Foundation University Journal of Psychology
Vol 9, No.2 (July, 2025)

FUJP Open Access Journal

Research Article 10.33897/fujp.v9i2.888

Translation and Validation of Drug-related Locus of Control in Urdu for Substance Use Disorder

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Abstract

Background. Substance Use Disorder (SUD) is a significant public health challenge. Understanding factors influencing SUD development, such as Locus of Control (LoC), is crucial for effective intervention strategies. The Drug-related Locus of Control (D-LOC) Scale measures beliefs regarding control over drug-related behaviors but lacks validation in Urdu-speaking populations.

Method. This was a cross-sectional study which translated and validated the D-LOC Scale into Urdu for individuals with SUD. The translation was completed through a rigorous process using MAPI guidelines. The translated version was initially pilot-tested with five participants and refined as necessary. Data was collected from 200 Urdu-speaking adults aged 18 and above with SUD diagnoses, using nonprobability purposive sampling.

Results. CFA results indicated the Urdu version of the D-LOC Scale (15 items) had acceptable fit indices $p < 0.01$ and good internal consistency ($\alpha = 0.878$).

Conclusion. The study underscored the scale's linguistic precision and cultural relevance for assessing D-LOC in individuals with SUD, enhancing accessibility and applicability in clinical and research settings. The rigorous translation process ensured linguistic accuracy and cultural sensitivity, bridging gaps in psychometric tools for SUD research. Findings support the scale's reliability and validity in Urdu, facilitating comprehensive assessments of the target population.

Keywords. Validation, locus of control, substance use disorder, validity, reliability, Urdu version

Foundation University Islamabad

Introduction

Substance Use Disorder (SUD) continues to be a major public health issue, exerting significant impacts on individuals and communities worldwide (Lo et al., 2020). Globally approximately 296 million people use drugs (UNODC, 2023). In Pakistan, the prevalence of substance use, including illicit drugs and alcohol, has been on the rise, contributing to various health, social, and economic challenges. According to a study conducted by Khan et al. (2019), the prevalence of SUDs among adults in Pakistan was found to be around 5.8%. The most abused substances included tobacco, cannabis, opioids, and sedatives.

The economic costs associated with substance misuse in the country amount to billions of rupees each year, encompassing expenses related to healthcare, law enforcement, lost productivity, and social welfare (Mirza & Jenkins (2018). Moreover, substance use has been linked to adverse health outcomes such as depression, anxiety, and post-traumatic stress disorder (Khan et al., 2020). A report by the United Nations Office on Drugs and Crime (UNODC, 2021) highlighted the challenges posed by drug trafficking and the increasing prevalence of synthetic drugs in Pakistan. Understanding the factors that contribute to the development and perpetuation of SUD is paramount for effective intervention and treatment strategies (NIDA, 2021). Among the diverse psychological constructs influencing SUD, Locus of Control (LoC) has emerged as a salient determinant worth investigating.

Originally defined by Rotter (1966), LoC is a prominent psychological construct that examines the extent of individuals' perception to have personal control over their environment. Over the years, LoC has been frequently measured in various clinical populations including but not limited to alcohol use (Ersche et al, 2012), SUD (Shafie et al., 2017) and suicide (Aviad-Wilchek, 2021). In the context of substance use, the Drug-related Locus of Control (D-LOC) Scale has proven to be a valuable instrument for evaluating an individual's beliefs regarding their ability to control drug-related behaviors and outcomes (Hall, 2001). The D-LOC Scale has been widely utilized in both research and clinical settings to explore the role of locus of control in substance use patterns and treatment outcomes. While the D-LOC Scale has demonstrated utility in various cultural and linguistic settings, its application among Urdu-speaking populations has been limited.

Worldwide, over 70 million and 100 million people use Urdu as a first and second language respectively (Britannica, 2024). Further, in Pakistan where Urdu is the national and most commonly used language, Translating the D-LOC into Urdu facilitates reliable assessment for a large proportion of clinical SUD patients. This will ultimately reduce barriers to screening and assessment in clinical settings as well as in research participation (Nagy et al., 2021).

The present study aimed to translate and validate D-LOC in Urdu language for individuals with SUD. The cultural and linguistic nuances of Urdu, the national language of Pakistan and widely spoken in several regions of South Asia, underscore the significance of validating the Urdu version of proposed assessment measures for individuals with SUD. This study aimed to address the existing gap in psychometric tools available for this population and provide a culturally relevant instrument for researchers and clinicians in the addiction field. To our knowledge, this study represents the first attempt to validate the D-LOC Scale in Urdu, thereby offering crucial insights into the cultural dimensions and implications in the field of SUD.

Method

Study Design

This cross-sectional study a used nonprobability purposive sampling technique to collect the study data.

Inclusion and Exclusion Criteria

Both male and female participants, aged 18 and above with a diagnosis of SUD or currently in recovery were included. Participants who had difficulty engaging in the study and those unable to comprehend the Urdu language were excluded.

Sample size

The study included N = 200 participants based on the sample size recommendation proposed by Myers et al. (2011) for conducting Confirmatory Factor Analysis (CFA). Myers et al. (2011) recommend a minimum sample size of 200 participants to ensure the robustness and reliability of CFA results. Adhering to this guideline enhanced the statistical power of the analysis, provided more robust results for validating the hypothesized factor structure and ensured the accuracy of parameter estimates (Wolf et al., 2013).

Assessment Measures

Demographic Questionnaire: The demographic information was used to collect data on age, education, marital status, no of siblings, monthly income, family system etc.

Drug Related Locus of Control (D-LOC; Hall, 2001): The D-LOC scale is comprised of 15 forced-choice items designed to assess attitudes towards drug use. The scale exhibits good psychometric properties as indicated by Cronbach's α coefficient of .81. The utilization of a forced-choice format ensures that respondents make explicit choices, contributing to the clarity and objectivity of the instrument.

Translation Process: The translation process of the assessment measures followed MAPI guidelines (Acquadro, Conway, Giroudet, & Mear, 2012) of linguistic validation with a focus on maintaining conceptual equivalence with the source instrument. The translation process ensured that it remains comprehensible to the target population. These steps of standard linguistic validation from The MAPI research institute have been represented in Figure 1.1.

Forward Translation: The forward translation of the instruments was carried out by two researchers (MA and AK) independently with strong proficiency in both English and Urdu, as well as previous experience in translation and validation process. The translation process prioritized conceptual equivalence over direct, word-for-word translation, aiming for clarity, relevance, and ease of comprehension. Simple, commonly used Urdu vocabulary was chosen to enhance accessibility while preserving the intended meaning of the original text. The translation underwent proofreading by a bilingual expert Professor of Psychology (RR) for consensus on the readability and equality of meanings. Where there were discrepancies in the translations, preferences were given to precise, more valid, and more readable words. The bilingual expert made every effort to ensure that the translated version used culturally relevant terms, did not include jargon, used simplified language; and included sufficient explanations of concepts and examples. After proofreading by a bilingual expert, the translation was reviewed again for typing or grammatical errors before finalization.

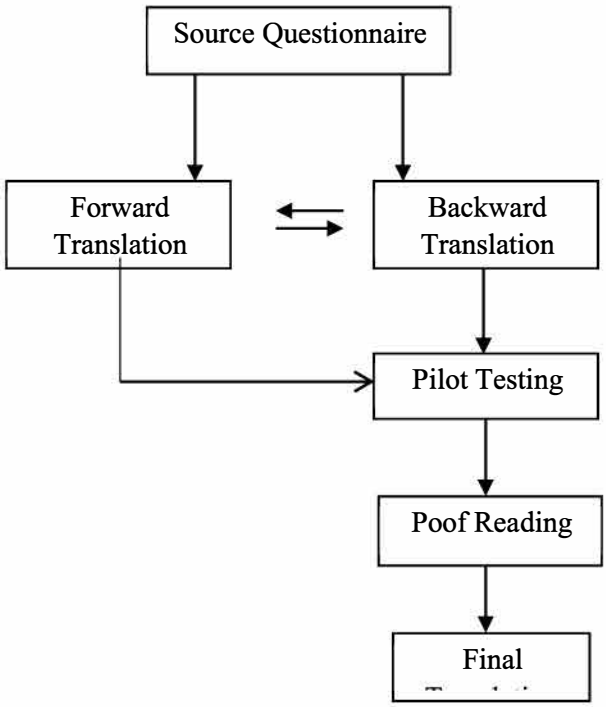

Figure 1.1 *MAPI Process of Linguistic Validation*

Backward Translation: To identify any discrepancies arising from contextual differences, the final forward translation was back translated into English. This process was conducted by an independent bilingual translator (AA), a native Urdu speaking with no previous exposure to the original scale, ensuring an unbiased translation. The focus remained on maintaining simplicity and clarity, ensuring the translated scale was both accessible and faithful to the original intent. A consensus meeting with expert bilingual researchers (including RR) was held to finalize the backward translation, emphasizing precision, validity, and contextual relevance in preserving the original scale's meaning.

Piloting

After translation, piloting was done with participants (n = 5) to evaluate their comprehension and ease of understanding. Participants were provided detailed instructions. They are asked to discuss any difficulties in responding or understanding the items and ask for repetition if anything was not clear. The researcher tried to engage participants throughout the piloting process and asked follow-up questions to assess their level of understanding and explore their interpretation of scale items. All participant feedback, including any questions or concerns, was carefully documented, and suggested revisions were made to finalize the scale. The revisions suggested were incorporated *(Supplementary material of pilot testing along with suggested revisions is available upon request).*

Results

Confirmatory Factor Analysis (CFA) was used to assess the psychometric properties of the D-LOC (Urdu version. The D-LOC model, consisting of one factor and 15 items, was analysed, and the initial model demonstrated a good fit. Model fit was assessed using statistics consistent with the previous studies. The following thresholds were applied to determine acceptable model fit: χ^2/df between 1 and 3, RMSEA < 0.08, and GFI and CFI ≥ 0.90 (Yusoff et al., 2021; Meydan, 2011; Hidayat et al., 2018; Gebrimedhin et al., 2022).

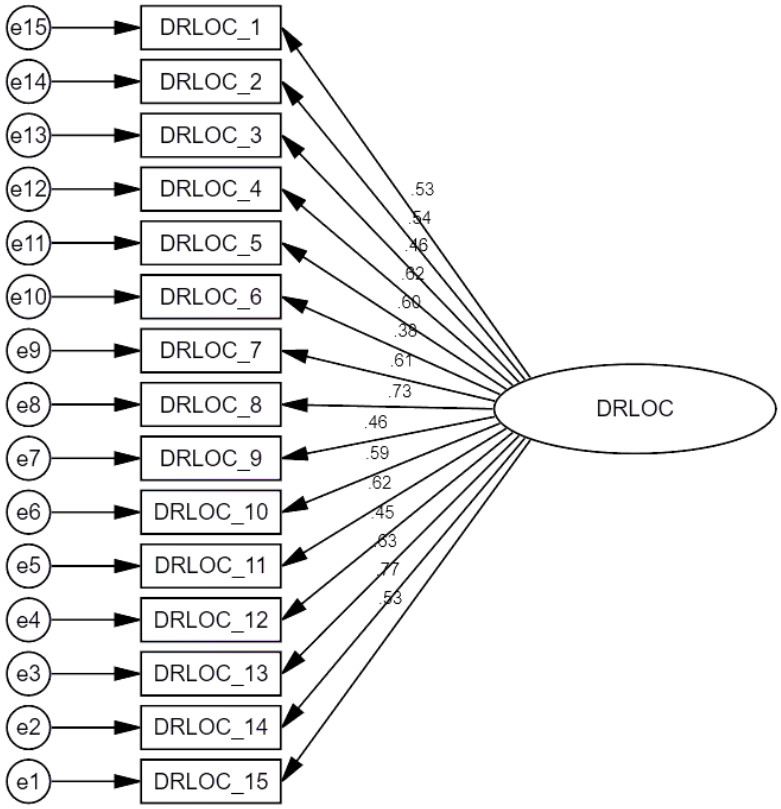

Figure 1.2 *Path Diagram of translated version of D-LOC*

There were significant correlations ($p < 0.001$). between items The overall model fit was considered acceptable with fit indices of: $\chi^2(90) = 177.20$, $p < 0.01$, RMSEA = 0.070, CFI = 0.902, and GFI = 0.90 (see Table 1.1). The factor loadings for D-LOC were between 0.38 and 0.77, as shown in Figure 1.2. Generally, factor loadings greater than 0.5 are considered acceptable (Hidayat et al., 2018). However, in this study, items with factor loadings exceeding 0.30 were also considered a good fit, as suggested in previous research (Ching et al., 2015; Farooqi & Shahid, 2022; Hassim et al., 2020).

Reliability and Validity Analysis: As guided by previous studies (Yusoff, 2021; Shreshta, 2021; Yan et al., 2022), the acceptance criteria for Cronbach's alpha, CR and AVE were greater than 0.7, 0.7, and 0.5 respectively. The analysis indicated an AVE of 0.33 and a CR of 0.87. While the AVE value fell below the recommended threshold of 0.5, it was considered acceptable in accordance with the guideline that convergent validity remains satisfactory if AVE is below 0.5 but CR exceeds 0.6 (Hair et al., 2010). Additionally, the scale showed strong internal consistency, with a Cronbach's alpha (α) of 0.878.

Discussion

The present study conducted a robust translation and validation process to ensure scale is linguistically precise, culturally sensitive, and understandable for individuals even with low literacy levels. The translation of scales plays a critical role in studies particularly cross-cultural research, ensuring that measurements remain equivalent across different linguistic and cultural contexts (Lee & Sohng, 2020). To achieve this, the study adhered to the Mapi guidelines (2012), following a rigorous seven-step process that involved expert bilingual researchers. Their focus was on conceptual equivalence and easy comprehension and avoided word-for-word translation. Back-translation and consensus meetings were held to reach consensus on any language differences while maintaining original essence of the scale.

Moreover, the study add valuable insights on psychometric properties, validity, and reliability of Urdu version of D-LOC. The study used various statistical techniques and indices to assess the psychometric properties of the scale including CFA. This enhanced the robustness of the findings, ensuring the validity and reliability of the scale. One dimension structure of D-LOC was determined to be a good fit as per established criteria of the study. To ensure a comprehensive assessment of model fit, a set of relative fit indices, including χ^2/df, RMSEA, CFI, and GFI, was utilized. The model met the established criteria for acceptable fit, aligning with previous research findings (Yusoff et al., 2021; Meydan, 2011; Hidayat et al., 2018; Gebrimedhin et al., 2022). These results suggest that the D-LOC effectively captures the intended underlying construct.

Although factor loading on 0.5 was considered acceptable as shown by previous studies (Cheung et al., 2023; Hidayat et al., 2018; Wei & Nguyen, 2020). However, we retained some items with factor loadings above 0.3 for some theoretical and practical reasons. Some studies suggest that factor loadings above 0.30 can be considered acceptable for certain populations (Ching et al., 2015; Farooqi & Shahid, 2022; Hair, Black, & Babin, 2010; Hassim et al., 2020) such as to indicate a meaningful association between items and their intended constructs. Additionally, removing these items did not significantly improve model fit and they contributed meaningfully to the overall scale. Therefore, they were retained.

A standardized approach was taken in the assessment of psychometric properties, integrating both statistical metrics and theoretical significance. However, while expert judgment played a role in item retention, it is important to acknowledge that expert perspectives may not fully capture the viewpoints of the broader population. The reliability of the scale was $\alpha = 878$ which is considered acceptable (McNeish, 2018; Arof et al., 2018). This suggests good reliability in the measurement instrument e.g., indicating scale consistency in measuring the underlying construct. Overall, the scale showed acceptable results in terms of psychometric properties of the scale including CFA, AVE, CR, and Cronbach's alpha.

Strengths and Limitations

The study utilized a robust methodology for translation and validation of the Urdu version of D-LOC scale. Various statistical techniques were used to assess its psychometric properties. The study included demographically diverse samples from Pakistani culture which has the potential to enhance findings generalizability to a broader population. However, the data collected in this study was cross-sectional research so subsequent research should incorporate longitudinal data across different time points to address limitations of the test-retest reliability and

predictive validity of the Urdu version of the scale. Furthermore, even though we had a reasonable sample size to conduct the confirmatory factor analysis (CFA), a more extensive sample size would have enabled us to perform additional analyses. Specifically, a larger sample could have been divided into two, allowing for a second CFA. Additionally, the study primarily translated the scale in Urdu language and made linguistic adaptations to ensure comprehension. However, no specific cultural adaptations were undertaken. It is important to note that the findings presented here should be confirmed by future research. Subsequent studies may use different methodologies and validate in different population to determine how well the scale predicts relevant outcomes.

Implications

This study contributes to measurement validation by highlighting the importance of balancing statistical rigor with theoretical relevance. By translating and validating the D-LOC scale in Urdu, it broadens the scale's applicability beyond its original context. Given that Urdu is the 10th most widely spoken language, with over 100 million speakers worldwide (Muzaffar et al., 2019), this translation opens up opportunities for its use in a wider range of cultural and geographical settings. Future studies should explore its effectiveness across different populations and contexts to enhance its generalizability. Further investigation into its predictive validity and relationships with other key constructs could offer valuable insights, particularly in areas related to decision-making, locus of control, and psychological and behavioral outcomes.

Conclusion

The study findings are useful for both researchers and practitioners. By confirming the psychometric properties of the D-LOC scale within the Pakistani context, this research provides a reliable tool for assessing and addressing SUD. Its application in clinical and research settings could contribute to improved results or health outcomes while using the scale for screening and assessment purposes.

Declaration

Funding

This was not funded study.

Conflict of interest

Authors have no declarations of interest.

Availability of data

Data would be available upon reasonable request.

Ethical Approval

The ethics was taken from the Doctoral Programme Coordination Committee (DPCC) of the University of Punjab, Pakistan (Ref#1696/9881/ ACAD).

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Appendix

Table 1.1. *Goodness-of-Fit Indices for Tested Model*

Model	χ^2	*df*	*p*	χ^2/df	*GFI*	*CFI*	*RMSEA*
Model 1 15 items	177.209	90	<.001	1.969	.90	.902	.070

Note: χ^2 /df: relative chi-square. GFI, Goodness of fit index; CFI, Comparative fit index; RMSEA, root mean square error of approximation.

Table 1.2. *Confirmatory factor analysis of D-LOC for individuals with SUD*

	CR	*AVE*	α	λ
	.87	.33	.878	
Item 1				.53
Item 2				.54
Item 3				.46
Item 4				.62
Item 5				.60
Item 6				.38
Item 7				.61
Item 8				.73
Item 9				.46
Item 10				.59
Item 11				.62
Item 12				.45
Item 13				.63
Item 14				.77
Item 15				.53

Note: λ (lambda) = standardized factor loading ≥ .5, *CR* = Composite Reliability, *AVE* = Average Variance Extracted, *MaxR(H)* = Maximum Reliability