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Cross-Cultural Adaptation, Validation and Reliability of the Turkish Version of the Child's Challenging Behaviour Scale 2

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ABSTRACT

Objective: The Child's Challenging Behaviour Scale 2 (CCBS-2) is a scale designed for mothers of school-age children with disabilities between the ages of 5 and 18 and evaluates the child's challenging behaviours. This study was carried out to conduct the Turkish cross-cultural adaptation, validity, and reliability of CCBS-2. **Materials and Methods:** One hundred thirty-eight mothers of disabled children were included in this study. The Child's Challenging Behaviour Scale-2 Turkish version (CCBS-2-TR) was administered to mothers twice with an interval of 7 days. Internal consistency of CCBS-2-TR was assessed with Cronbach's Alpha coefficient. In addition, test–retest reliability was analysed using intra-class correlation coefficient (ICC). Confirmatory factor analysis was performed to evaluate the construct validity. **Results:** A total of 138 mothers (38.6±6.8 years) and their children (9.8±4.7 years) were included in this study. Cronbach's Alpha value of the scale was 0.73, demonstrating that this value has good internal consistency. Test–retest reliability was found as (ICC) 0.930 (ICC 95% CI [0.903- 0.949]. As a result of the confirmatory factor analysis, CCBS-2-TR was found to be unidimensional. **Conclusion:** The Turkish version of the Child's Challenging Behaviour Scale-2 is reliable and valid scale for mothers with children with developmental disabilities. CCBS-2-TR was found to be a brief, well-targeted, and unidimensional scale and this scale can help researchers in determining the compulsive behaviors of children with disabilities on their mothers and caregivers.

Keywords: Behaviour, Disabled Children Mothers, Turkish Version, Reliability, Validity.

Çocuğun Zorlayıcı Davranış Ölçeği 2 Türkçe Versiyonunun Kültürler Arası Uyarlama, Geçerlilik ve Güvenirliği

ÖZ

Amaç: Çocuğun Zorlayıcı Davranış Ölçeği 2 (CCBS-2), okul çağındaki 5-18 yaş arası engelli çocukların anneleri için tasarlanmış ve çocuğun zorlayıcı davranışlarını değerlendiren bir ölçektir. Bu çalışma, CCBS-2'nin Türkiye'de kültürler arası adaptasyonunu, geçerliliğini ve güvenirliğini yapmak amacıyla yapılmıştır. **Gereç ve Yöntem:** Bu çalışmaya engelli çocuğu olan 138 anne dahil edildi. Çocuğun Zorlayıcı Davranış Ölçeği-2 Türkçe versiyonu (CCBS-2-TR) annelere 7 gün arayla iki kez uygulandı. CCBS-2-TR'nin iç tutarlılığı Cronbach's Alpha katsayısı ile değerlendirildi. Ayrıca sınıf içi korelasyon katsayısı (ICC) kullanılarak test-tekrar test güvenilirliği analiz edildi. Yapı geçerliliğini değerlendirmek için doğrulayıcı faktör analizi yapıldı. **Bulgular:** Çalışmaya toplam 138 anne (38.6±6.8 yıl) ve çocukları (9.8±4.7 yıl) dahil edildi. Ölçeğin Cronbach's Alpha değerinin 0.73 olması bu değerin iyi bir iç tutarlılığa sahip olduğunu göstermektedir. Test-tekrar test güvenirliği (ICC) 0.930 (ICC %95 GA [0.903-0.949] olarak bulundu. Doğrulayıcı faktör analizi sonucunda CCBS-2-TR'nin tek boyutlu olduğu görüldü. **Sonuç:** Çocuğun Zorlayıcı Davranış Ölçeği-2'nin Türkçe versiyonu, gelişimsel engeli olan çocuğa sahip anneler için geçerli ve güvenilir bir ölçektir. CCBS-2-TR'nin kısa, iyi hedeflenmiş ve tek boyutlu bir ölçek olduğu ve bu ölçeğin araştırmacılara ve klinisyenlere engelli çocukların anneleri ve bakımverenler üzerindeki zorlayıcı davranışlarının belirlenmesinde yardımcı olacaktır.

Anahtar Kelimeler: Davranış, Engelli Çocuk Annesi, Türkçe Versiyon, Güvenilirlik, Geçerlilik.

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INTRODUCTION

Behavior is an individual's method of expressing himself in various forms (Bourke- Taylor at al., 2014). The appropriateness of behavior may vary in accordance with the context and environment. In children, some behaviors such as playing with toys and talking rudely are acceptable in the family, but not in the school environment. However, some behaviors are not universally accepted. For example, passive behaviors like non-compliance, withdrawal, avoidance, inattention, and lack of response are obstacles to participating in social life. Also, active behaviors like direct refusal to engage, opposition, aggression toward people, property are disruptive and impede occupational performance and participation. Both active and passive behaviors may be challenging to be handled primarily those with few experiences in treating children with challenging behavior (Sabri & Wahab, 2020).

All children may be affected by challenging behavior at some time in their lives. It is parts and parcels of grown-up. However, special attention is needed when behaviors are leading to impede occupational participation and increase the risk of injury to children or others. In addition, challenging behaviors were more prominently reported in children with disabilities such as in Cerebral Palsy, Autism Spectrum Disorder (ASD), genetic syndromes, Mental Retardation (MR) and Learning Disabilities (Butcher et al. 2008, Tomanik et al. 2004, Hartley, Sikora & McCoy, 2008, Arron et al. 2011, Rzepecka et al., 2011).

Challenging behaviors displayed by a child with a disability may increase the stress of families especcialy mothers and professionals. Mothers of child with a disability have difficulties in participating in social life, work and taking care of other children (Bourke-Taylor et al., 2010). Studies have shown that families of children with disabilities experience socio-economic difficulties due to the situation of taking care of the child and being behind in business life (Raina et al. 2005). In addition, studies have shown that the physical and mental health of families is negatively affected and the risk of anxiety, maternal stress and depression increases (Montes & Halterman 2007). In this sense, determining the challenging behaviors of children with disabilities and the management of these behaviors are important for both children's health and caregivers health. With early detection, rapid adaptation and social participation of families may provide economic relief (Bourke-Taylor et al., 2010). There are many methods for evaluating behavior process management. Some of these were developed by Turkish researchers for example The Child Behaviour Evaluation Scale (73 items) (Sübaşi & Şehirli, 2018) and some of them were translated into the Turkish language for example Child Behaviour Scale (59 items) (Ergene et al. 2018), Child Behavior Rating Scale (17 items) (Sezgin & Demiriz, 2016). However, these scales were mostly created to assess the behaviors of healthy children. In addition, the number of items is partially higher than The Child's Challenging Behaviour Scale 2 (CCBS). CCBS may be considered more advantageous than other scales because it is short and allows to be evaluated directly from the eyes of the primary caregiver.

In this study, we translated the original CCBS-2 into Turkish and examined its reliability, construct validity in a Turkish disabled children sample to determine whether it may be used as a tool for the measurement of challenging behavior of disabled children.

MATERIALS AND METHODS

Study type

This study is a methodological study.

Participants

One hundred thirty-eight mothers of children who received physiotherapy in a rehabilitation center were included in this study. Written informed consent was obtained from all subjects.

Inclusion criteria were;

- Having a disabled child between the ages of 5-18
- Mother should be the primary caregiver of child diagnosed with neuro-developmental disability.
- The absence of another disabled child in need of care.
- Mother should live in the same house with the disabled child.
- Exclusion criteria were;
- Mothers who cannot speak and understand Turkish,
- Caring for more than one disabled child.

Data tools

Child's Challenging Behaviour Scale (CCBS)-2: Child's Challenging Behaviour Scale (CCBS)-2 is a psychometric tool that provides clinicians with a new tool to assess a mother's school-age child's behaviors related to the challenging and reduced maternal mental health and care capacity, and to their behavior. CCBS-2 helps professionals identify mothers and family situations in need of further support and intervention. CCBS-2 is designed for mothers of school-age disabled children aged 5-18. Each item is evaluated using a 4-point Likert scale (1=strongly agree, 2=agree, 3=disagree, 4=strongly disagree). Before scoring, two items should be reverse scored (Item 2: My child aggravates the others; Item 5: My child can be stubborn and unable to uncooperative). This means that it has a value of 4=1; 3=2; 2=3; 1=4. After reversing these two scale items, the total score of the CCBS-2 is calculated by adding up scores with possible scores ranging from 9 to 36. Higher scores in CCBS-2 indicate that the child exhibits more challenging behaviors (Bourke-Taylor at al. 2014).

Translation and cross-cultural adaptation study

The cultural adaptation process of the questionnaire was applied using the guideline developed by Beaton, Bombardier, Guillemin and Ferraz (Beaton et al. 2000).

Two translators, who are Turkish but know English very well, translated the questionnaire (T1 and T2 translators). One of the translators was a physical therapist and was aware of the study. The other was not a health professional and had no knowledge of the study.The translation was first translated from English to Turkish by two native speakers of Turkish (T1 and T2 translators), but who also wrote and spoke very well English. These two Turkish translations were combined in a meeting with physiotherapists by agreed decision (T-12). The two bilingual English-speaking translators translated the T12 version from Turkish to English (B1 and B2). After that, B1 and B2 were sent back to Prof Bourke-Taylor. The pre-final version of the questionnaire was determined after the second meeting.The pre-final version was done to ensure that the latest version still provides linguistic equivalence. The pre-final version was done with the mother of thirty neuro-developmentally disabled children. The acceptability and comprehensibility of the translation were examined by taking into account the notes obtained as a result of the interviews made by the translators and physiotherapists and the answers given by the mothers who participated the pre- final version. According to these various several changes have been made during the pre-final version development. The cultural adaptation of "my child does not mind" in question four in the scale as "çocuğum sorun etmez" was translated into Turkish. Later, the word 'uncooperative' in the fifth question was translated into Turkish and its cultural adaptation was made as 'istenileni yapamayabilir'. In the translation of the word "routine" in the eighth and ninth questions in the scale into Turkish, its cultural adaptation was made as "alışılagelmiş". No conflicts were encountered in the pre-final version.

Following the pilot testing, CCBS-2 was administrated to 138 mothers. Demographic and clinical data were obtained from all mothers through an interview.

Statistical analysis

IBM SPSS for Windows Version 23.0 and AMOS version 20.0 were used for statistical analysis. Continuous variables were presented as mean ± standard deviations and categorical variables as percentages. The sample size, as recommended, was determined to be a minimum of ten-fold participants per item (Tonga et al. 2015)

Reliability

Internal consistency of CCBS-2-TR was evaluated by Cronbach alpha coefficient. In addition, test-retest reliability was analysed using the intra-class correlation coefficient (ICC; one-way random) (Shrout and Fleiss 1979) Accordingly, CCBS-2 Turkish version was administered to the same participants (138 mothers) 7 days after the first evaluation. The standard error of measurement (SEM, formula: SDtest 1 × (1−ICC)1/2) and minimal detectable change (MDC95, formula: SEM × 1.96 × 21/2) were also calculated.

Validation study-construct validity

Confirmatory factor analysis was applied to confirm unidimensionality of scale. We expected a best-fit model with the following indices: a Satorra–Bentler scaled chi-square (S-Bχ2)/ degrees of freedom ratio (CMIN/DF) of ≤2.0; a Trucker Lewis index (TLI) of ≥0.90; a comparative fit index (CFI) of ≥0.90; a goodness-of-fit index (GFI) of ≥0.90; an adjusted goodness-of-fit index (AGFI) of ≥0.90; a Normed Fit Index (NFI) of ≥0.90 and a low Root Mean Square Error of Approximation (RMSEA) of ≤0.08.

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Ethical considerations

Before starting the translation study, necessary permissions were obtained from Prof Helen Bourke-Taylor via e-mail. This study was approved by the Pamukkale University Clinical Research Medical Ethics Committee with the decision of numbered 41766.

RESULTS

A total of 138 mothers (38.6±6.8 years) and their 138 children (9.8±4.7 years, 56 female) were included in this study. Most of the mothers were housewife (79.7%). 53.6% of mothers take care of their children alone. Besides, 53.6% of the children were cerebral palsy. The socio-demographic and physical characteristics of the mothers and children are given in the Table 1 and Table 2. Cronbach's alpha value of the scale was found as 0.736. Test–retest reliability was found as (ICC) 0.930 (ICC 95% CI [0.903, 0.949]. SEM and MDC of CCBS-2 values were 1.309 and 3.628, respectively. Adjusted item-total correlation and Cronbach alpha values when item deleted were given in Table 3. Cronbach alpha values when item deleted were ranged between 0.687 to 0.747.

Validity

Confirmatory factor analysis was performed to show compatibility with a single factor structure (Figure 1). Since the fit indices were suitable (cmin/df: 1.405, RMSEA: 0.054, AGFI: 0.910, GFI: 0.952, CFI: 0.961, TLI: 0.942, NFI: 0.883), it was decided that it fit the single factor structure (unidimensional).

Table 1. Descriptive statistics of mothers (n=138).

		Mean±SD	**Min-Max**
Age (yrs)		38.6±6.8	23 – 60
Height (cm)		162.5±6.3	147 – 181
Weight (kg)		69.1±11.0	45 – 110
BMI (kg/m²)		26.3±4.5	17.6 – 41.9
Years of education (yrs)		8.5±3.8	1 – 16
		n	**%**
Marital status	Married, living with her husband	127	92.0
	Married, living separately from husband	4	2.9
	Divorced	5	3.6
	Single	2	1.4
Mother's work	Housewife	110	79.7
	Full-time work	17	12.3
	Part-time work	6	4.3
	Retired	5	3.6
Does anyone help with caring for the child	Yes	64	46.4
	No	74	53.6

SD=Standart deviation, **Min-Max**=Minimum-Maximum, **yrs=** years, **cm**=centimeter, **kg**=kilogram, **m²=** square metre.

Table 2. Descriptive statistics of children (n=138).

		Mean±SD	**Min-Max**
Age (yrs)		9.8±4.7	2 – 21
Height (cm)		125.7±27.4	45 – 180
Weight (kg)		33.8±17.8	9 – 88
BMI (kg/m²)		20.7±8.2	8.3 –39.1
		n	**%**
Gender	Male/ Female	82/56	59.4/40.6
Diagnosis	Cerebral palsy	74	53.6
	Down syndrome	6	4.3
	Autism	7	5.1
	Spina bifida	4	2.9
	Microcephaly	2	1.4
	Brachial plexus injury	10	7.2
	Immunodeficiency	1	.7
	Learning difficulties	21	15.2
	Rett syndrome	2	1.4
	Muscle diseases	9	6.5
	Others	2	1.4

SD=Standart deviation, **Min-Max**=Minimum-Maximum, **n=**number of sample, **%**=percent.

Table 3. Item analysis about CCBS-2 Turkish Version.

	Mean±SD	**Adjusted item-total correlation**	**Cronbach alpha when item deleted**
Item 1	2.2±1.0	0.526	0.691
Item 2	2.4±1.0	0.304	0.732
Item 3	1.9±1.0	0.459	0.704
Item 4	2.3±1.1	0.369	0.721
Item 5	2.9±1.0	0.209	0.747
Item 6	2.0±0.9	0.387	0.717
Item 7	1.7±0.8	0.382	0.718
Item 8	2.0±0.9	0.560	0.687
Item 9	2.2±0.9	0.554	0.688

SD: Standart deviation, Min-Max:Minimum-Maximum.

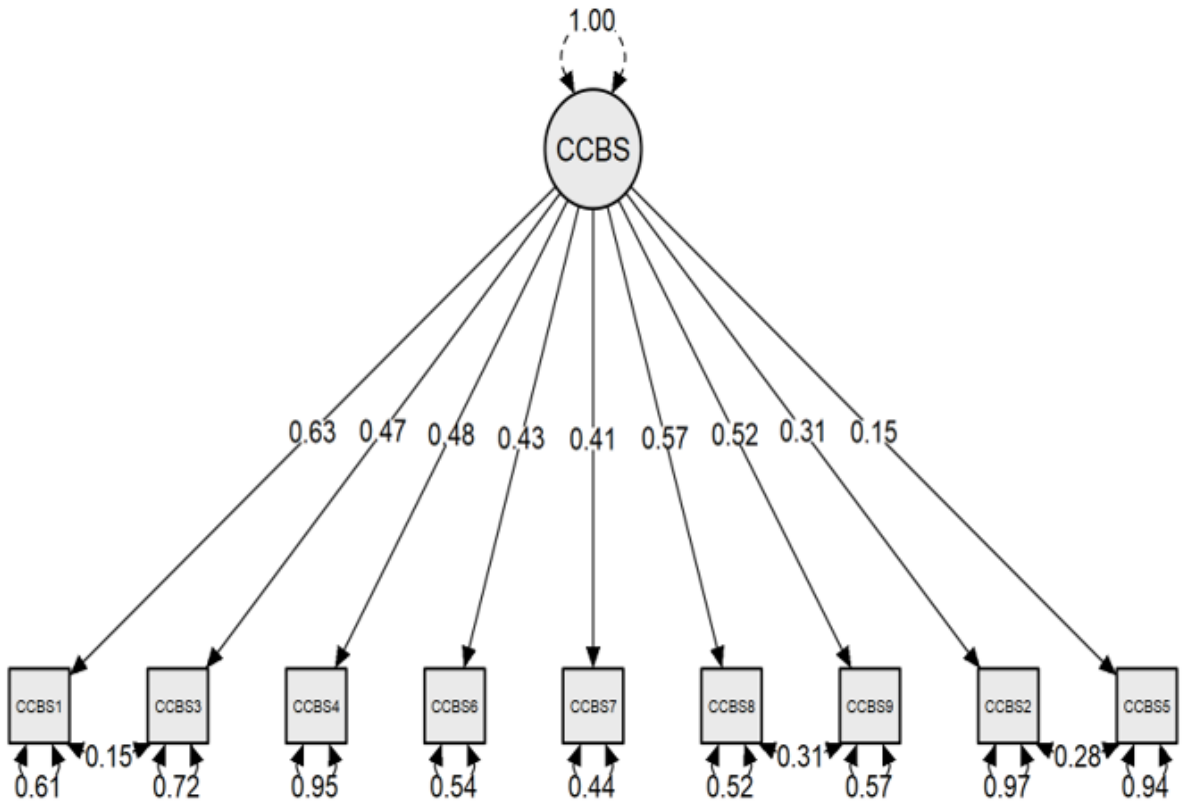

Figure 1. Single factor confirmatory factor model of CCBS-2 Turkish Version

DISCUSSION

This study was carried out to conduct the Turkish cross-cultural adaptation, validity and reliability of the Child's Challenging Behaviour Scale (CCBS)-2. Results obtained the study revealed that CCBS-2 was adapted in accordance with Turkish population and had sufficient psychometric validity and reliability.

CCBS is an assessment scale developed for mothers of school-age children with disabilities between the ages of 5 and 18. The CCBS is a psychometrically robust and brief scale designed to measure a mother's rating of the prevalence of challenging behavior exhibited by her disabled child. CCBS assists professionals in identifying mother and her family situations in need of further support and intervention (Bourke-Taylor et al., 2010). This study was conducted with the thought that adapting this scale, which evaluates mothers' attitudes towards their school-age children with disabilities, to the Turkish society will benefit both clinicians and mothers. In addition, the challenging behaviors of children with disabilities on mothers and caregivers will be determined and clinicians will be informed about the management of these behaviors by translating this questionnaire into Turkish. In our study, two different reliability analyses were performed, namely internal consistency reliability and test-retest reliability. In addition, construct validity was evaluated with confirmatory factor analysis.

In our study, Cronbach's alpha coefficient was used to assess the internal consistency of the scale. Internal consistency reliability indicates whether each item in a scale is correlated with each other and consistently aimed to assess the same topic (Terwee, 2007). Thanks to the good coefficient of internal consistency in CCBS-2 (>0.70), the scale items were found to measure mother's rating of the prevalence of challenging behavior exhibited by her disabled child reliably and consistently. Cronbach's alpha coefficient of the CCBS-2 total score was 0.736, and Cronbach's alpha values when item deleted were ranged between 0.687 to 0.747. To date, two additional validation studies have been carried out in addition to the development work of CCBS. The first psychometric evaluation of CCBS carried out with mothers of school-age disabled children, was conducted with 152 participants and showed quite good internal consistency (Cronbach's alpha: 0.89) (Bourke-Taylor et al. 2010). Then, with the Rasch analysis performed, 2 questions of CCBS were removed and CCBS-2, consisting of 9 items in total, was formed. This study was conducted with mothers with disabled children and the questionnaire showed good internal consistency (Person Separation Index: 0.84) (Bourke- Taylor at al., 2014). In addition, the psychometric properties of CCBS-2 were evaluated with 337 mothers of young, typically developing children. According to results of this psychometric evaluation, CCBS-2 showed good internal consistency (Cronbach's alpha: 0.77) (Bourke-

Taylor, 2019). Although the internal consistency coefficients of other studies are slightly higher than our study, they all have acceptable high consistency levels.

Test-retest reliability is an indispensable and important parameter for assessing the reliability of the patient-reported outcome measures. Test-retest reliability was carried out in intervals of 7 days according to internationally accepted recommendations (Beaton et al., 2000). The reproducibility of the CCBS-2's score was excellent (ICC: 0.93). It shows the reliability of the CCBS-2 in terms of whether it properly reflects the participant's actual status in repeated measurements conducted at different times (Terwee et al., 2007). None of the previous three studies about CCBS and CCBS-2 was presented the test-retest reliability (Bourke-Taylor et al. 2010, Bourke- Taylor at al. 2014, Terwee et al., 2007). Unlike other studies, investigation of test-retest reliability in our study and obtaining excellent reliability reveal the reliability of the questionnaire in Turkish society.

Because there was no equivalent scale with CCBS-2, factor analysis validity was used for construct validity in our study. Confirmatory factor analysis is used to explain the factor structure of the questionnaire (Harrington, 2009) Because of CCBS-2 is a scale that evaluates mother's rating of the prevalence of challenging behavior exhibited by her disabled child with a total score, it was expected to have a single factor structure. When the results were examined, all items were loaded on unidimensional, and it was shown that the CCBS-2 Turkish version was unidimensional. In the study conducted with Rasch analysis, CCBS was found to be multidimensionality and it was stated that CCBS-2, which was created by removing 2 items, was unidimensional (Bourke- Taylor at al., 2014). This study showed similar results to our study in terms of factor loadings.

Limitations and strengths of the study

The limitation of our study is that mothers with disabled children were included in general. Including more homogeneous cases (for example, mothers of children with cerebral palsy) would have provided better results specific to that group. Conducting validity and reliability studies specific to the disease can provide more comprehensive information to the literature.

Similar to this questionnaire, which evaluates the challenging behaviors of the children of mothers with disabled children, the number of questionnaires valid for Turkish society is quite low. For this reason, it is important to adapt this scale to Turkish society. In addition to internal consistency and construct validity, conducted test-retest analysis is our strength in our study.

CONCLUSION

CCBS-2 Turkish version found to be valid and reliable for mothers with disabled children. CCBS-2 is a short, well-targeted, and unidimensional questionnaire that can be used by researchers and clinicians especially physiotherapists, in maternal health follow-up. The use of CCBS-2 can contribute to the literature in examining the effectiveness of interventions for the difficulties faced by mothers with disabled children.

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Conflict of Interest

The author declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Author Contributions

Plan, design: FY, EAT, SS, AD; **Material, methods and data collection:** SS, AD; **Data analysis and comments:** FY, EAT, SS, AD, SK; **Writing and corrections:** FY, EAT, SS, AD, SK.

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