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# Translation, Adaptation, and Cross Language Validation of the Revised Version of Developmental Coordination Disorder Questionnaire'07 (DCDQ'07) in Urdu Language (DCDQ-UR)

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## Abstract

The current study analyses children with Developmental Coordination Disorder (DCD) who face difficulty in learning through physical activities. Such children find it more difficult while performing movement skills, learning new physical tasks, and applying self-help skills in their day to day life. These functional limitations at times lead towards the range of other psychological and emotional problems. The application of valid and reliable screening and diagnostic tool is a prerequisite to start appropriate rehabilitation services. The current study aims to translate and validate DCDQ'07 into Urdu language for Pakistani population in order to identify children with DCD. This step is especially taken because there is no screening tool available in Urdu language. So far children with DCD have severely been understudied in Pakistan. The current study was divided into two phases, preliminary and main studies. The preliminary phase revealed the process of translation and cross language validation of the scale. The main study was conducted on a sample of 70 children at risk of DCD to establish psychometric properties of DCDQ-UR. Results demonstrated the adequate test-retest reliability, significant inter-item correlation, item total correlation and item loading scores. The DCDQ-UR has proved to be a valid and reliable scale for screening of children with DCD in the age ranging from 5 to 15 years among Pakistani population.

**Keywords:** developmental coordination disorder (DCD), developmental coordination disorder questionnaire (DCDQ), reliability, validity

## Introduction

Neurodevelopmental disorders are the specific group of disorders which are explained in DSM. These disorders are characterized by impairments in the development of individuals including their cognitive functioning, behavior, communication, and motor functioning. However, these characteristics are

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attributable to atypical brain development (Dewey & Bernier, [2016](#)). DCD is also a neurodevelopmental disorder, affecting about 5 in every 100 individuals around the globe. Moreover, children and adults may exhibit poor motor coordination and comparatively perform low in their daily life activities. 30 to 70 % persistence of DCD has been observed for the adults who were diagnosed with DCD in childhood (Biotteau et al., [2019](#)). Also, it is believed to be the most common among all childhood disorders (Blank et al., [2012](#)). Though, it is considered the most common childhood movement disorder which displays a condition where children hardly outgrow. (Smits-Engelsman et al., [2018](#)) Yet, the etiology of the disorder is still not clear. The possible reasons behind it, may be related to the pathology of central nervous system. Initially, it was conceptualized as “minimal brain dysfunction” (MBD) but later, it was replaced with “minimal neurological dysfunction” (MND) (Zwicker et al., [2012](#)).

Since, children with DCD are prone to atypical brain development, the possible contributing factors may include lack of nutrition, genes, exposure to teratogens, movement experiences, and prenatal brain injury (Dewey & Bernier, [2016](#)). In this case, it is very important to understand that Children with DCD do not show such physical limitations due to any medical problem. There are also no deficiencies found in intelligence level of children with DCD (Zoia et al., [2006](#)). According to the current study, children suffering from DCD may exhibit limitations when it comes to their activity and participation in class (Magalhães et al., [2011](#)). Although, children with DCD are always at the risk of facing secondary consequences of this disorder. For instance, low self-esteem, depression, anxiety, and obesity are the most common secondary consequences present among children with DCD (Missiuna et al., [2007](#)). Furthermore, the related psychosocial and health issues are not limited to children only. Adults with DCD and those who are at the stake of developing DCD are also prone to such problems. Thus, high level of anxiety, low level of life-satisfaction, and personal wellbeing have been observed. It seconds the findings of large number of researches aimed at finding related physical and psychosocial health issues of children and adults with DCD (Kirby et al., [2013](#)).

Adults who were previously diagnosed with DCD are also likely to demonstrate mood impairments (Hill & Brown, [2013](#)). It is therefore conceptualized that the activity-oriented interventions are good for limiting the impact of DCD on motor competence and everyday life skills. Related

health issues should also be addressed and dealt that may arise in early or later life due to DCD. Along with motor interventions, goals for improving health related quality of life should also be designed (Smits-Engelsman, & Verbecque, 2022). When it comes to children with DCD, interventions are seemed to be designed more to serve the accommodation purpose rather than the treatment. These interventions are not framed to eradicate the causes of DCD but actually it facilitates the children with different ways and techniques to learn and perform motor tasks, efficiently (Caçola, 2014).

In the current study, all the following features contribute to assessment process of DCD. It includes, individual's medical and developmental history, clinical examination, interview, questionnaires, and motor skills test. Identification should involve tracing out performance level in activities of daily living, functioning in school tasks, and involvement in play or leisure activities (Blank et al., 2019). To screen population with a physical test is not only time consuming but also expensive. Implementing a parent-teacher questionnaire is far less time consuming, less expensive, and quite an efficient way of initial screening of children with DCD. Hence, results obtained from the questionnaire can later be confirmed through any relevant physical test (Caravale et al., 2014). Even then findings of the parent-teacher questionnaire can again be further validated and crosschecked by involving the children in any valid physical test which is designed to diagnose the children with DCD.

There are many questionnaires which are available for the initial screening of DCD. In other words, Little DCDQ, Developmental Coordination Disorder Questionnaire'07 (DCDQ'07), Movement Assessment Battery for Children Checklist (MABC Checklist), and children's own response is taken through Children Self-perception of Adequacy and Predilection for Physical Activity (CSAPPA). Among all sorts of feedbacks, parental response is much more valid than the teacher's response or self-response feedbacks. Beside, DCDQ'07 has been designed to take the parental response for screening of children with DCD. It has been cross-culturally adapted in many countries, for instance, Australia, Brazil, China, Japan, Germany, Italy, and Netherlands (Ray-Kaeser et al., 2019). Since, the DCDQ has basically been developed in English and thus far no Urdu version is available. Furthermore, the need for translating the tool in Urdu language and making cross-culture adaptations are direly required. Hence, this will not only make the questionnaire more understandable and

appropriate for Pakistani parents but also encourage the local researchers to pay heed towards discovering more about this disorder.

The current study has been divided into two phases namely; preliminary and the main study that is the translation of scale and determining the psychometric properties, respectively.

Objectives of the current study include:

1. To translate and validate the Developmental Coordination Disorder Questionnaire'07 into Urdu (National Language of Pakistan).
2. To analyze reliability and validity of Developmental Coordination Disorder Questionnaire Urdu Version (DCDQ-UR).

### **Methodology**

The current study was performed into two phases. Phase I comprised the translation and adaptation of DCDQ'07 into Urdu language. Whereas in Phase II, psychometric properties of the translated scale were determined. The simple back translation method was applied for translation and adaptation purpose. The entire translation and adaptation process comprised six main steps that included forward translation, committee approach, back translation, committee approach, reconciliation by first author, and pilot testing. Before the commencement of the process, permission of translation and cross-culture adaptation was taken from the primary author of DCDQ'07. Furthermore, an agreement was signed by the researcher for the fulfillment of procedural demands imposed by the primary author. Hence, author and the researcher remained in the continuous communication through email to complete the process in a professional and appropriate manner.

#### **Phase I: Standard Backward Translation Method was used**

##### ***Step 1: Forward Translation***

Four native language speakers who were fluent both in English and Urdu languages were recruited to translate original DCDQ'07 from English to Urdu language. It was ensured that the translators would not collaborate or communicate with one another during the translation process. Moreover, translators were requested to consider the aspects of compatibility, colloquial requirements, and conceptual equivalence of all items. They were also instructed to avoid word to word translation and were asked to focus

on overall concept of each item and integral theme of the questionnaire as a whole. They were also told not to use words with dual or vague meanings and words that are less common in day to day Urdu language. It was observed during the adaptation process that the idiom “*bull in the China shop*” (item 14 in original DCDQ’07) may not be replaced with any Urdu language idiom with same sense. Hence, it was described and replaced with simple words which parents could easily understand and respond to the each item, appropriately.

### ***Step 2: Committee Approach***

All four translations were deeply reviewed by the committee which involved research, language, and sports experts. Each item from all translations was read and variations among the translations were observed. In addition to it, vocabulary, syntax, and concepts were reviewed by the review committee. Besides, the most appropriate items, words, and expressions were selected for finalizing the English to Urdu translation process. Thus, Urdu translation was finalized and draft was completed with consensus of the committee.

### ***Step 3: Backward Translation***

Once the Urdu draft was completed, the three volunteers were recruited who had expertise in English language. However, they could speak and understand both Urdu and English languages very well. They were also instructed to translate the Urdu draft into English language without disturbing the overall theme and concept of each item. Later, few adaptations were made in items 2,3,12, and 14 (explained in discussion). Besides, review process and finalizing procedure was followed for the backward translation in the same way as it was followed for the forward translation. So, an English draft of DCDQ’07 was prepared after reviewing the three different translations.

### ***Step 4: Committee Approach***

A three member committee of bilingual experts was again formed who were not involved in any of the prior processes. Their expert opinion was sought in checking out achievement of the overall compatibility, comprehension, and conceptual similarities between the original and the translated items. Hence, slightest impression of vagueness was immediately addressed and eliminated. In this way, the clarity of understanding in each item was ensured.

### ***Step 5: Reconciliation by Author***

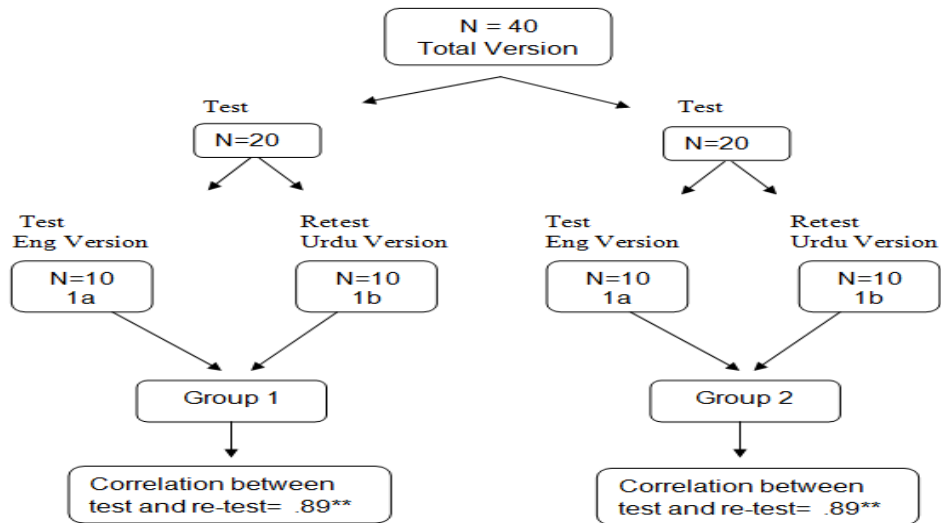
As per agreement was signed between the researcher and the primary author of DCDQ'07, final draft of backward translation was sent to the primary author for reconciliation. The author reviewed the backward translation and recommended few changes in the end. Thus, recommended changes were made to further refine the draft and were resent for approval. Hence, primary author approved the backward translation and allowed for proceeding forward.

### ***Step 6: Preliminary Testing with Parents***

The final Urdu version of DCDQ'07 was tested among 10 parents of the children who belonged to the age group of 6 to 15, for the clarity of items. They were asked to elaborate what they understood by each item. Their explanations were similar to what each item actually asks for. Most of the parents found it difficult to rate the questions as the rating captions were confusing. Later on, the matter was discussed with other researchers and language experts. After which, the issue was addressed efficiently by replacing the captions that best suited the understanding level of local parents. In the end, elimination of ambiguity was again ensured with the feedback of parents. The concern was shared with the author of DCDQ'07 and permission was sought for further necessary adaptations. So, the adapted rating captions were again approved by the primary author.

### ***Step 7: Cross Language Validation***

After finalizing the translated and adapted Urdu version of DCDQ'07, cross language validation was performed. A sample of 40 parents was involved in the validation process. They were provided with full freedom of filling or not filling the questionnaire. Further, they were divided into two equal groups (20 each), and were named as group A and group B. Group A was given original DCDQ'07, whereas, group B was given the translated version. After two weeks of gap, the questionnaires were distributed between both groups. The group A completed the translated version and group B completed the original DCDQ'07.

**Figure 1***Diagrammatic Representation of Total Sample***Phase II: Determination of Psychometric Properties of DCDQ-UR.*****Part 1: Instruments***

Developmental Coordination Disorder Questionnaire was originally developed by the Alberta Children's Hospital, Calgary, Canada in 1990s. After the few revisions, it was finally termed as DCDQ'07. The scale has been designed for diagnosing children with developmental coordination disorder of age group ranging from 5 to 15 years. It is a 15th item scale with 3 subscales covering the domains of control during movement, fine motor/handwriting, and general coordination. Since, the scale is originally developed in English language which needs an Urdu translation for an easy usage of Pakistani population.

**Scale Validation of DCDQ Urdu Version (DCDQ-UR)**

To conduct the current study, 100 parents of children with motor difficulties and who are at the risk of developing DCD were approached. They were also requested to participate in the validation process. They were given the translated version of DCDQ'07 that is DCDQ-UR. They were provided with the complete choice of whether to respond the questionnaire or not. Hence, 81 parents responded completely but 11 submitted the



incomplete forms. Therefore, the incomplete ones were not included in the current study. Thus, responses of 70 participants were computed for further testing and analysis.

### Data Analysis

Cronbach alpha reliability, test-retest reliability, and item-total correlations of both English and Urdu versions of DCDQ'07 were checked by using Statistical Package of Social Sciences (SPSS version 21).

### Results

To determine the reliability and validity of DCDQ-UR, data was analyzed by using Cronbach Alpha, test-retest reliability, inter-item correlations, item total correlation, and factor analysis. Analysis was done by utilizing Statistical Package of Social Sciences (SPSS version 21).

**Table 1**

*Cross Language and Test-retest Reliability of Developmental Coordination Disorder Questionnaire English and Urdu Versions*

| Groups | N  | 1 <sup>st</sup> Administration | 2 <sup>nd</sup> Administration | r     |
|--------|----|--------------------------------|--------------------------------|-------|
| I      | 15 | English                        | English                        | .85** |
| II     | 15 | English                        | Urdu                           | .86** |
| III    | 15 | Urdu                           | Urdu                           | .87** |
| IV     | 15 | Urdu                           | English                        | .86** |

*Note.* \*\* $p < .01$

Table 1 exhibits that the correlation between Developmental Coordination Disorder Questionnaire Urdu version (DCDQ-UR) and Developmental Coordination Disorder Questionnaire (DCDQ) English versions are significant ( $p < .01$ ). The correlation value ranges from .85 (English to English) to .87 (Urdu to Urdu).

**Table 2**

*Reliability Coefficient (Cronbach's a Coefficient) of the DCDQ-UR*

|         | Cronbach Alpha | Items |
|---------|----------------|-------|
| DCDQ-UR | .92            | 15    |
| CDM     | .89            | 06    |
| FMH     | .84            | 04    |
| GC      | .72            | 05    |

The internal consistency reliability was calculated by using Cronbach's alpha for both total DCDQ-UR and the subscales. Scores gained from Developmental Coordination Disorder Questionnaire Urdu version subscale: 1) control during movement = 0.89; 2) fine motor/handwriting= 0.894; and 3) general coordination= 0.72 respectively and the total DCDQ-UR was 0.92.

**Table 3**

*Correlation Matrix Across the Subscale and Total for DCDQ-UR (n=70)*

| Scales  | 1-CDM | 2-FMH   | 2-GC    | DCDQ-UR |
|---------|-------|---------|---------|---------|
| DCDQ-UR |       | 0.891** | 0.815** | 0.949** |
| CDM     | -     | -       | 0.609** | 0.764** |
| FMH     | -     | -       | -       | 0.719*  |
| GC      | -     | -       | -       | -       |

*Note.* \*\*  $p < 0.01$ . DCDQ-UR: Urdu Version of Developmental Coordination Disorder Questionnaire'07

Construct validity was determined by the total score on each subscale (control during movement, fine motor/handwriting, general coordination) which was correlated with all other subscales and also with the total score of DCDQ-UR. Pearson product moment method was applied to obtain correlation score. Thus, the results revealed the significance correlation between DCDQ-UR and all its subscales, such as control during movement ( $r = 0.89$ ,  $p < 0.001$ ), fine motor/handwriting ( $r = 0.81$ ,  $p < 0.001$ ) and general coordination ( $r = 0.95$ ,  $p < 0.001$ ). Table 3 also demonstrates the significant correlations found ( $p = 0.000$ ) across all three subscales and with the total DCDQ-UR score.

To establish an internal consistency with the scale, item total correlation was calculated (see Table 4). The significant correlation was demonstrated with total score of DCDQ-UR in Table 5. All items showed the significant correlation. The values of correlation coefficient ranged from .34 to .81 which met the standard inclusion criteria of an item in the scale that was .30 and above with the total. So, the findings demonstrated that all items had above .30 value and hence, established the reliability of the scale.

**Table 5**

*Inter-Item Correlation for DCDQ-UR (n=70)*

|     | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | 11     | 12     | 13     | 14   | 15   |
|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|------|
| 1.  | 1.00   |        |        |        |        |        |        |        |        |        |        |        |        |      |      |
| 2.  | .730** | 1.00   |        |        |        |        |        |        |        |        |        |        |        |      |      |
| 3.  | .639** | .703** | 1.00   |        |        |        |        |        |        |        |        |        |        |      |      |
| 4.  | .641** | .599** | .548** | 1.00   |        |        |        |        |        |        |        |        |        |      |      |
| 5.  | .705** | .463** | .592** | .662** | 1.00   |        |        |        |        |        |        |        |        |      |      |
| 6.  | .586** | .505** | .440** | .578** | .502** | 1.00   |        |        |        |        |        |        |        |      |      |
| 7.  | .434** | .227   | .325** | .578** | .540** | .465** | 1.00   |        |        |        |        |        |        |      |      |
| 8.  | .452** | .241*  | .312** | .454** | .518** | .549** | .707** | 1.00   |        |        |        |        |        |      |      |
| 9.  | .417** | .426** | .360** | .305*  | .385** | .505** | .382** | .593** | 1.00   |        |        |        |        |      |      |
| 10. | .356** | .227   | .393** | .412** | .527** | .447** | .646** | .602** | .498** | 1.00   |        |        |        |      |      |
| 11. | .614** | .517** | .598** | .478** | .624** | .698** | .474** | .533** | .513** | .532** | 1.00   |        |        |      |      |
| 12. | .628** | .521** | .538** | .677** | .574** | .691** | .605** | .613** | .426** | .456** | .643** | 1.00   |        |      |      |
| 13. | .522** | .365** | .520** | .380** | .485** | .553** | .474** | .511** | .517** | .611** | .610** | .541** | 1.00   |      |      |
| 14. | .171   | .160   | .064   | .169   | .226   | -.100  | .199   | .205   | .080   | .091   | .064   | .092   | -.127  | 1.00 |      |
| 15. | .385** | .436** | .346** | .264*  | .332** | .357** | .341** | .386** | .400** | .247*  | .550** | .423** | .424** | .197 | 1.00 |

**Table 4***Item Total Correlation for the Total Scale along with its Three Subscales*

|           | DCDQ-UR r | Control<br>During<br>Movement<br>(CDM) r | Fine<br>Motor/Handwr<br>iting (FMH) r | General<br>Coordination<br>(GC) r |
|-----------|-----------|--|---------------------------------------|-----------------------------------|
| DCDQ-UR1  | .78**     | .78**                                    |                                       |                                   |
| DCDQ-UR2  | .69**     | .69**                                    |                                       |                                   |
| DCDQ-UR3  | .69**     | .69**                                    |                                       |                                   |
| DCDQ-UR4  | .72**     | .72**                                    |                                       |                                   |
| DCDQ-UR5  | .77**     | .77**                                    |                                       |                                   |
| DCDQ-UR6  | .71**     | .71**                                    |                                       |                                   |
| DCDQ-UR7  | .69**     |  | .69**                                 |                                   |
| DCDQ-UR8  | .72**     |  | .72**                                 |                                   |
| DCDQ-UR9  | .63**     |  | .63**                                 |                                   |
| DCDQ-UR10 | .65**     |  | .65**                                 |                                   |
| DCDQ-UR11 | .81**     |  |                                       | .81**                             |
| DCDQ-UR12 | .79**     |  |                                       | .79**                             |
| DCDQ-UR13 | .67**     |  |                                       | .67**                             |
| DCDQ-UR14 | .34**     |  |                                       | .34**                             |
| DCDQ-UR15 | .66**     |  |                                       | .66**                             |

Table 5 indicated the correlation between each pair of the items. The average or means of these correlations is derived from the average inter-item correlation. Individual correlations ranged from .22 to .73.

**Table 6***KMO and Bartlett's Test of Sphericity values of Developmental Coordination Disorder Questionnaire Urdu Version (DCDQ-UR) (n=70)*

|  |                    |         |
|--|--------------------|---------|
| Kaiser-Meyer-Olkin Measure of Sampling |                    | .871    |
| Bartlett's Test of Sphericity          | Approx. Chi-Square | 673.000 |
|  | <i>df</i>          | 105     |
|  | Sig                | .000    |

Table 6, explains that the Kaiser-Meyer-Olkin measure of the sampling adequacy was .87 that is above .60 which is the recommended value. The Bartlett's Test of Sphericity was also significant (673,  $p < .05$ ). The related probability was 0.000 which is less than 0.05 which explained that the correlation matrix is not an identity matrix.

**Table 7**

*Eigen Values and Percentage of Variances Explained by the Extracted Factors for Developmental Coordination Questionnaire Urdu Version (DCDQ-UR)*

|    | Eigen Values | % of Variance | Cumulative % |
|----|--------------|---------------|--------------|
| F1 | 7.53         | 50.21         | 50.21        |
| F2 | 1.45         | 9.68          | 59.89        |
| F3 | 1.25         | 8.32          | 68.20        |

Table 7 reveals the Eigen values and percentages of variance described by the means of the three factors. Also, it shows that F1 has an Eigen value of 7.53 and explains 50.21 % of the total variance which is the highest value among three factors. Rest of the two factors carry Eigen values above 1.25 and 68.2 % total variance explained by three factors.

**Table 8**

*Factor Loading for the Items of Developmental Coordination Disorder Questionnaire Urdu Version (DCDQ-UR) Obtained from the Principal Component Factor Analysis (n=70)*

| Items | F1          | F2          | F3          |
|-------|-------------|-------------|-------------|
| 1     | <b>.826</b> | .291        | .090        |
| 2     | <b>.904</b> | .037        | .034        |
| 3     | <b>.809</b> | .194        | -.061       |
| 4     | <b>.678</b> | .364        | .223        |
| 5     | <b>.617</b> | .477        | .225        |
| 6     | <b>.563</b> | .543        | -.264       |
| 7     | .201        | <b>.800</b> | .266        |
| 8     | .195        | <b>.849</b> | .167        |
| 9     | .317        | <b>.613</b> | -.116       |
| 10    | .161        | <b>.813</b> | .005        |
| 11    | <b>.617</b> | .552        | -.132       |
| 12    | <b>.603</b> | .559        | .024        |
| 13    | .408        | <b>.646</b> | -.350       |
| 14    | .117        | .068        | <b>.903</b> |

| Items | F1          | F2   | F3   |
|-------|-------------|------|------|
| 15    | <b>.441</b> | .351 | .068 |

**Note.** Item loading  $>.35$ . Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization

Table 8 demonstrates the item loading of DCDQ-UR on three factors. Loadings were gained by running principal factors analysis for determining the structure of scale .35 and above was the criteria set for the selection of item loading. All items fulfilled the standard inclusion criteria. All 15 items were included in the final version of Developmental Coordination Disorder Questionnaire Urdu Version (DCDQ-UR).

### Discussion

The continuously expediting tendencies of researchers towards DCD increase the need for valid and reliable tools to diagnosis the children with DCD. Already developed tools are fulfilling the requirements. However, it makes them cross culturally valid and reliable. It is always a challenge as original English version is not equally effective in varied parts of the world by using different languages and dwelling indifferent cultural setups. Pakistan is no exception in this regard. Since, the Urdu is the national and mother language of Pakistan, for this reason, it is talked and understood across the country. Moreover, English is used and understood in some parts of the country and some specific sections of population. So, any research tool requires to be filled by parents and children who belong to the diverse groups of population. Their area has to be in Urdu language to acquire the valid and reliable results. Furthermore, this scenario initiated the translation of DCDQ'07 to make it equally reliable tool for diagnosing children with DCD in Pakistan. This is so far a neglected or extremely under-studied area of research in the country. In addition to it, the purpose of the current study is to translate and adapt the DCDQ'07 into Urdu language and check the psychometric properties of the translated version. Translation and adaptations are also made according to the proposed international guidelines. The translated version shows a good internal consistency and test-retest reliability. The current study also aims at validating and checking reliability of DCDQ-UR based on local population. So, the purpose extended to validate the factorial structure of DCDQ-UR with the help of confirmatory factor analysis.

Though, item loading of all items in DCDQ-UR remains in the range based on all three factors. Yet, item fifteen is at the verge of exclusion. The item is still incorporated as it was above .3 inclusion criteria. Similarly, in inter-item correlation item 14 is close to the range of exclusion but considered for inclusion, it also fulfilled the .30 inclusion criteria. These two items require consideration in future research to improve their scores.

While translating DCDQ'07 into Urdu language, the idiom “bull in a China Shop” mentioned in item 14 could not be translated in the form of an Urdu idiom. Parents showed less knowledge about the term. Therefore, it was explained in the plain and simple words in Urdu version which parents rightly understood and responded.

The adaptations made for local use were necessary for cross-culture adaptation of the scale. This would allow the sample participants to understand each item easily and appropriately. Here, most commonly played sports and activities were used as a substitute to provide an easy to understand and judge vocabulary in the scale. Originally, tennis ball was included in brackets while explaining small ball in item 2. During the translation phase, brackets were removed and small tennis ball was replaced with cricket ball for clarity purpose. It is more understandable for the targeted populations. In item 3 “birdie” has been replaced with shuttle cock as the word “birdie” is hardly used in local culture. Shuttle cock is locally more common in use. Similarly, rollerblading has been replaced with the cycling that is more common and understandable physical activity used in item 12 of original scale. Furthermore, the word rollerblading or rollerblading as sports or physical activity is hardly used and played in most parts of the country. In item 14 Idiom “bull in a china shop” could not be replaced with any Urdu idiom that sounded same meaning and context. The understanding of this item was ambiguous and at the stake during the initial parental response. Therefore, it was replaced with the simple words which explain the same meaning and context of the idiom in Urdu language. So, that parents or teachers could easily understand the underlying meanings and respond to the questions, aptly. The measuring or rating captions have been made simple and understandable and addition of “like your child” has been removed on parents’ feedback in initial testing. These words caused a lot of confusion and felt difficulty in responding the items appropriately as reported by the parents. Thus, every parent complained about the same issue and hence, decision of removal was made.

**Table 9**  
*Details of adapted words and phrases*

| S. No | Item No | DCDQ'07                | DCDQ-UR                   |
|-------|---------|------------------------|---------------------------|
| 1.    | 2       | Tennis ball            | Cricket ball              |
| 2.    | 3       | Birdie                 | Shuttle Cock              |
| 3.    | 12      | Rollerblading          | Cycling                   |
| 4.    | 14      | “bull in a china shop” | Explained in simple words |

### Limitations of the Study

The current study proves to be valuable when it comes to adding knowledge into translation. In this study, an adaptation of scale is also aimed at screening children with DCD which gains attention and importance, worldwide. Along with significance, the current study also has some limitations. Though, sample size for the validation process fulfils the requirement. Yet, it can be increased to improve the quality of the scale validation. The current study included sample from Islamabad, hence, the nature of the current study was limited. The results may become more reliable by incorporating the bigger samples from the other cities.

### Conclusion

The current study establishes that DCDQ-UR is the valid and reliable tool that has been translated and cross-culturally adapted in Urdu language to diagnose children with DCD among Pakistani population. This translated tool will facilitate the researchers in order to discover the under studied area of DCD in Pakistan with more ease and with the help of a valid and reliable Urdu language tool. Once the prevalence is appropriately determined, it would become easier to establish the rehabilitative measures. It would also become easy to work in the right direction to address the issues of children with DCD in Pakistan. With this initiative, new ways will be available for the future researchers. The concrete knowledge will be added regarding the actual status of children with DCD in Pakistan.

### References

- Biotteau, M., Danna, J., Baudou, É., Puyjarinet, F., Velay, J. L., Albaret, J. M., & Chaix, Y. (2019). Developmental coordination disorder and dysgraphia: Signs and symptoms, diagnosis, and



rehabilitation. *Neuropsychiatric Disease and Treatment*, 15, (1), 1873-1875. <https://doi.org/10.2147/NDT.S120514>

Blank, R., Barnett, A. L., Cairney, J., Green, D., Kirby, A., Polatajko, H., Rosenblum, S., Smits-Engelsman, D., 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 & Child Neurology*, 61(3), 242-285. <https://doi.org/10.1111/dmcn.14132>

Blank, R., Smits-Engelsman, B., Polatajko, H., & Wilson, P. (2012). European academy for childhood disability (EACD): Recommendations on the definition, diagnosis and intervention of developmental coordination disorder (long version). *Developmental Medicine and Child Neurology*, 54(1), 54-93. <https://doi.org/10.1111/j.1469-8749.2011.04171.x>

Caçola, P. (2014). Movement difficulties affect children's learning: an overview of developmental coordination disorder (DCD). *Learning Disabilities: A Multidisciplinary Journal*, 20(2), 98-106.

Caravale, B., Baldi, S., Gasparini, C., & Wilson, B. N. (2014). Cross-cultural adaptation, reliability and predictive validity of the Italian version of Developmental Coordination Disorder Questionnaire (DCDQ). *European Journal of Paediatric Neurology*, 18(3), 267-272. <https://doi.org/10.1016/j.ejpn.2013.11.009>

Dewey, D., & Bernier, F. P. (2016). The concept of atypical brain development in developmental coordination disorder (DCD)—a new look. *Current Developmental Disorders Reports*, 3(2), 161-169. <https://doi.org/10.1007/s40474-016-0086-6>

Hill, E. L., & Brown, D. (2013). Mood impairments in adults previously diagnosed with developmental coordination disorder. *Journal of Mental Health*, 22(4), 334-340. <https://doi.org/10.3109/09638237.2012.745187>

Kirby, A., Williams, N., Thomas, M., & Hill, E. L. (2013). Self-reported mood, general health, wellbeing and employment status in adults with suspected DCD. *Research in Developmental Disabilities*, 34(4), 1357-1364. <https://doi.org/10.1016/j.ridd.2013.01.003>

- Magalhães, L. D. 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. <https://doi.org/10.1016/j.ridd.2011.01.029>
- Missiuna, C., Moll, S., King, S., King, G., & Law, M. (2007). A trajectory of troubles: parents' impressions of the impact of developmental coordination disorder. *Physical & Occupational Therapy in Pediatrics, 27*(1), 81-101. [https://doi.org/10.1080/J006v27n01\\_06](https://doi.org/10.1080/J006v27n01_06)
- Ray-Kaeser, S., Thommen, E., Martini, R., Jover, M., Gurtner, B., & Bertrand, A. M. (2019). Psychometric assessment of the French European developmental coordination disorder questionnaire (DCDQ-FE). *Plos One, 14*(5), e0217280. <https://doi.org/10.1371/journal.pone.0217280>
- Smits-Engelsman, B., Vincon, S., Blank, R., Quadrado, V. H., Polatajko, H., & Wilson, P. H. (2018). Evaluating the evidence for motor-based interventions in developmental coordination disorder: A systematic review and meta-analysis. *Research in Developmental Disabilities, 74*(1), 72-102. <https://doi.org/10.1016/j.ridd.2018.01.002>
- Smits-Engelsman, B., & Verbecque, E. (2022). Pediatric care for children with developmental coordination disorder, can we do better? *Biomedical Journal, 45*(2), 250-264. <https://doi.org/10.1016/j.bj.2021.08.008>
- Zoia, S., Barnett, A., Wilson, P., & Hill, E. L. (2006). Developmental coordination disorder: Current issues. *Child: Care, Health and Development, 32*(6), 613-618.
- Zwicker, J. G., Missiuna, C., Harris, S. R., & Boyd, L. A. (2012). Developmental coordination disorder: a review and update. *European Journal of Paediatric Neurology, 16*(6), 573-581. <https://doi.org/10.1016/j.ejpn.2012.05.005>