

## Translation and Validation of Multi-Dimensional Family Functioning Scale: A Confirmatory Factor Analysis

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### ABSTRACT

**Objective:** To study the cross-language validation and confirmatory factor analysis of the Urdu version of the Multi-Dimensional Family Functioning Scale.

**Study Design:** Cross-Sectional study.

**Place and Duration of Study:** Public schools of Rawalpindi Pakistan, Oct to Nov 2021.

**Methodology:** Nine hundred ten adolescents aged 10-19 years, were included in the main study. The study involved two steps, Step-1 consisted of translation and cross-language validation of the scale. Step-2 involved item-to-total correlation and confirmatory factor analysis of the translated Urdu version. Urdu translation was done using the forward-backwards translation method.

**Results:** Findings of the pilot study showed Multi-Dimensional Family Functioning Scale as a reliable measure in both versions (English Version  $\alpha=0.77$ , Urdu Version  $\alpha=0.77$ ). After passing two weeks, cross-language validation was checked by the Pearson product-moment correlation coefficient, which showed a significant result ( $r=0.88$ ).

**Conclusion:** Results from various analyses revealed that Multi-Dimensional Family Functioning Scale is a reliable and locally validated scale for determining family functioning in Pakistan.

**Keywords:** Cross-language validation, Confirmatory factor analysis, Psychometrics, Reliability.

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### INTRODUCTION

Family functioning can be defined as social and structural characteristics of the overall family environment, which considers relationship and interaction between family members in terms of conflict or cohesion, adaptability, organization, and quality of communication.<sup>1,2</sup> Pakistan is a country whose culture resides in collectivism, in which the family is responsible for accomplishing the needs of family members. These needs can be financial and social.<sup>3</sup> In family, dynamics is the core on which individuals learn new ways to cope with the challenges of upcoming life. Family dynamics can be understood as a particular structure of one's family in which each family member fulfils their interpersonal role.<sup>4</sup> In the family, parents are the hallmark that plays a decisive role in shaping and maintaining interpersonal communication with children.<sup>5</sup> These interactions affect the person's development, which can be observed among parents, child and their parents, siblings and other people who are part of the family.<sup>6</sup> If the interactions are healthy, it

positively improves the family's mental health. The Primary goal of global mental health is to identify precise assessment and screening tools that measure the general public's emotions, behaviours, and overall functioning across various cultures and subcultures by keeping their contexts in mind.<sup>7</sup> Whenever the functioning of the family is affected due to individual and social factors, the whole family gets negatively affected by it.<sup>8</sup>

It addresses the point to develop and validate measures constructed on different populations.<sup>9</sup> Nearly all previously developed scales are developed in Western countries, and they mostly target parent-child relationships or focus only on communication. These tools measure the construct of family functioning with respect to adults' perceptions.<sup>10</sup> Either they are very lengthy, too old or too short to grasp different dimensions of the construct, as there is a high need for culturally developed and validated scales for measuring family functioning based on adolescents' perceptions in Pakistan. So, the current study is designed to do Urdu translation, cross-language validation, and to find confirmatory factor analysis of a locally developed scale known as Multi-Dimensional Family Functioning Scale (MFFS).

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## METHODOLOGY

The cross-sectional study was conducted from October 2021 to November 2021 after the approval from the FJWU Ethics Committee (Number FJWU/EC/2021/33).

**Inclusion Criteria:** Adolescents of either gender, 10-19 years of age were included in the study.

**Exclusion Criteria:** Adolescents having any physical and psychological disability, experienced any traumatic incident or had undergone any procedure or surgery, were excluded.

The study consisted of two steps, Step-1 of the pilot study consisted of translation and cross-language validation of the scale. Step-2 involved item-to-total correlation and confirmatory factor analysis of the translated Urdu version. Urdu translation was done using the forward-backwards translation method.<sup>10,11</sup>

In the basic translation step, the original MFFS was translated into Urdu by five native bilingual professionals. The professionals had the minimum Master of education and were experts in both English and Urdu. The scale was given to them by asking them to translate it as close to the original language as possible without compromising its concepts and language.<sup>12</sup> As a result, the scholar received five independent Urdu translations. In the next step, these five Urdu forward translations were gathered in Word. Five new subject matter experts (SMEs) were enrolled, and their main responsibility was to observe all these five Urdu translations in terms of their grammar, word/sentence and content. If there is any mistake, such as inappropriate content, unclear text, or mistranslation of word/s or sentences, then they are asked to suggest new word/s and sentences. Only those translations for each item were finalized, closest to the original English version. In Step-3, five fresh blind bilinguals who had no idea and were unknown about the scale were asked to do five backward translations. The same SMEs of Step-2 were involved in Step-4, in which they also had to evaluate five backward translations critically. They were asked to select final items for the Urdu version to assess the item's construction based on its accuracy and precision. After selecting the final version of the Urdu translation, Urdu and English versions were administered in two groups with male and female adolescents (n=64) at one time. Subsequently, same practice was repeated after 15 days with the same participants.

Personal information of adolescents was collected through demographic details based on age, gender and

class. Family functioning was assessed through MFFS. Multi-Dimensional Family Functioning Scale (MFFS) is a measure based on 26 items that evaluate family functioning and dysfunctioning of one's family. Twelve items out of 26 were reverse coded.

Statistical Package for Social Sciences (SPSS version 23, IBM Corp., Armonk, NY, USA) and Analysis of Moment Structures (AMOS 22) were used for data analysis. In the first part, mean, standard deviation, alpha reliabilities of English and Urdu versions, and Pearson correlation were considered, and in part 2, item to total correlation and factor structure of the scale was done.

## RESULTS

In the pilot study there were 33 males and 31 females of class 9 and 10 aged 13-17 years (mean 14.86±0.97 years). On the other hand, the main phase study sample had 454 males and 456 females with an age range of 10-17 years (mean 13.45±1.63 years). Table-I shows that the alpha reliability of the Urdu and English versions as 0.77, and the test re-test reliability correlation was (r=0.88). These two indicators showed that Urdu MFFS had good internal consistency and test-retest reliability over 15 days in a sub-sample of 64 students. Table-II displays the corrected item to the total correlation of the main study for the Multi-Dimensional Family Functioning Scale (MFFS). Table-III characterizes Model Fit Indices for the Urdu version of the Multi-Dimensional Family Functioning Scale. Model 1 indicated the fit indices of the default model, which were lower than the desired ones. Error covariances between different items were applied on items of scale to achieve goodness of model fit.

Model 11 represented model fit indices of the Multi-Dimensional Family Functioning Scale after adding error covariance between different items. After adding error variance values of all desired indicators, such as  $\chi^2$  (pdf), NFI, IFI, TLI, CFI and RMSEA, were in a suitable range. Pictorial presentation of items and factor loadings of MFFS is shown in the Figure.

**Table-I: Correlation Coefficient, Test-Retest Reliability of Urdu and English versions of Multi-Dimensional Family Functioning Scale (n = 64)**

| MFFS                | Test (Urdu) | Retest (English) | Correlation Coefficiens | p-value |
|---------------------|-------------|------------------|-------------------------|---------|
| Mean±SD             | 60.09±13.33 | 60.67±13.46      | 0.88                    | <0.001  |
| Range               | 60          | 61               |                         |         |
| Alpha Reliabilities | 0.77        | 0.77             |                         |         |

Note. MFFS = Multi-Dimensional Family Functioning Scale

## Multi-Dimensional Family Functioning Scale

**Table-II: Corrected item total correlation of Multi-Dimensional Family Functioning Scale (MFFS) (n= 910)**

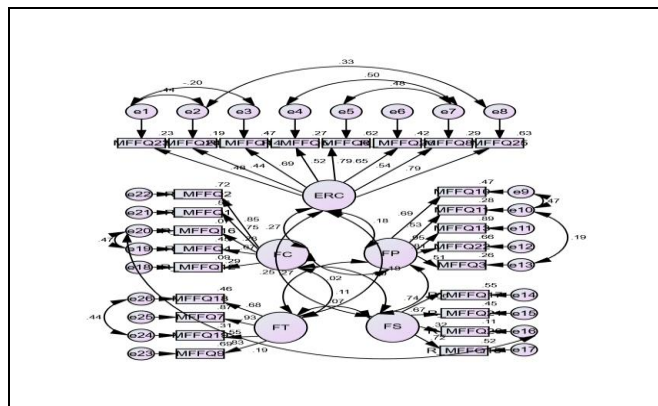
| Scale    | Item-Total Correlation |
|----------|------------------------|
| MFFQ3    | 0.35                   |
| MFFQ6    | 0.52                   |
| MFFQ7    | 0.41                   |
| MFFQ8    | 0.42                   |
| MFFQ9    | 0.38                   |
| MFFQ10   | 0.33                   |
| MFFQ11   | 0.23                   |
| MFFQ13   | 0.39                   |
| MFFQ18   | 0.39                   |
| MFFQ19   | 0.35                   |
| MFFQ22   | 0.39                   |
| MFFQ23   | 0.37                   |
| MFFQ24   | 0.42                   |
| MFFQ25   | 0.52                   |
| R_MFFQ1  | 0.35                   |
| R_MFFQ2  | 0.44                   |
| R_MFFQ4  | 0.44                   |
| R_MFFQ5  | 0.36                   |
| R_MFFQ12 | 0.23                   |
| R_MFFQ14 | 0.39                   |
| R_MFFQ15 | 0.32                   |
| R_MFFQ16 | 0.34                   |
| R_MFFQ17 | 0.41                   |
| R_MFFQ20 | 0.25                   |
| R_MFFQ21 | 0.30                   |
| R_MFFQ26 | 0.40                   |

## DISCUSSION

The current study intended to assess the reliability, cross-language validity and confirmatory factor analysis of the MFFS. This is the first study that aimed to determine the factor structure of this scale in Pakistani culture, and it was used to study the goodness of fit and the inherent structure of the scale. Cross-language validation was determined in the pilot study by administering both versions with 15 days gap on 64 adolescents. Results revealed that the Urdu and English versions of the scale had good reliability (i.e.,  $\alpha = 0.77, \alpha = 0.77$ ). The findings of the present study related to the scale's reliability align with the previous studies.<sup>11,12</sup> In the second step, the item-to-total correlation was computed, and the correlation value ranged from 0.23-0.52. These values in the range for item-to-total correlation are the same as in previous studies.<sup>13,14</sup> Previous study on MFFS, calculated EFA for the scale, and it showed a five-factor structure with eigenvalues of more than 1 for each factor, and their variance was about 63.73%.<sup>15</sup> Five-factor structure model of MFFS was tested for CFA based on EFA results reported by the original author. The results of the CFA model showed the value of chi-square and

**Table-III: Model-fit Indexes for Students Multi-Dimensional Family Functioning Scale (MFFS) (n=910)**

|          | $\chi^2(df)$  | NFI   | IFI   | TLI   | CFI   | RMSEA | $\Delta\chi^2(\Delta df)$ |
|----------|---------------|-------|-------|-------|-------|-------|---------------------------|
| Model 1  | 2395.149(289) | 0.782 | 0.803 | 0.777 | 0.802 | 0.090 |                           |
| Model 2  | 2189.289(288) | 0.800 | 0.822 | 0.798 | 0.821 | 0.085 | 205.86(1)                 |
| Model 3  | 1996.411(287) | 0.818 | 0.840 | 0.818 | 0.839 | 0.080 | 192.878(1)                |
| Model 4  | 1789.853(286) | 0.837 | 0.859 | 0.839 | 0.859 | 0.076 | 206.558(1)                |
| Model 5  | 1627.141(285) | 0.857 | 0.874 | 0.856 | 0.874 | 0.072 | 162.712(1)                |
| Model 6  | 1448.296(284) | 0.868 | 0.891 | 0.875 | 0.891 | 0.067 | 178.845(1)                |
| Model 7  | 1283.440(283) | 0.883 | 0.906 | 0.892 | 0.906 | 0.062 | 164.856(1)                |
| Model 8  | 1200.984(282) | 0.891 | 0.914 | 0.900 | 0.914 | 0.060 | 82.456(1)                 |
| Model 9  | 1159.539(281) | 0.894 | 0.918 | 0.905 | 0.917 | 0.059 | 41.445(1)                 |
| Model 10 | 1119.776(280) | 0.898 | 0.882 | 0.921 | 0.908 | 0.057 | 39.763(1)                 |
| Model 11 | 1085.384(279) | 0.901 | 0.925 | 0.912 | 0.924 | 0.056 | 34.392(1)                 |



**Figure: Pictorial presentation of items of Multi-Dimensional Family Functioning Scale after applying error covariances**

degree of freedom as 2395.149 (289) with values of other indexes as NFI=782; IFI=803; TLI=777; CFI=802 and RMSEA=090.<sup>16,17</sup> The values of all indices, such as NFI, IFI, TLI, CFI and RMSEA, were not in an acceptable range. For improving the model of CFA, several error variances were applied and resulted in the model being an adequate fit in which the value of chi-square and degree of freedom was 1085.384(279) along with values of other indexes as NFI=901; IFI=925; TLI=912; CFI=923 and RMSEA=056.<sup>18</sup> Hence, different types of analyses showed that Multi-Dimensional Family Functioning Scale is a reliable and locally validated scale for determining family functioning in Pakistan.

**CONCLUSION**

Results from various analyses revealed that Multi-Dimensional Family Functioning Scale is a reliable and locally validated scale for determining family functioning in Pakistan.

**Conflict of Interest:** None.

**Author’s Contribution**

Following authors have made substantial contributions to the manuscript as under:

TJ: & AM: Data acquisition, data analysis, critical review, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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