Cadernos Brasileiros de Terapia Ocupacional
Brazilian Journal of Occupational Therapy

ISSN 2526-8910

Original Article

Translation, cross-cultural adaptation, and validation of the Developmental Coordination Disorder Daily Questionnaire (DCDDaily-Q) for the Brazilian context

Tradução, adaptação e validação do Developmental Coordenation Desorder Daily Questionnarie (DCDDaily-Q) *para o contexto brasileiro*

Tailine Lisboa[a], Jessica de Jesus Dutra Lopes[b], Erico Pereira Gomes Felden[b], Felipe Paschoal Leite Domingos Silva[b], Gabriel Vieira da Rosa[b], Thais Silva Beltrame[b]

[a]Pontifícia Universidade Católica do Paraná – PUCPR, Curitiba, PR, Brasil.
[b]Universidade do Estado de Santa Catarina – UDESC, Florianópolis, SC, Brasil.

How to cite: Lisboa, T., Lopes, J. J. D., Felden, E. P. G., Silva, F. P. L. D., Rosa, G. V., & Beltrame, T. S. (2025). Translation, cross-cultural adaptation, and validation of the Developmental Coordination Disorder Daily Questionnaire (DCDDaily-Q) for the Brazilian context. Cadernos Brasileiros de Terapia Ocupacional, 33, e4028. https://doi.org/10.1590/2526-8910.cto410540281

Abstract

Introduction: The Developmental Coordination Disorder Daily Questionnaire (DCDDaily-Q) is an instrument designed to assess the performance, participation, and acquisition of a wide range of activities of daily living (ADLs) in children with developmental coordination disorder (DCD). **Objective:** To conduct the cross-cultural adaptation and examine the reliability and construct validity of the DCDDaily-Q in Brazilian children aged six to eight years. **Method:** The validation process was conducted in six stages: translation, synthesis, back-translation, review by an expert committee, administration to the target population, and analysis of psychometric properties. In the final stage, a study was conducted with 263 children aged six to eight years, in which parents or guardians answered the questionnaire, allowing for the analysis of reliability (Cronbach's alpha) and construct validity (through confirmatory factor analysis). **Results:** The DCDDaily-Q showed good internal consistency in the performance ($\alpha = 0.876$), participation ($\alpha = 0.838$), and acquisition ($\alpha = 0.970$) scales of ADLs. Confirmatory factor analysis indicated that the Brazilian version of the DCDDaily-Q demonstrates adequate semantic and cultural equivalence with the original construct. However, to achieve satisfactory fit indices in the confirmatory model it was necessary to establish error covariance between some items in the performance and participation scales.

Received on Jan. 11, 2025; 1ª Revision on June 13, 2025; Accepted on Aug. 11, 2025.

Conclusion: The findings suggest that the Brazilian version of the DCDDaily-Q is a reliable and valid instrument for assessing the acquisition, participation, and performance of a wide variety of ADLs.

Keywords: Activities of Daily Living, Motor Skill Disorders, Validation Study.

Resumo

Introdução: O *Developmental Coordination Disorder Daily Questionnaire* (DCDDaily-Q) é um instrumento desenvolvido para avaliar o desempenho, a participação e a aquisição de uma ampla gama de atividades de vida diária (AVDs) por crianças com transtorno do desenvolvimento da coordenação (TDC). **Objetivo:** Adaptar transculturalmente e examinar a confiabilidade e a validade de construto do DCDDaily-Q em crianças brasileiras de seis a oito anos de idade. **Método:** O processo de validação do instrumento foi conduzido em seis etapas: tradução, síntese, retrotradução, revisão por comitê de especialistas, aplicação no público-alvo e análise das propriedades psicométricas. Na etapa final, foi realizado um estudo com 263 crianças entre seis e oito anos de idade, no qual os pais ou responsáveis responderam ao questionário, possibilitando a análise da confiabilidade (alfa de Cronbach) e da validade de construto (por meio de análise fatorial confirmatória). **Resultados:** O DCDDaily-Q apresentou boa consistência interna nas escalas de desempenho (alfa = 0,876), participação (alfa = 0,838) e aquisição (alfa = 0,970) de AVDs. A análise fatorial confirmatória indicou que a versão brasileira do DCDDaily-Q apresenta adequada equivalência semântica e cultural em relação ao construto original. No entanto, para alcançar índices de ajuste satisfatórios no modelo confirmatório, foi necessário estabelecer covariância de erro entre alguns itens nas escalas de desempenho e participação. **Conclusão:** Os resultados sugerem que a versão brasileira do DCDDaily-Q é uma medida confiável e válida para avaliar a aquisição, a participação e o desempenho em uma ampla variedade de AVDs.

Palavras-chave: Atividades Cotidianas, Transtorno do Desenvolvimento da Coordenação, Estudo de Validação.

Introduction

Developmental Coordination Disorder (DCD) is a neurological condition characterized by deficits in the acquisition and execution of coordinated motor skills (American Psychiatric Association, 2013). As a result, children with DCD experience participation restrictions and limitations in activities of daily living (ADLs) (Magalhães et al., 2011; American Psychiatric Association, 2013; Van der Linde et al., 2013).

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) (American Psychiatric Association, 2013), one of the diagnostic criteria for DCD is that deficits in motor skills cause a significant and persistent impact on age-appropriate everyday activities, negatively affecting academic performance, pre-vocational and vocational tasks, leisure activities, and play. Currently, questionnaires are used to assess this criterion, providing information on the child's performance in daily activities (Van der Linde et al., 2014). Despite the relevance of this information, there remains a need for a standardized and objective assessment that allows for a more comprehensive understanding of a child's ability to perform ADLs, considering functionality and

participation aspects (Blank et al., 2019; Martins et al., 2020; Delgado-Lobete et al., 2022; Huang et al., 2025).

The Developmental Coordination Disorder Daily Questionnaire (DCDDaily-Q) is a parent- or caregiver-reported instrument that provides a comprehensive assessment of ADLs in children aged five to eight years who have been diagnosed with or are suspected of having DCD. The development of this instrument considered ADLs as motor activities performed daily, with functional or meaningful purposes (Van der Linde et al., 2014). The DCDDaily-Q is based on the conceptual model of the International Classification of Functioning, Disability and Health (ICF) (World Health Organization, 2007), which defines ADLs according to the components "activity", related to the functional execution of a task or action, and "participation", referring to the child's active involvement in daily situations requiring motor skills, considering the social, environmental, and cultural contexts in which these activities occur (World Health Organization, 2007; Van der Linde et al., 2014).

The original version of the DCDDaily-Q demonstrated adequate psychometric properties, standing out as an effective tool for screening and assessing ADLs in 217 children aged five to eight years (Van der Linde et al., 2014). However, the instrument was developed for the Dutch population, and, to date, no studies have conducted its cross-cultural adaptation and validation in the Brazilian context. Therefore, the adaptation and validation of the DCDDaily-Q for Brazil will enable its application in future research and provide a useful tool to support interventions related to ADLs in children with DCD. This perspective reinforces the importance of considering the sociocultural and educational contexts in which assessment and intervention practices are developed (Díaz et al., 2024).

Additionally, validation studies of the original instrument did not present the psychometric properties of the participation and acquisition scales (Van der Linde et al., 2014; Delgado-Lobete et al., 2020; Dragoumanaki et al., 2021; Delgado-Lobete et al., 2022; Huang et al., 2025. Thus, this study aims to conduct the cross-cultural adaptation and examine the reliability and construct validity of the DCDDaily-Q in Brazilian children aged six to eight years.

Method

Research characterization

This is a validation study with a descriptive approach, following a normative survey design (Thomas et al., 2009). The objective was to conduct the cross-cultural adaptation and examine the reliability and construct validity of the DCDDaily-Q for the Brazilian context. To this end, the methodological recommendations of Beaton et al. (2000), Koller et al. (2012), and Mokkink et al. (2012) were followed, encompassing six stages. The study protocol was approved by the Research Ethics Committee of the State University of Santa Catarina under the protocol: CAAE 70599017.6.0000.0118.

DCDDaily-Q

Proposed by Van der Linde (2014), the DCDDaily-Q is a parent- or caregiver-reported instrument that assesses the performance, participation, and acquisition of ADLs in children

aged five to eight years. Developed in the Netherlands, it is available in Dutch and English. The English version was used in this study.

The questionnaire includes 23 activities considered essential and challenging for children with DCD, organized into three domains: self-care and self-maintenance, school productivity, and leisure and play. Each item consists of a definition of the activity and a detailed description of the expected performance. The questionnaire is completed by parents or caregivers, who assess children across three scales: performance, participation, and acquisition of ADLs.

In the performance scale, caregivers rate the quality of the child's execution of the activity on a three-point scale: 1 = well; 2 = sometimes well, sometimes not; 3 = not very well or poorly most of the time. The total score ranges from 23 to 69, with lower scores indicating better performance. The participation scale measures how often the child engages in the activities, with responses ranging from: regularly (1), sometimes (2), seldom (3), and never (4). The total score ranges from 23 to 92 points; higher scores indicate lower participation frequency. The acquisition scale assesses whether parents perceive that their child needed more time to learn a specific activity compared with other children of the same age. The response options are: 0 = did not need more time; 1 = needed more time.

In the original psychometric validation study (Van der Linde et al., 2014), the DCDDaily-Q demonstrated good internal consistency (α>0.800) across the 23 items. Exploratory factor analysis identified three factors: items 1–10 (self-care and maintenance), items 11–17 (fine motor skills), and items 18–23 (gross motor skills), corresponding to the three original domains.

Cross-cultural adaptation

The cross-cultural adaptation process involved six stages, five of which were related to the equivalence process and one to the psychometric analyses of the instrument (Beaton et al., 2000; Koller et al., 2012).

Stage 1 – independent translation

The instrument was first translated into Brazilian Portuguese by two native Portuguese speakers with academic backgrounds and professional experience in the health field. As a result, two different versions of the instrument were created: T1 and T2.

Stage 2 – synthesis

After producing the two independent versions, the translators met to synthesize the translations, resulting in a single version named T1+2.

Stage 3 – back-translation

The T1+2 version was given to a third translator, a native English speaker, who back-translated it into English, generating version TR. This version was compared

with the original instrument. The third translator and the researchers then compared the original DCDDaily-Q with versions T1+2 and TR, producing the final Portuguese version (T3).

Stage 4 – expert committee review

Version T3 was submitted to a committee composed of seven specialists, all PhD holders in the field of motor behavior, to assess content validity and the instrument's suitability for the Brazilian population. The experts evaluated the clarity of the instrument's items (1 = not clear, 2 = slightly clear, 3 = clear, 4 = very clear) and their practical relevance (1 = not relevant or representative, 2 = item requiring major revision to be representative, 3 = item requiring minor revision to be representative, 4 = relevant or representative item).

Based on the criteria for clarity and relevance, consensus among experts was established through the analysis of score reliability and the qualitative evaluation of their reports. At this stage, the instrument's authors maintained direct contact with the committee, which enabled the consensual development of version T4, ensuring the cultural equivalence of the DCDDaily-Q for the Brazilian context.

Stage 5 – testing with the target population

The revised questionnaire (T4) was tested with a convenience sample composed of five mothers of children aged six to eight years, from different regions and with diverse educational and occupational backgrounds. The administration followed an individual interview debriefing model. This preliminary stage was conducted as part of the intercultural adaptation process to identify potential misunderstandings, conceptual gaps, and inconsistent interpretations by respondents.

Stage 6 – construct validation

Construct validation was performed through item reliability analysis and exploratory and confirmatory factor analyses for the performance, participation, and acquisition scales of ADLs. The complete instrument was administered to a stratified random sample of 263 children, following the recommendations of Hair et al. (2010), who suggest a minimum of 100 to 200 participants for reliability analyses.

The sample consisted of children aged six to eight years, regularly enrolled in public schools in the municipality of Balneário Camboriú, state of Santa Catarina. Participation required the submission of a signed Assent Form (TA) by the child and an Informed Consent Form (TCLE) by their parents or guardians, as well as proper completion of the questionnaire by the parents or caregivers. Children with a prior medical diagnosis of clinical conditions affecting motor or cognitive development—such as cerebral palsy, muscular dystrophy, intellectual disability, autism spectrum disorder, or hearing or visual impairments—were excluded from the study. These cases were identified through questionnaires, school records, and communication with teachers or the school administration.

The researchers personally distributed the questionnaires to the children along with an informational note for parents or guardians, indicating a specific date for return. The parents returned the questionnaires anonymously and voluntarily. The same researchers who distributed them collected the completed questionnaires through the administrative teams of the participating schools.

Statistical analysis

Simple descriptive statistics were used to describe the participants' characteristics and calculate the mean scores of the scale items. Subsequently, the reliability and internal consistency of the instrument were examined using Cronbach's alpha coefficient. Exploratory and confirmatory factor analyses were conducted to assess the validity of the instrument.

Model fit in the confirmatory factor analysis (CFA) was evaluated using the following indices: chi-square (χ^2), Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA). For the chi-square test, a nonsignificant *p*-value was considered ideal (Hu & Bentler, 1999). The cutoff point of 0.90 was adopted as the minimum acceptable value for both the CFI and TLI to indicate a satisfactory model fit, whereas RMSEA values between 0 and 0.08 were considered acceptable (Hu & Bentler, 1999).

All statistical analyses were performed using Microsoft Excel® and STATA® version 13.1.

Results

Cross-cultural adaptation

During the evaluation of conceptual, item, and semantic equivalence, both translators reported that the items of the DCDDaily-Q were easy to understand and translate. The main discrepancies found between the translated versions were related to words or expressions with similar meanings in Brazilian Portuguese, such as the terms "*desempenho*" and "*performance*."

In the expert review stage, moderate agreement was observed regarding the item clarity (Fleiss' Kappa = 0.45; 95% CI = 0.34–0.55) and substantial agreement regarding practical relevance (Fleiss' Kappa = 0.63; 95% CI = 0.50–0.76). The item-by-item concordance analysis revealed considerable variation in the indices, as presented in Table 1.

To ensure the cultural equivalence of the instrument, certain terms and expressions were adapted to make them more appropriate to the Brazilian context and target population. Examples of these changes include replacing "spreading butter on a sandwich" with "spreading butter on bread" and "serving juice" with "pouring water from a bottle into a glass"; these changes aimed to improve the clarity of task descriptions. Adjustments were also made to the instructions for use and interpretation of the questionnaire to facilitate completion by respondents.

Table 1. Agreement among experts regarding clarity and relevance of the DCDDaily-Q items.

Instrument items	Clarity		Relevance	
	Mean / SD	Kappa	Mean / SD	Kappa
Item 1	3.86 (0.38)	0.62	3.57 (0.79)	0.30
Item 2	3.86 (0.38)	0.62	3.57 (0.79)	0.30
Item 3	3.57 (0.79)	0.30	3.71 (0.49)	0.37
Item 4	3.71 (0.75)	0.62	3.86 (0.38)	0.62
Item 5	3.71 (0.75)	0.37	4.00 (0.00)	1.00
Item 6	3.86 (0.38)	0.62	3.86 (0.38)	0.62
Item 7	4.00 (0.00)	1.00	4.00 (0.00)	1.00
Item 8	4.00 (0.00)	0.37	4.00 (0.00)	1.00
Item 9	3.71 (0.48)	0.37	3.86 (0.38)	0.62
Item 10	3.14 (1.07)	0.24	3.71 (0.49)	0.37
Item 11	3.86 (0.38)	0.62	4.00 (0.00)	1.00
Item 12	3.43 (0.53)	0.24	3.57 (0.79)	0.24
Item 13	3.86 (0.38)	0.62	3.86 (0.38)	0.62
Item 14	3.86 (0.38)	0.62	4.00 (0.00)	1.00
Item 15	3.43 (0.53)	0.24	4.00 (0.00)	1.00
Item 16	3.43 (0.53)	0.24	3.43 (0.79)	0.11
Item 17	3.29 (0.75)	0.05	3.71 (0.49)	0.37
Item 18	3.86 (0.38)	0.62	3.86 (0.38)	0.62
Item 19	3.57 (0.53)	0.24	3.86 (0.38)	0.62
Item 20	3.29 (0.95)	0.11	3.86 (0.38)	1.00
Item 21	3.43 (0.53)	0.24	3.86 (0.38)	0.62
Item 22	3.83 (0.40)	0.37	4.00 (0.00)	1.00
Item 23	3.83 (0.40)	0.37	3.16 (0.75)	0.11

SD = standard deviation.

In the stage involving the target population, all participants considered the items easy to understand and the instructions clear. Only one participant reported difficulty assessing the quality of performance in item 23 ("playing marbles"), stating that her child did not usually engage in that activity. However, after discussion among the researchers, it was decided to retain the original wording of the item to preserve the instrument's structure. Therefore, the final stage of the cross-cultural adaptation did not lead to further modifications in the Brazilian version of the DCDDaily-Q.

Psychometric properties

In the ADL performance scale, the DCDDaily-Q showed good internal consistency, with the following Cronbach's alpha coefficients: general scale (0.876) and the domains of self-care (α=0.792), fine motor skills (α=0.736), and gross motor skills (α=0.737). However, regarding the construct validity of the Brazilian DCDDaily-Q, the model fit indices did not reach satisfactory values, indicating inadequate fit (Table 2).

Table 2. Fit indices of the performance, participation, and acquisition models of ADLs assessed using the DCDDaily-Q.

Models	X^2 (df)	X^2/df	CFI	TLI	RMSEA	SRMR
Performance in ADLs						
Initial model	426.434 (227)	1.88	0.859	0.842	0.059	0.060
Final model	338.382(223)	1.52	0.918	0.907	0.045	0.054
Participation in ADLs						
Initial model	596.909 (227)	2.63	0.750	0.721	0.080	0.076
Final model	324.910 (206)	1.57	0.920	0.901	0.048	0.055
Acquisition of ADLs						
Initial model	585.163(227)	2.58	0.929	0.921	0.080	0.038

Given these results, the performance scale of the DCDDaily-Q was refined using modification index (MI) analysis to identify potential sources of model misspecification. Error covariances were established between the following item pairs: 21–22 (MI=24.277), 16–17 (MI=21.451), 6–8 (MI=20.800), and 3–4 (MI=20.372) (Figure 1). After these modifications, the model fit indices indicated a more parsimonious version of the scale, with acceptable values (Table 2).

In the ADL participation scale, the DCDDaily-Q also presented good internal consistency, with Cronbach's alpha of 0.838 for the general scale and 0.687, 0.751, and 0.748 for the domains of self-care, fine motor skills, and gross motor skills, respectively. However, as in the performance scale, the initial confirmatory model fit indices were unsatisfactory (Table 2).

To address this issue, error covariances were established between the following item pairs: 21–22 (MI=43.346), 6–8 (MI=34.085), 1–2 (MI=31.940), 16–17 (MI=24.056), 7–10 (MI=20.213), 18–19 (MI=18.711), 14–15 (MI=18.615), 18–19 (MI=18.457), 19–21 (MI=9.152), 12–13 (MI=7.868), 1–3 (MI=5.920), 1–10 (MI=6.134), 1–7 (MI=8.491), 13–14 (MI=5.547), 20–22 (MI=5.251), 20–21 (MI=4.873), 3–5 (MI=4.331), 7–8 (MI=4.215), 11–17 (MI=4.162), 12–15 (MI=5.022), 12–14 (MI=8.501), and 11–14 (MI=4.225). After these modifications, the confirmatory model fit indices improved significantly, resulting in a more parsimonious version of the participation scale (Figure 2; Table 2).

In the ADL acquisition scale, the DCDDaily-Q demonstrated excellent internal consistency, with Cronbach's alpha of 0.970 for the general scale and 0.955, 0.921, and 0.891 for the domains of self-care, fine motor skills, and gross motor skills, respectively. Unlike in the other scales, the confirmatory factor analysis indicated satisfactory model fit indices for the original model (Table 2), with no additional modifications required (Figure 3).

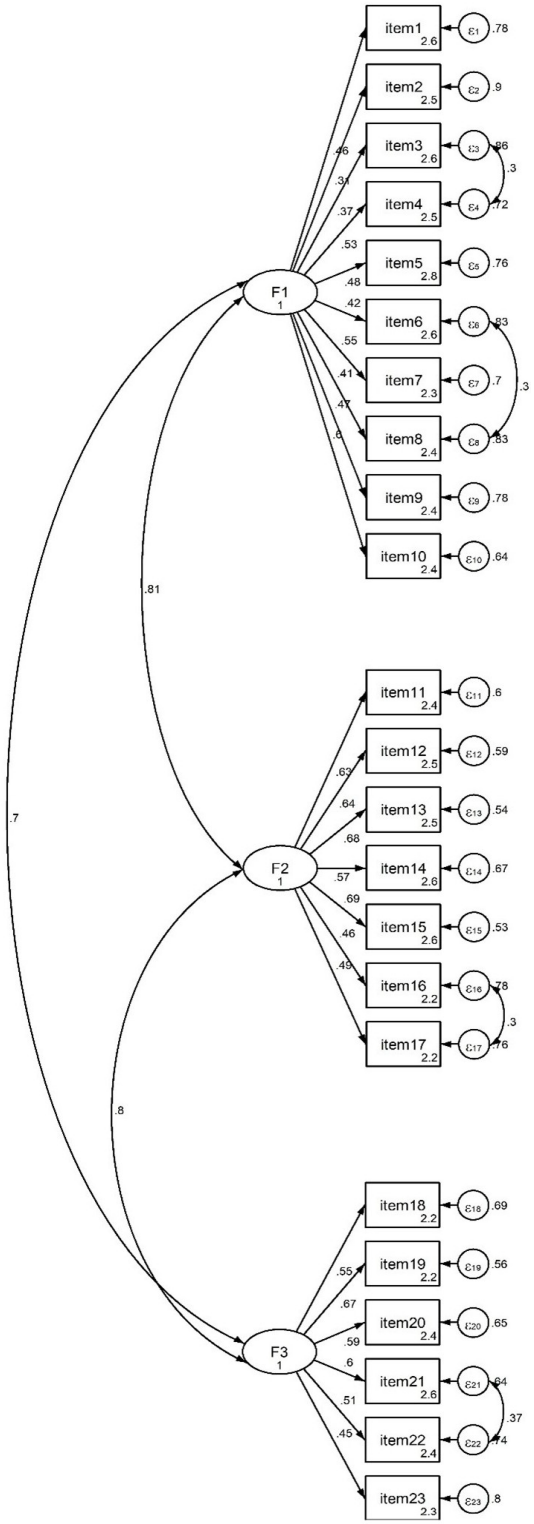

Figure 1. *Confirmatory factor analysis of the final performance model for ADLs in the Brazilian version of the DCDDaily-Q. F1 – self-care; F2 – fine motor; F3 – gross motor; E – error.*

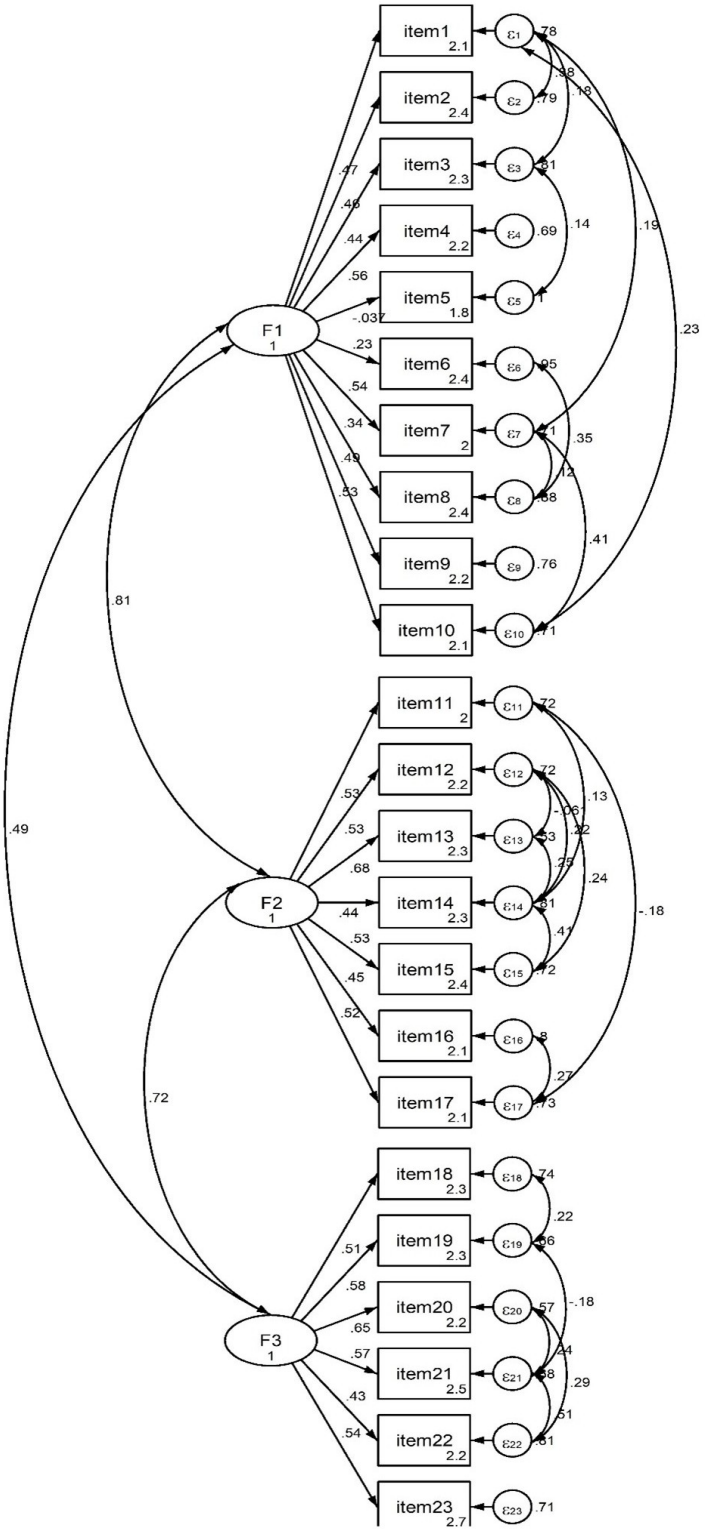

Figure 2. Confirmatory factor analysis of the final participation model for ADLs in the Brazilian version of the DCDDaily-Q.*F1 – self-care; F2 – fine motor; F3 – gross motor; E – error.*

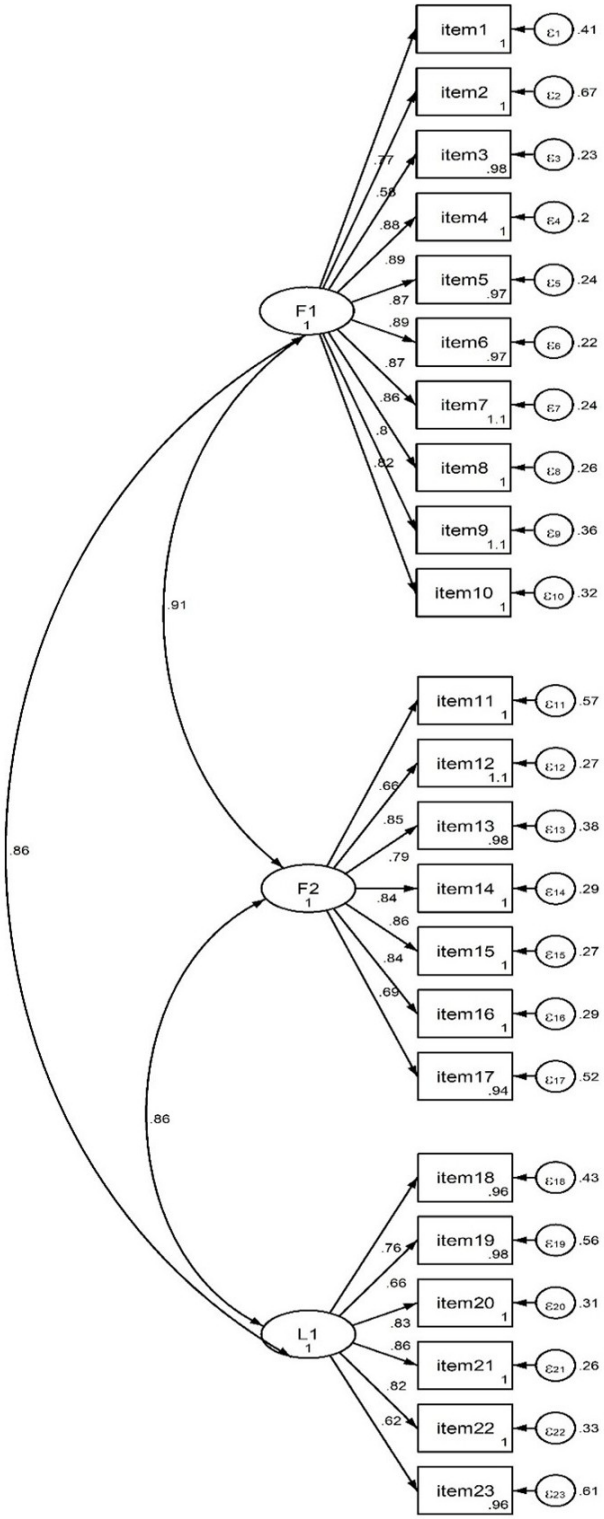

Figure 3. Confirmatory factor analysis of the final acquisition model for ADLs in the Brazilian version of the DCDDaily-Q. *F1 – self-care; F2 – fine motor; F3 – gross motor; E – error.*

Discussion

Cross-cultural adaptation

This study aimed to conduct the cross-cultural adaptation and examine the reliability and construct validity of the DCDDaily-Q in Brazilian children aged six to eight years. One of the essential steps of this process was the translation of the instrument and its adaptation to the Brazilian context. At this stage, the main concern was to ensure that the items were understandable for the target population. To this end, translators with prior knowledge of the instrument's subject matter were selected, as recommended by Beaton et al. (2000), which was essential to guarantee semantic equivalence. After the initial translation, only minor adjustments were required, as the items already showed clarity and good interpretability.

In the expert committee review, semantic and conceptual aspects were analyzed, resulting in a final version of the questionnaire that was more appealing and culturally appropriate compared with the merely translated version. Targeted adjustments were implemented, such as adding complementary instructions and definitions related to the assessed activities. Among these changes, the inclusion of additional options for specific foods or objects and the addition of explanatory details to make the questions clearer are noteworthy, as recommended by Terwee et al. (2018) in the process of assessing content validity and cultural adaptation of instruments.

Although certain grammatical and conceptual modifications were necessary, overall, both the experts and the parents participating in the preliminary application stage reported that the Brazilian version of the DCDDaily-Q exhibited good coherence and clarity. The adaptations focused on making the activities more familiar to the Brazilian context without altering the original meaning of the items proposed in the instrument.

Regarding cultural equivalence, a low cultural variance was observed in the content of the DCDDaily-Q, indicating that the everyday activities included in the questionnaire are relevant and meaningful for children from different countries and cultural contexts. This finding aligns with the fact that the instrument was originally developed for Dutch children (Van der Linde et al., 2014) and has already demonstrated validity evidence in countries such as Greece (Dragoumanaki et al., 2021), Spain (Delgado-Lobete et al., 2020), and China (Huang et al., 2025). However, to the best of our knowledge, there are no studies reporting its application in Latin American countries. Therefore, by testing the psychometric properties of the Brazilian version of the DCDDaily-Q, this study contributes to validating the instrument in a new cultural context, expanding its international applicability.

Construct validity

The findings related to reliability and construct validity showed that the Brazilian version of the DCDDaily-Q performance scale is reliable. The instrument presented good internal consistency, with a high Cronbach's alpha for both the general scale and specific domains (Streiner, 2003). Similar results were obtained in other validation studies of the instrument: by Huang et al. (2025) for Chinese children, by Dragoumanaki et al. (2021) for Greek children, and by Delgado-Lobete et al. (2020) for Spanish children, with Cronbach's alpha values for the total scale of 0.917, 0.857, and 0.843, respectively.

These studies also reported alpha values above 0.700 for the three domains, self-care, fine motor skills, and gross motor skills, without the need to exclude any items.

Regarding the factor structure of the original instrument, Van der Linde et al. (2014) identified three factors through exploratory factor analysis. Items 1 to 10 formed the first factor, related to self-care and maintenance; items 11 to 17 composed the second factor, associated with fine motor skills; and items 18 to 23 formed the third factor, related to leisure and/or gross motor activities. These factors correspond to the domains widely referenced in the literature: "Self-care and maintenance," "School productivity," and "Leisure and play."

According to Van der Linde et al. (2014), the instrument's internal consistency was satisfactory across the 23 items and within each of the three factors, supporting its reliability. However, the original study used only exploratory factor analysis, whereas the present study also applied confirmatory factor analysis, as did Huang et al. (2025), allowing confirmation of the instrument's structure and obtaining a more parsimonious version with adequate fit indices.

To achieve these indices in the Brazilian version, modification indices (MI) were examined to identify sources of model misspecification, leading to the inclusion of error covariances between certain items. These correlations can be justified by the functional proximity between tasks. For instance, item 21 ("Catching a ball") showed an error correlation with item 22 ("Kicking a soccer ball"), and item 16 ("Building with Lego-type pieces") with item 17 ("Moving pieces on a board"). These associations reflect the simultaneous and interdependent nature of motor skill development (Gallahue et al., 2013).

Similarly, items such as "Washing and drying hands" (item 6) and "Brushing teeth" (item 8), classified within the self-care category, belong to the same functional category in the ICF, "Caring for body parts," indicating that these activities tend to be learned and performed concurrently (World Health Organization, 2007). The same rationale applies to the correlation between items 3 ("Pouring water from a bottle into a glass") and 4 ("Opening a package or wrapper"), as both actions are related to eating and drinking, requiring coordinated movements such as opening, pouring, and handling utensils (World Health Organization, 2007).

The ADL participation scale of the DCDDaily-Q was also found to be reliable, showing good internal consistency among items and satisfactory fit indices. However, additional adjustments were necessary in the confirmatory model, resulting in a more parsimonious version of the scale. The correlation between items may be attributed to the similarity in the way activities are performed or to the child's preferences, which may influence the development of specific interests and skills (Engel-Yeger & Hanna Kasis, 2010).

The ADL acquisition scale also demonstrated strong reliability and construct validity. Confirmatory factor analysis indicated good fit indices for the initial model, with no need for modifications. This result supports the notion that skill acquisition occurs through interaction with the environment and practice, enabling children to explore and learn. However, children with DCD tend to experience delays in this process, which negatively affects the development of the skills required to perform ADLs (American Psychiatric Association, 2013). This finding underscores the importance of the acquisition scale in measuring the effects of DCD on children's everyday lives.

Therefore, early identification of motor difficulties in everyday activities can assist health professionals in planning targeted interventions and preventing behavioral problems associated with DCD (Baldi et al., 2018). The DCDDaily-Q is an effective tool for investigating specific difficulties in children's ADLs, enabling assessment of how often they perform these activities and whether they experience delays compared to their peers (Van der Linde et al., 2015).

Limitations and considerations

Among the strengths of this study, the methodological rigor employed to ensure the cross-cultural equivalence of the DCDDaily-Q for Brazilian children stands out. The use of a stratified random sampling approach allowed for the selection of a more representative sample, balanced by sex and age group. Moreover, to the best of our knowledge, this is the first study to confirm the psychometric properties of the DCDDaily-Q across its three scales: ADL performance, ADL participation, and ADL acquisition.

Nevertheless, some limitations must be considered. Although the DCDDaily-Q was originally designed to assess children aged five to eight years, this study's sample included only children aged six to eight years. This decision was determined by the characteristics of the Brazilian educational system, which admits children into elementary school beginning at six years of age. As data collection occurred in June, all children in the sample had already reached that age. Including five-year-old children could have introduced bias, as they would have been enrolled in a different educational setting, with distinct demands regarding ADLs, which could have influenced the validation results.

Another limitation concerns the geographical distribution of participants, restricted to a city in southern Brazil with a high Human Development Index (HDI). This limitation constrains the generalization of the findings, given the socioeconomic and cultural diversity of the country. Therefore, it is recommended that future research expand the sample to include different regions of Brazil and children with various neurodevelopmental disorders.

It is also essential to consider environmental and psychosocial factors that may influence children's daily participation. Further studies should establish cutoff points and assess the sensitivity and specificity of the DCDDaily-Q in identifying children with DCD, which represents one of the main objectives of the instrument's original version.

Conclusion

The Brazilian version of the DCDDaily-Q was culturally adapted and demonstrated good reliability and construct validity. These findings reinforce the evidence that the DCDDaily-Q is an appropriate measure for assessing a wide range of activities related to performance, participation, and acquisition of ADLs in children.

To the best of our knowledge, this is the first study to examine the psychometric properties of the instrument across its three scales, enabling a more comprehensive approach to investigating ADLs in Brazilian children aged six to eight years.

Overall, the DCDDaily-Q is a free, easy-to-administer, and easy-to-interpret instrument that can be used by researchers and healthcare professionals to identify daily functional challenges faced by children. Based on this information, individualized and specific treatment goals can be established to promote full participation in everyday life.

References

American Psychiatric Association. (2013). *Manual diagnóstico e estatístico de transtornos mentais – DSM-5.* Porto Alegre: Artmed Editora.

Baldi, S., Caravale, B., & Presaghi, F. (2018). Daily motor characteristics in children with developmental coordination disorder and in children with specific learning disorder. *Dyslexia (Chichester, England)*, *24*(4), 380-390.

Beaton, D. A., Bombardier, C., Guillemin, F., & Ferraz, M. B. (2000). Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine*, *25*(24), 3186-3191.

Blank, R., Barnett, A. L., Cairney, J., Green, D., Kirby, A., Polatajko, H., Rosenblum, S., Smits-Engelsman, B., Sugden, D., Wilson, P., & Vinçon, S. (2019). International clinical practice recommendations on the definition, diagnosis, assessment, intervention, and psychosocial aspects of developmental coordination disorder. *Developmental Medicine and Child Neurology*, *61*(3), 242-285.

Delgado-Lobete, L., Montes-Montes, R., Van der Linde, B., & Schoemaker, M. M. (2020). Assessment of motor activities of daily living: spanish cross-cultural adaptation, reliability and construct validity of the DCDDaily-Q. *International Journal of Environmental Research and Public Health*, *17*(13), 1-13.

Delgado-Lobete, L., Montes-Montes, R., Pértega-Díaz, S., Santos-Del-Riego, S., Hartman, E., & Schoemaker, M. M. (2022). Motor performance and daily participation in children with and without probable developmental coordination disorder. *Developmental Medicine and Child Neurology*, *64*(2), 220-227.

Díaz, C. L., Parra-Esquivel, E., & Salazar Rivera, J. (2024). Terapia ocupacional en educación en Latinoamérica: un análisis desde la Comunidad de Práctica Terapia Ocupacional en Educación (TOE). *Cadernos Brasileiros de Terapia Ocupacional*, *32*(spe1), e3925.

Dragoumanaki, G., Patelarou, A., Vorgia, P., Sifaki-Pistolla, D., & Patelarou, E. (2021). Validation and translation of the Greek version of the "DCDDaily-Q-GR" questionnaire. *Health (Irvine, Calif.)*, *13*(11), 1222-1241.

Engel-Yeger, B., & Hanna Kasis, A. (2010). The relationship between Developmental Co-ordination Disorders, child's perceived self-efficacy and preference to participate in daily activities. *Child: Care, Health and Development*, *36*(5), 670-677. PMid:20412146. https://doi.org/10.1111/j.1365-2214.2010.01073.x.

Gallahue, D. L., Ozmun, J. C., & Goodway, J. D. (2013). *Compreendendo o desenvolvimento motor: bebês, crianças, adolescentes e adultos*. Porto Alegre: AMGH Editora.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). London: Pearson Prentice Hall.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*(1), 1-55.

Huang, M., Huang, W., Chen, Y., Zhou, C., Cao, J., Peng, K., & Liu, Q. (2025). Quality of instruments measuring activity and participation in children with developmental coordination disorder: a systematic review. *Annals of Physical and Rehabilitation Medicine*, *68*(1), 101889.

Koller, M., Kantzer, V., Mear, I., Zarzar, K., Martin, M., Greimel, E., Bottomley, A., Arnott, M., & Kuliś, D. (2012). The process of reconciliation: evaluation of guidelines for translating quality-of-life questionnaires. *Expert Review of Pharmacoeconomics & Outcomes Research*, *12*(2), 189-197.

Magalhães, L. C., Cardoso, A. A., & Missiuna, C. (2011). Activities and participation in children with developmental coordination disorder: a systematic review. *Research in Developmental Disabilities*, *32*(4), 1309-1316.

Martins, R., Lisboa, T., Lopes, J., & Beltrame, T. S. (2020). Concordância entre testes concorrentes para identificação de crianças com Transtorno do Desenvolvimento da Coordenação. *Cadernos Brasileiros de Terapia Ocupacional*, *28*(2), 500-510.

Mokkink, L. B., Terwee, C. B., Patrick, D. L., Alonso, J., Stratford, P. W., Knol, D. L., Bouter, L. M., & Vet, H. C. W. (2012). *COSMIN Checklist Manual.* Amsterdam: VU University Medical Center.

Streiner, D. L. (2003). Being inconsistent about consistency: when coefficient alpha does and doesn't matter. *Journal of Personality Assessment*, *80*(3), 217-222.

Terwee, C. B., Prinsen, C. A. C., Chiarotto, A., Westerman, M. J., Patrick, D. L., Alonso, J., Bouter, L. M., de Vet, H. C. W., & Mokkink, L. B. (2018). COSMIN methodology for evaluating the content validity of patient-reported outcome measures: a Delphi study. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation*, *27*(5), 1159-1170.

Thomas, J. R., Nelson, J. K., & Silverman, S. J. (2009). *Métodos de pesquisa em atividade física.* Porto Alegre: Artmed Editora.

Van der Linde, B. W., Van Netten, J. J., Otten, E., Postema, K., Geuze, R. H., & Schoemaker, M. M. (2013). A systematic review of instruments for assessment of capacity in activities of daily living in children with developmental coordination disorder. *Child: Care, Health and Development*, *41*(1), 23-34.

Van der Linde, B. W., Van Netten, J. J., Otten, B. E., Postema, K., Geuze, R. H., & Schoemaker, M. M. (2014). Psychometric properties of the DCDDaily-Q: a new parental questionnaire on children's performance in activities of daily living. *Research in Developmental Disabilities*, *35*(7), 1711-1719.

Van der Linde, B. W. (2014). *Daily functioning in children with developmental coordination disorder* (Doctoral thesis). University of Groningen, Groningen.

Van der Linde, B. W., Van Netten, J. J., Otten, B., Postema, K., Geuze, R. H., & Schoemaker, M. M. (2015). Activities of daily living in children with developmental coordination disorder: performance, learning, and participation. *Physical Therapy*, *95*(11), 1496-1506.

World Health Organization. (2007). *International classification of functioning, disability and health: ICF.* Retrieved in 2025, January 11, from https://www.who.int/standards/classifications/international-classification-of-functioning-disability-and-health

Author's Contributions

Tailine Lisboa: Conceptualization – Formulation or development of ideas, research goals, and overall aims; Investigation – Conducting the research process, including experiments and data or evidence collection; Methodology – Development or design of methodology and creation of models; Project administration – Responsibility for management, planning, and execution of the research activity; Validation – Verification of the general reproducibility or replication of results, experiments, and other research findings; Writing – review and editing; Preparation, creation, and/or presentation of the published work by the original research group, specifically critical analysis and revision. Jessica de Jesus Dutra Lopes: Writing – review and editing; Preparation, creation, and presentation of the

published work by the original research group, specifically critical analysis and revision; Data curation – Management of activities for annotating (producing metadata), cleaning and/or maintaining research data (including program codes when necessary for interpreting the data) for initial use and later reuse; Formal analysis – Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data; Project administration – Responsibility for management and coordination in the planning and execution of the research activity. Erico Pereira Gomes Felden: Conceptualization – Formulation or development of ideas, research goals, and overall aims; Methodology – Development or design of methodology and creation of models; Writing – review and editing; Preparation, creation, and/or presentation of the published work by the original research group, specifically critical analysis, commentary, or revision. Felipe Paschoal Leite Domingos Silva: Writing – review and editing; Preparation, creation, and presentation of the published work by the original research group, specifically critical analysis and revision; Investigation – Conducting the research process, including experiments and data or evidence collection; Formal analysis – Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data; Project administration – Execution of the research activity. Gabriel Vieira da Rosa: Investigation – Conducting the research process, including experiments and data or evidence collection; Methodology – Development or design of methodology and creation of models; Writing – review and editing; Preparation, creation, and/or presentation of the published work by the original research group, specifically critical analysis, commentary, or revision, including pre- or post-publication stages. Thais Silva Beltrame: Funding acquisition – Obtaining financial support for the project leading to this publication; Methodology – Development or design of methodology and creation of models; Project administration – Responsibility for management and coordination in the planning and execution of the research activity; Supervision – Leadership and oversight responsibility for the execution and planning of the research activity, including external mentorship for the core team; Writing – review and editing; Preparation, creation, and/or presentation of the published work by the original research group, specifically critical analysis, commentary, or revision, including pre- or post-publication stages. All authors have approved the final version of the manuscript.

Data availability

The data supporting the findings of this study are available from the corresponding author, upon request.

Corresponding author
Tailine Lisboa
e-mail: tai-lisboa@hotmail.com

Section editor
Prof. Iza Faria-Fortini