presente estudio tuvo como objetivo traducir y adaptar la escala de utilidad clínica de Tyson y Connell al portugués brasileño, y evaluar su fiabilidad interexaminador e intraexaminador. El proceso de traducción y adaptación transcultural se desarrolló en cinco etapas: traducción, síntesis de las traducciones, retrotraducción, evaluación por el comité de expertos, y prueba de la versión prefinal. Para evaluar la fiabilidad intra e interexaminador de la escala, 20 herramientas de evaluación fueron analizadas de forma independiente por dos examinadores (fiabilidad interexaminador). Uno de los examinadores realizó todas las evaluaciones, en dos

momentos diferentes, en un intervalo de 30 días entre cada una (fiabilidad intraexaminador). La traducción y la adaptación transcultural se llevaron a cabo sistemáticamente siguiendo los criterios propuestos, y solo hubo pequeños cambios en dos ítems con el fin de dejar la escala más útil para todos los instrumentos disponibles en la literatura. Respecto a la fiabilidad interexaminador de la escala de utilidad clínica de Tyson y Connell-Brasil, el resultado fue CCI=0,85 (IC 95%, 0,79-0,87), mientras que para la fiabilidad intraexaminador fue CCI=0,89 (IC 95%, 0,85-0,93). Los resultados de este proceso apuntaron un grado adecuado de equivalencia semántica, conceptual y cultural. Y se consideraron adecuadas las medidas de fiabilidad intra e interexaminadores. Estos hallazgos demostraron la adecuación de la escala para evaluar la utilidad clínica de herramientas de evaluación comúnmente utilizadas en pacientes. Se concluye que debe ser inserida en la práctica clínica y en la investigación para elegir la mejor herramienta.

**Palavras clave** | Traducción; Reproducibilidad de los Resultados; Fisioterapia.

## INTRODUCTION

Functional disability is one of the main reasons leading individuals to seek physical therapy<sup>1</sup>. Nonetheless, for a good reception of the patient/client and, so that an effective treatment plan can be drawn based on their individuality, an adequate assessment is necessary<sup>2</sup>. Thus, in their daily lives, the physical therapist uses several standardized assessment instruments, such as physical examination, specific tests, questionnaires and scales, which assist in the construction of clinical reasoning and planning of an intervention program<sup>3</sup>. However, not all instruments currently proposed in the literature are clinically adequate.

Clinical usefulness is measured by the instrument's ability to be short and easy to administer, understand and score<sup>4,5</sup>. Thus, the choice of the best assessment method within the outpatient setting is based on the cost-benefit ratio<sup>4,5</sup>. Therefore, the evaluation method must be fast, inexpensive, accurate, reliable, valid and interpretable so that its use can be indicated for daily clinical practice<sup>4</sup>. To quantify such aspects, Tyson and Connell<sup>6</sup> developed a scale that assesses the clinical utility of instruments used as methods of assessment by the physical therapist. This scale assesses items such as time; cost; need for specific equipment and training for application, and portability, in a score ranging from 0 to 10, and the higher the score, the

better the clinical utility of the instrument<sup>6</sup>. It would be important for therapists to use the scale in everyday clinical practice, since it would allow professionals, objectively and prior to its use, to evaluate the clinical utility of the test they propose to use and, based on its score, to judge whether it is clinically useful or not; that is, if it will be easy and quick to be applied, if it is cheap, and if it can be transported, which is essential for professionals who care at home.

Although the Tyson and Connell clinical utility scale is adequate for evaluating instruments commonly used in clinical practice and research, their Brazilian Portuguese version has not yet been developed. To apply it in the Brazilian context, Tyson and Connell's scale of clinical utility needs to be translated and culturally adapted to Brazilian Portuguese. For this, the process of translation and cross-cultural adaptation must be done in a systematic way and requires certain steps to be carefully followed to ensure adequate reliability. In addition, after this process, the scale measurement properties should be tested<sup>7</sup>. Reliability, one of these properties, guarantees that a certain instrument measures faithfully, through the consistency and agreement of the results, and is fundamental to guarantee the quality of the information obtained by the test<sup>4</sup>. This can be divided into two types: intra-rater, which evaluates the consistency of the scores achieved on an instrument, by

the same evaluator, at two different times; and inter-rater, who evaluates the agreement of the scores achieved in an instrument, by two independent evaluators<sup>8</sup>. Reliability is a property called population-dependent, that is, whenever an instrument is translated and adapted to another population, it must be tested again, since it depends on the culture of each country<sup>4</sup>. Thus, although the translation and cross-cultural adaptation of the clinical utility scale of Tyson and Connell are fundamental for its application in Brazil, this alone does not guarantee that the measurement properties of the instrument are maintained, since it has been adapted for a new culture<sup>9-12</sup>.

Thus, the aim of this study was to translate and cross-culturally adapt the clinical utility scale of Tyson and Connell to Brazilian Portuguese, and to assess the inter-rater and intra-rater reliability of this new version.

## METHODOLOGY

### Design

This is a clinometric methodological study, with exploratory research, carried out between March and October 2018.

### Tyson and Connell clinical utility scale

The Tyson and Connell clinical utility scale presents four items and quantifies whether a specific instrument can be used in practice quickly, if it is clearly understood, if it is easy to administer and score, if it is cheap, if you need some specialized equipment for use or training, as well as whether it is portable. The score for each of its four items varies from 0 to 3 (for items 1 and 2) and from 0 to 2 (for items 3 and 4), with a final score of 10<sup>6</sup>. The higher the score achieved, the better the clinical utility of the tests / instruments<sup>6</sup>. Still according to the authors, a score greater than or equal to nine indicates an instrument that can be recommended for clinical practice<sup>6</sup>.

### Procedures

#### *Cross-cultural translation and adaptation*

The process of translation and cross-cultural adaptation was developed in five stages, according to previous recommendations in the literature: translation; synthesis of translations; back-translation; evaluation by the expert committee; and testing the pre-final version<sup>7</sup>.

The first stage consisted of translating the Tyson and Connell scale into Brazilian Portuguese. This step was carried out by two bilingual translators, independently, whose mother tongue was Brazilian Portuguese and who had no prior knowledge of the purpose of the study, one of whom was aware of the concepts examined by the questionnaire and the other was not. In addition, translators should pay attention to the semantic, cultural and conceptual quality of the scale<sup>7</sup>.

In the second stage, a synthesis of the two translated versions of the scale was carried out. Called the consensus version, it was developed based on the comparison of the original version, in English, with the two versions in Portuguese<sup>13</sup>.

In the next stage, two bilingual translators whose mother tongue was English, and who did not have access to the original questionnaire or prior knowledge of the purpose of the study, independently back-translated the scale. This stage consists of returning the unified translated version to the source language, English. This version was compared with the original scale<sup>7,13</sup>.

In the fourth stage, clarity, relevance and equivalence between the translated and back-translated versions and the original version of the scale were discussed. This conference was made by a committee of experts, composed of three physical therapists (KKPM, PRA and HSC) and a translator. The average age of physical therapists was 36 years ( $\pm 4$ ), with an average clinical experience of 9 years ( $\pm 4$ ). At the end of the discussion, a pre-final version was consolidated, again focusing on semantic, idiomatic, cultural and conceptual equivalence<sup>14</sup>.

Finally, in the fifth stage, the pre-final version was applied by two physical therapists (RFNV and AFM) in five commonly used assessment instruments, in order to analyze the level of understanding of this version by the physical therapists.

#### *Reliability*

To assess the inter- and intra-rater reliability of the Tyson and Connell clinical utility scale, 20 assessment instruments, among tests, scales and questionnaires commonly used in research and in the physical therapist's clinical practice in different populations, were evaluated according to the scale criteria. All instruments were analyzed independently by two examiners (KKPM and RFNV), to assess inter-rater reliability. In addition, one of the examiners performed all evaluations at two different times, with an interval of 30 days between them, to measure intra-rater reliability. This period was chosen

to ensure that during the second round of assessment, the examiner did not remember the scores assigned to each of the instruments previously.

To measure the clinical usefulness of the instrument, the clinical experience of each of the examiners with it was considered, in addition to information obtained in the literature. Thus, the instruments selected were: Berg balance scale<sup>15</sup>; modified Ashworth scale<sup>16</sup>; esthesiometry<sup>17</sup>; goniometry<sup>18</sup>; Barthel index<sup>19</sup>; lower extremity motor coordination test (Lemocot)<sup>20</sup>; functional independence measure<sup>21</sup>, mini-mental state examination<sup>22</sup>, Medical Outcomes Study: 36-Item Short Form Health Survey (SF-36)<sup>23</sup>; incremental shuttle walking test (ISWT)<sup>24</sup>; heel-shin test<sup>25</sup>; block box testing<sup>26</sup>; six-minute walk test (6MWT)<sup>27</sup>; Romberg balance test<sup>28</sup>; sit and stand test<sup>29</sup>; test of going up and downstairs<sup>30</sup>; 10-meter walking speed test<sup>30</sup>; finger-nose test<sup>26</sup>; test of nine pins and nine holes<sup>26</sup>; and timed up and go test (TUG)<sup>30</sup>.

*Statistical analysis*

The statistical program SPSS, version 17.0, and a significance level of 5% were used for all analyzes. Intraclass correlation coefficients (ICC-2.1) were calculated to assess intra- and inter-rater reliability, as well as their respective confidence intervals (95% CI). The KICs were classified as follows: KIC <0.50: poor; 0.50≤CCI≤0.75: moderate; 0.75≤CCI> 0.90: good; and ICC≥0.90: excellent<sup>4</sup>.

**RESULTS**

The cross-cultural adaptation process followed all the proposed recommendations<sup>7,13</sup>. In the developed version, three of the four items (first, second and third) remained unchanged, which demonstrates adequate semantic equivalence between the English and Brazilian Portuguese versions. Regarding the fourth criterion, “equipment portability”, after the application of the pre-final version, the committee of experts chose to include criteria for space used for the application of the test, or the use of objects easily found in any environment, such as a chair. This cross-cultural adaptation was made to facilitate and expand the possibility of applying the Tyson and Connell scale of clinical utility to existing instruments and available for use in research and clinical practice today. In addition, the name of the criterion was changed from “equipment portability” to “instrument portability”, also to expand the possibility of applying the scale to

assessment instruments other than equipment, such as the 6MWT, for example. The final version, translated and adapted into Brazilian Portuguese, was called the Tyson and Connell-Brasil clinical utility scale, as shown in Chart 1.

Chart 1. Tyson and Connell Clinical Utility Scale – Brazil

Instrument feature	Score
Time spent on data management, analysis and interpretation	( ) <10 minutes – score 3 ( ) 10 to 30 minutes – score 2 ( ) 30 to 60 minutes – score 1 ( ) >60 minutes or unknown – score 0
Cost	( ) <R\$ 100 – score 3 ( ) R\$ 100 to R\$ 500 – score 2 ( ) R\$ 500 to R\$ 1,000 – score 1 ( ) >R\$ 1,000 or unknown – score 0
Need for specialized equipment and training for use	( ) No – score 2 ( ) Yes, but it is simple, easy to use, and does not need specific training – score 1 ( ) Yes, or unknown – score 0
Instrument portability	( ) Yes, it easily fits in a bag, or needs a physical space of 10 meters or less, or the necessary equipment is easily found in any environment (e.g.: chair) – score 2 ( ) Yes, it fits in a suitcase or cart, or requires physical space between 10 and 30 meters – score 1 ( ) No, or very difficult to be transported, or requires physical space equal to or greater than 30 meters, or unknown – score 0

Regarding the inter-rater reliability of the scale, the value found was significant and considered good (ICC=0.85; 95% CI, 0.79-0.87), according to the classification adopted. Similarly, for intra-rater reliability, the result was also significant and considered good (ICC=0.89; 95% CI, 0.85-0.93).

**DISCUSSION**

This study aimed to translate and cross-culturally adapt the clinical utility scale of Tyson and Connell to Brazilian Portuguese, in addition to assessing the intra and inter-rater reliability of this new version. Translation and cross-cultural adaptation were carried out systematically, following the proposed criteria. Only minor changes were necessary to make the scale more useful to the instruments available in the literature, but without changing the semantic equivalence between the English and Brazilian Portuguese versions. In assessing intra- and inter-rater reliability, the results were considered

good, so that their application can be indicated in clinical practice and in research to assess the clinical utility of instruments commonly used by physical therapists. It is important to note that this is the first study of translation and adaptation of the scale to a language other than English, which it was originally developed for.

One of the decisions of the expert committee during the evaluation of the instruments was to include other evaluation criteria in the item "Equipment portability", to expand the possibilities of using the scale, adding space criteria and easily found support objects. Thus, in criterion 4, score 2, the following part was added: "either it needs a physical space equal to or less than 10 meters, or the necessary equipment is easily found in any environment (e.g.: chair)"; while for the same criterion, in score 1, the part was added: "or you need a physical space between 10 and 30 meters"; and finally, for the score 0 of the same criterion, the part was added: "or it needs a physical space equal to or greater than 30 meters". Without these adaptations, tests such as the 6MWT or ISWT, which are commonly used in clinical practice, would not be subject to evaluation using the Tyson and Connel original clinical utility scale, since the main need for these tests in other environments is space, and not its portability, like the block box test or Lemocot. In addition, the name of the criterion related to portability has been changed from "Equipment portability" to "Instrument portability". This change aimed, again, to expand the application of the scale in other assessment methods that were not equipment. Finally, the committee of experts chose not to convert the pound sterling to Real, since, for the Brazilian context, the value converted into reais would be approximately five times greater than the equivalent of each test / instrument. For example, for score 3, while on the original scale the suggested value would be 100 pounds, on conversion we would find an approximate value of 500 reais, which cannot be considered cheap and, therefore, would not obtain the maximum score, as the value is high for clinical practice in our country.

Regarding the measurement properties, as observed, the intra-rater reliability found was considered good, according to the reference values proposed in the statistical analysis. This indicates that the Tyson and Connel-Brasil clinical utility scale can be used by the same individual in different contexts, without compromising the score found for the scale. The inter-rater reliability also showed a good result, that is, the scale is a reliable instrument to be used by several professionals in clinical and / or research contexts.

Such results are important for the physical therapist's daily clinical practice. With the daily emergence of new instruments in the literature, when faced with a new evaluation method, the therapist must be able to quickly assess its clinical usefulness and, provided with this information, judge the feasibility of using it on his patient. In addition, evaluation methods already known should also have their clinical usefulness assessed and, thus, rethought if in fact they are practical for everyday life.

Finally, this study has positive points and also some limitations. The use of standardized procedures with internationally recognized criteria for translation and cross-cultural adaptation, makes this process reliable. In addition, the investigation of reliability allows its free use among professionals. As limitations, it is important to note that the pre-final version was tested with only two professionals, on five instruments. However, it is noteworthy that the Tyson and Connell clinical utility scale does not evaluate patients (if so, the minimum sample would be 30 patients<sup>10-12</sup>), but evaluates other scales, tests, questionnaires, etc., which makes it impossible to take reference to previously established numbers. Finally, another limitation to be highlighted is the fact that the reliability analysis was carried out by two professionals who also participated in previous stages of the cross-cultural adaptation process (one professional participated in the expert committee and another participated in the test of the pre- Final). However, as the five tests included in the pre-final version were different from the 20 tests used to assess reliability, we believe that only previous knowledge of the scale did not interfere with the results found.

## CONCLUSION

The results of the cross-cultural adaptation of the Tyson and Connell clinical utility scale into Brazilian Portuguese indicated an adequate degree of semantic, conceptual and cultural equivalence between the English and Brazilian Portuguese versions. The intra and inter-rater reliability measures were considered good according to the references used. Thus, these findings demonstrated that the Tyson and Connell-Brasil clinical utility scale proved to be adequate to assess the clinical utility of assessment instruments, being an alternative to be incorporated into clinical practice and research when choosing the best instrument for evaluation. evaluation to be used.

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