RESEARCH ARTICLE

Preliminary Reliability and Repeatability of the Brazilian Version of the Revised Knox Preschool Play Scale

Amanda M. Pacciulio*†, Luzia I. Pfeifer & Jair L. F. Santos

School of Medicine of Ribeirão Preto, University of São Paulo, São Paulo, Brazil

Abstract

The aim of this study was to create an adaptation of the Revised Knox Preschool Play Scale (RKPPS) for the Brazilian population, as well as to apply the instrument with statistical analysis to verify the preliminary intra-rater and inter-rater reliability and repeatability of the instrument. The instructions presented by Beaton et al. regarding adaptation of instruments were followed to perform a cross-cultural adaptation of the RKPPS. A preliminary test of the Portuguese version was performed on 18 children with no motor, cognitive or sensory impairment. The video recordings of this administration were analysed on two separate occasions by two examiners within a 5-month interval, using the scores suggested by Pfeifer. The Spearman's test was used in the statistical analysis of the obtained data. The author of the RKPPS agreed with the small necessary cultural adaptations. The Spearman test revealed a high correlation coefficient and good significance levels for both intra- and inter-raters values. This study demonstrated the reliability and repeatability of the Brazilian version of the RKPPS. This is a preliminary study and further studies are needed in order to validate the scale to be administered in the Brazilian population.

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Keywords

cross-cultural adaptation; play; pre-school child

***Correspondence**

Amanda M. Pacciulio, 501 Rua Francisco Caetano Gaia, Lagoinha, Ribeirão Preto, São Paulo 14.095-130, Brazil.

†Email: amanda.tousp@gmail.com

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Introduction

Play refers to any spontaneous activity that promotes fun, entertainment or distraction (Parham and Fazio, 1997). Through games, children interact with the world, with objects and with other people (Pierri and Kudo, 2000; Mesomo et al., 2003). Through this interaction, children begin developing their own self-knowledge, exercise their strengths and are able to re-experience circumstances that have caused them excitement, happiness, anxiety, fear or anger (Pedro et al., 2007).

Playing is a significant and fundamental child occupation (Parham and Primeau, 1997) and it is seen as an important area of occupation (American Occupational Therapy Association, 2002, 2008). Playing should primarily be considered a necessary human occupation for child development. Furthermore, it facilitates the acquisition and/or development of important skills needed for activities of daily living, school and leisure activities (Pfeifer and Cruz, 2008).

By observing a child at play, it is possible to evaluate his or her skills, and coordination, cognitive functions

and how he or she expresses feelings and social skills (Knox, 1997; Ferland, 2004).

The assessment of play and the capacities that the child demonstrates while playing provides a means of analysing this area of occupational performance, in order to provide appropriate interventions (Knox, 1997). By evaluating children at play, the occupational therapist can identify the characteristics of each child, which is essential to planning intervention objectives (Pfeifer and Cruz, 2008).

The Preschool Play Scale was developed in the United States in 1968 by Susan Knox, and was originally referred to as the Play Scale. It consists of an assessment tool based on observation, developed to provide an evolutionary description of the typical play behaviour of children aged 0 to 6 years through free playing (Knox, 1997).

After examining the use of the Preschool Play Scale, as well as its limitations, Knox (1997) modified the scale, after which time, it was referred to as the Revised Knox Preschool Play Scale (RKPPS). This instrument describes play in 6-month increments for children from birth to 3 years of age and in yearly increments from the age of 3 to 6 years and presents qualitative information regarding development (Stagnitti, 2004). The advantages of this scale are that it addresses all areas of development and shows the child's evolution state without requiring toys or specialized equipment (Knox, 1997); it evaluates the child in natural environments, and it evaluates spontaneous behaviours rather than requested behaviours (Knox, 1997; Jankovich et al., 2008).

The administration of the RKPPS requires that children be observed during free play and in their natural environments (Jankovich et al., 2008). Children are assessed on four dimensions comprised of 12 categories: space management (gross motor skills and interests), material management (manipulation, construction, purpose and attention), pretence/symbolism (imitation, dramatization) and participation (type, cooperation, humour and language) (Knox, 1997, 1998). In this way, it permits the therapist to identify the specific area of play that is dysfunctional and in need of intervention (Cavalcanti, 2007).

The World Health Organization (1995) recommends the translation and cultural adaptation of existing assessment tools rather than the creation of new tests. This process favours communication among researchers and the comparison of data obtained internationally. In addition, if the evaluation is considered adequate for the country's culture, it is considered faster and more economical than developing new instruments.

When an assessment instrument for children is adapted from another country, it should be used with care since it needs to be adjusted with a view to making it pertinent and adequate for the new culture (Mancini, 2005).

The adaptation of an instrument to be used in another country or another culture (even if within the same country) requires a single method to guarantee that the original and the adapted version are equivalent. If the scale will be used in different cultures, its items need to be not only linguistically translated but also submitted to a cultural adaptation, with a view to maintaining the validity of the original content (Beaton et al., 2000). Guillemin et al. (1993) and Beaton et al. (2000) named the process that focuses on both the language (translation) and cultural adaptation of an assessment tool as cross-cultural adaptation.

Hence, the purpose of this study was to translate and adapt the RKPPS for the Brazilian population, as well as to test this version in a subject sample, a stage that Beaton et al. (2000) refers to as pre-test, in order to verify the applicability of this version.

Method

Translation and cross-cultural adaptation

The cross-cultural adaptation of the RKPPS was founded on the guidelines by Beaton et al. (2000), and was carried out in six steps:

(1) Step I. Two translators, both fluent in the English language, translated the instrument from English to Portuguese. One of the translators was aware of the concepts that would be examined by the instrument and had knowledge regarding child development, providing an equivalent translation of the technical terms specific to this area. The other translator did not receive any additional information regarding the items assessed by the RKPPS and did not have any theoretical or clinical knowledge in the area of child development, thus providing a translation that reflects the language used by the Brazilian population.
(2) Step II. Both translators met for a discussion; the purpose of which was to synthesize the content of

both translations into a single version, named the common translation. An observer, who had no involvement with the translations, also followed the synthesis process, and was responsible for making note of any differences between the two translations, in addition to any questions that arose and how these issues were solved.

(3) Step III. Using the common translation, and without having seen the original version, two other translators who were native speakers of English and who were also fluent in Portuguese, and who had no academic knowledge regarding the area assessed in the instrument, translated the instrument from Portuguese back to English, as a way to check the validity of the new version.

(4) Step IV. A committee, composed of all the people involved in the translation process, met with the purpose of analysing and reviewing all the translations, as well as solving any possible discrepancies among them, and combined all versions of the instrument into a single 'pre-final' version.

(5) Step V. The final part of the cross-cultural adaptation consisted of submitting the 'pre-final' version to the author of the RKPPS, to receive her approval of the new version and the adaptations, allowing it to be used in Brazil.

(6) Step VI. The pre-test of the Brazilian version of the instrument was performed. It was a field test using a small sample of the population to evaluate the instrument to ensure that the adapted version retained equivalence with the original RKPPS in an applied situation.

This study was approved by the Research Ethics Committee at School of Medicine of Ribeirão Preto. The participants' parents or guardians were informed about the study and provided written consent.

Application of the cross-culturally adapted version (pre-test)

Participants

Eighteen children with no motor, cognitive or sensory impairments, who were from two schools that also contained nurseries, took part in the study. The children were divided into nine groups (two children in each), maintaining the division into age groups as established by RKPPS: 0 to 5 months and 29 days, 6 to 11 months and 29 days, 12 to 17 months and 29 days, 18 to 23 months and 29 days, 24 to 29 months and 29 days, 30 to 35 months and 29 days, 36 to 47 months and 29 days, 48 to 59 months and 29 days and 60 to 71 months and 29 days.

Data collection

The children were selected at random by a school employee, thus allowing for a 'blind' analysis of the participants. After selection, children were observed during free play, and all observations were video recorded by the researcher, which allowed for further analysis.

The babies aged 0 to 11 months and 29 days were filmed individually for 30 minutes in a large closed area, and at some point during the recording, the baby interacted with their caregiver from the institution, which made it possible to analyse all the dimensions assessed by the RKPPS.

The children aged 12 to 71 months and 29 days were filmed in pairs, allowing them to play together, and thus permitting the analysis of this interaction (participation), which should also be evaluated according to the RKPPS. These recordings were made in distinct environments: 30 minutes in a closed room and 30 minutes outside, which allowed the participants to play games that involve space management, material management and pretence/symbolism.

The recordings of each child were made continuously on the same day, or on different days, depending on their availability and that of the school and the researcher, as well as the climatic conditions. No other child or employee was present during the recordings and all the analyses necessary in this study were made from a single video of each child or pair.

Data analysis

Each of the 12 categories present in the four RKPPS domains has several expected behaviours or actions, which vary according to the age group. These behaviours (items) were analysed and scored separately.

According to Knox (1997), when children are assessed using the RKPPS, it is possible to identify if the analysed behaviour is present, signalling +, or absent, signalling –, which does not present any score. However, as there is the need to perform statistical analyses to verify the reliability of the adapted RKPPS version, this

study used the scoring proposed by Pfeifer (2006). This form of scoring is interesting because it does not only consider whether the child performed the actions and behaviours or not, but also rates that performance and indicates if the child did not perform the action or behaviour due to a personal limitation or due to a restriction in the environment.

Scoring is awarded as follows: 2 points if the child naturally presents the expected behaviour or satisfactorily performs a certain task; 1 point if the child does not present the expected behaviour or is hesitant when performing a certain task; zero if the expected behaviour or the determined task cannot be observed due to a lack of conditions or material, environment and/or human resources; and –1 point if the child does not present the expected behaviour or fails to perform the determined task, despite having the opportunity (Pfeifer, 2006).

The video recordings of each child or pair were assisted by two examiners (one of them was the author of the present study) separately, on two distinct occasions, with a 5-month interval between the analyses, to avoid the possibility that their notion about the scores of the first analyses could influence this second scoring.

Spearman's correlation, a non-parametric statistical analysis measurement, was used to verify intra-rater and inter-rater reliabilities of the instrument, since it is appropriate for the studied variable (discrete-ordinal).

Results

The performed cross-cultural adaptation resulted in a version of the instrument that is appropriate for the Brazilian population. The adapted version proved to be equivalent to the original instrument in terms of semantics (meaning of words), language (expressions and colloquialisms), experiences (lived by the evaluated individuals) and concepts (interpretation of concepts).

To guarantee these equivalencies, the following items were changed, since these games do not exist in Brazil: *pulls apart pop beads* and *strings beads*. In these cases, a substitution for the games of putting macaroni on strings – often used in Brazilian children's schools – and of pulling rings (beads, macaroni, etc.) on a string was made, because they demand the same motor and cognitive skills as the actions cited in the original scale.

The author agreed (personal communication, 2007) with the changes made, confirming the equivalency between the games.

The statistical analysis using Spearman's test found a high intra-rater correlation coefficient in every dimension of the adapted RKPPS, demonstrating significance between the two assessments of each examiner, which can be seen in Table 1.

Inter-rater analysis (comparing the data obtained in the first and second assessment for each examiner) using Spearman's test found a high correlation coefficient and good levels of significance that can be seen in Table 2, which suggests that although there are small differences between the raters, they do not invalidate the consistency and repeatability of the assessment instrument.

Discussion

The Brazilian version of the RKPPS scored each behaviour (item) separately, using criteria that included from satisfactory presence of the expected behaviour to absence of the behaviour, which helped in the performance of a detailed analysis of each item of the instrument, since the original version (RKPPS) presents some confounding application instructions. The need to establish clearer criteria for the application of the

Table I Spearman's correlation coefficients and significance levels between the two assessments of each examiner (intra-rater reliability)

Dimension	Examiner 1		Examiner 2	
	Correlation coefficient	Level of significance (p-value)	Correlation coefficient	Level of significance (p-value)
Space management	0.94	$p = 0.0002$	1.00	$p < 0.0001$
Material management	0.93	$p = 0.0003$	0.99	$p < 0.0001$
Pretence/Symbolism	0.87	$p = 0.0024$	0.99	$p < 0.0001$
Participation	0.94	$p < 0.0001$	1.00	$p < 0.0001$
All	0.97	$p < 0.0001$	0.99	$p < 0.0001$

Table II Spearman's correlation coefficient and significance levels between the two assessments of both examiners (inter-rater reliability)

Dimension	First assessment		Second assessment	
	Correlation coefficient	Level of significance (p-value)	Correlation coefficient	Level of significance (p-value)
Space management	0.91	$p = 0.0008$	0.94	$p = 0.0002$
Material management	0.93	$p = 0.0003$	0.99	$p < 0.0001$
Pretence/Symbolism	0.78	$p = 0.0126$	0.95	$p = 0.0001$
Participation	0.92	$p = 0.0004$	0.92	$p = 0.0004$
All	0.92	$p < 0.0001$	0.95	$p < 0.0001$

instrument was also observed in the study of Jankovich et al. (2008).

The scoring method proposed by Pfeifer (2006) had already been used in studies by Grigolatto (2006), Silva (2006) and Solai (2006). It was observed that, in the present study, it was also appropriate for identifying the quality of each child's behaviour. Furthermore, it was considered to be easy to understand, since there was high inter-rater agreement.

The videotape allowed for each child to be scored by two examiners at different times, with a 5-month interval between the evaluations. The analysis of these four scores permitted the authors to analyse the reliability and reproducibility of the Brazilian version of the RKPPS.

The statistical analysis results in this study agree with the studies performed by Bledsoe and Shepherd (1982) and by Harrison and Kielhofner (1986) – although the cited studies used the Pearson correlation coefficient – who proposed to assess the reliability and validity of the Preschool Play Scale in its non-revised version.

Considering that the Spearman's coefficient of correlation is less sensitive to bias due to outliers, does not require data to be metrically scaled or other normality assumptions and does not make assumptions regarding symmetry of a Gaussian-like distribution, in addition to whether or not joint normal distribution can be assumed, the Pearson statistic should not be the method of choice (Hollander and Wolfe, 1999). The Spearman's coefficient is the most appropriate to be applied to ordinal variables, such as those variables involved in this study.

Despite the significant intra- and inter-rater reliability, this study showed some differences between the scores obtained in the first and second analyses. This can be partially attributed to the difficulty in determining if one behaviour was absent due to a lack of conditions in the environment (score zero) or if the child actually does not present the behaviour or is unable to perform the action (score of –1). In this manner, it remains unclear if the child did not present that certain behaviour due to a lack of opportunity and/or interest, or due to a lack of skills. Since the RKPPS does not propose any intervention in the child's play, it is difficult to make this distinction. This situation could be solved by encouraging the child to become involved in the several expected activities, a suggestion that has also been proposed by Jankovich et al. (2008).

Limitations of study

This study followed the instructions of Beaton et al. (2000) in performing the cross-cultural adaptation of the RKPPS. This included the application of the final version of the instrument to a small sample, referred to as pre-test, which is a preliminary study.

Further studies are needed in order to validate the scale for administration in the Brazilian population. With the aim of assigning continuity to the research, there is an ongoing study with the purpose of analysing and applying the adapted scale on 135 children, with ages from birth to 72 months (Pfeifer, 2006).

Conclusion

The translation and cultural adaptation performed in this study preserved the intent of the original RKPPS, despite capturing the linguistic nuances of a Brazilian population.

The statistical analysis demonstrated the intra- and inter-rater reliability and the repeatability of the Brazilian version of the Revised Preschool Play Scale.

The present study contributes to the knowledge area of play and permits use of the now translated and adapted instrument in studies that assess and compare

different pre-school children populations, with or without pathologies.

This study also contributes to the clinical practice of occupational therapy, because the instrument translated and adapted to the Brazilian population can be used to evaluate the occupational area of children at play. This permits the identification of changes and delays in the child's development, making it easier for health professionals to outline and create individualized treatment plans with more specific objectives.

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