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Psychometric Properties of the Urdu Translated Climate Change Anxiety Scale: A Confirmatory Factor Analysis Study

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Abstract

Climate change anxiety is a growing concern globally, yet few measurement tools are adapted for non-English-speaking populations. This study examines the psychometric properties of the Urdu-translated Climate Change Anxiety Scale (CCAS) among Pakistani participants, utilizing confirmatory factor analysis (CFA) to validate its structure in this cultural context. A sample of 320, 180 male and 180 female Afghan migrant living in flood affected areas. The study assessed the scale's reliability, convergent and discriminant validity, and factor structure using CFA. Results supported a two-factor structure consistent with the original scale, with strong internal consistency (Cronbach's alpha = .88) and satisfactory model fit indices (CFI = .95, TLI = .93, RMSEA = .05). Convergent validity was established through significant correlations with generalized anxiety measures, and discriminant validity was confirmed with unrelated constructs. Findings indicate that the Urdu-translated CCAS is a reliable and valid tool for assessing climate change anxiety in Urdu-speaking populations, facilitating cross-cultural research on climate-related psychological impacts.

Keywords: *Climate Change Anxiety, Urdu Translation, Psychometric Properties, Confirmatory Factor Analysis*

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1. Introduction

Climate change has increasingly emerged as a significant source of stress and anxiety, commonly termed "*climate change anxiety*." This type of anxiety is characterized by persistent feelings of worry, distress, and even existential fear, arising from the ongoing effects of climate change on the environment, society and future generation (Clayton, 2020). Individual often experiencing climate change anxiety often feel overwhelmed by potential environmental changes including natural disaster like earthquakes, floods and unpredictable weather condition. This global awareness of climate change has brought increasing attention to its psychological impact particular within the field of environmental psychology. Climate anxiety, in particular, has been recognized for its potential effects on mental health, as well as its influence on social interactions and communication (Swim et al., 2011). Culturally validated and reliable tools are crucial for the accurate and effective assessment of anxiety. However, there is a notable shortage of such scales for individuals who speak non-English languages, posing significant challenges for cross-cultural research on climate-related anxiety (Ojala et al., 2021). Climate change anxiety has become increasingly relevant in psychology and clinical practice, as it reflects widespread concerns about environmental degradation and its future consequences (Clayton & Karazsia, 2020). These concerns can severely impact individuals' mental health, leading to stress, feelings of isolation, and diminished motivation(Clayton & Karazsia, 2020). These effects severely impact on individual's mental health leading to stress, sense of isolation, and lack of motivation (Pihkala, 2020).

The psychometric tools need to be culturally adaptation and validation in order to maintain the reliability of the scales (Van de Vijver & Tanzer, 2004). This validation process play an essential role in the assessment of climate change anxiety for people belonging from diverse regions and may have various experiences for the understanding the environment concern (Reser et al., 2012). Previous research revealed that non-English languages translation and adaptation may have provided insight into more locally relevant climate changes experiences and concerns (Wahid et al., 2024).

In addition, Pakistan is a country facing a lot of environmental difficulties, including regular flooding, strong heatwaves, and widespread water shortages, all these factors strongly contributed in climate-related distress (Adnan et al., 2024). According to previous research revealed that young people in Pakistan are more prone to climate change concerns, because of the serious consequences for their communities and future livelihoods.(Hussain et al., 2020). However, the lack of such culturally established scale for local communities for assessing the climate change anxiety may hindered the research and the implementation for targeted populations. Translating and verifying the climate change anxiety scale (CCAS) in Urdu is critical for addressing climate-related mental health issues in Pakistan.

In a country like Pakistan, where environmental dangers are growing day by day. It is an important to understanding climate change fear of people, who have Urdu-language is necessary to plan an effective remedies. The purpose of this study to minimize the knowledge gap between originally adapted scale and Urdu translated version Climate Change Anxiety Scale (CCAS) through applying the confirmatory factor analysis. As a result the finding of the study may enhanced our understanding about climate change concerns in non-Western cultures. A previous study conducted in Pakistan, revealed that climate change impacts adults' cognitive, emotional, and functional capacities, with effects ranging from mild stress to severe clinical issues, including anxiety. Women reported higher levels of climate change anxiety than men. Furthermore, people with greater educational backgrounds reported lower anxiety levels than those with lower educational attainment. Prioritizing mental health support for these vulnerable populations is critical for organizations and mental health researchers (Zareen et al., 2024).

2. Method

2.1 Research Design

This study utilized across-sectional research design to assess the psychometric properties of the Urdu-translated Climate Change Anxiety Scale (CCAS) and to examine the climate change anxiety level in Afghan migrants impacted by recurrent flooding in Nowshera and Charsadda, Pakistan

2.2 Sample

The sample of the study included 320 Afghan migrants aged 18 and older, consisting of 180 men and 140 women, currently living in flood-affected areas of Nowshera and Charsadda. Participants were selected for the current

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study on their recent exposure with climate-related stressors, specifically recurrent flooding events

2.3 procedure

Data collection was took place at community centers in Nowshera and Charsadda. Participants provided written informed consent and were assured of confidentiality. Trained data collectors assisted with the CCAS, and demographic questionnaire. All procedures followed ethical guidelines approved by the Institutional Review Board (IRB) of Foundation University Islamabad.

2.4 Instruments

2.4.1 Climate Change Anxiety Scale (CCAS). Originally developed by Clayton and Karazsia (2020), this 13-item scale was translated and culturally adapted into Urdu, assessing two main dimensions of climate change anxiety, including Cognitive/Emotional Impairment and Functional Impairment.

2.4.2 Demographic Questionnaire. Demographic assessment a structured interview was used to collect such as age gender and residency, flood exposure and other relevant demographic information's.

3. Results

The table 1, involves assessing the significance and direction of the relationships between the predictor variables (CEI and FI) and the outcome variables (CCA1 to CCA8 and CCA13 to CCA9). For example, if we consider CCA1 as the outcome variable and CEI as the predictor, the estimate of 0.694 with a critical ratio of 10.660 and a p-value < 0.001 suggests that there is a statistically significant positive relationship between CEI and CCA1. Similarly, for as the outcome variable and FI as the predictor, an estimate of 1.083, a critical ratio of 10.586, and a p-value less than 0.001 demonstrate a statistically significant positive relationship between FI and CCA12.

Table 2 presents the regression coefficients for the outcome variables (CCA1 to CCA8 and CCA13 to CCA9) and their corresponding predictors (CEI and FI). The first part of the table displays the coefficient estimates, while the second part includes further details such as standard errors (S.E.), critical ratios (C.R.), p-values, and significance levels

In table 3, all p-values are less than 0.001, indicating that the estimated variances for all variables are statistically significant at the conventional significance level of 0.05. Therefore, we reject the null hypothesis that the variances are zero, suggesting that these variables contribute significantly to the model

The chi-square value divided by the degrees of freedom is 4.355, which indicates a significant chi-square value at $p < 0.001$, suggesting a less than ideal fit, although the model is still acceptable. Independence Model: The CMIN/DF ratio is 25.959, indicating a significant chi-square value at $p < 0.001$, suggesting a poor fit of the model to the data. The RMSEA value of 0.098 indicates a relatively good fit, falling within the acceptable range (typically below 0.08), suggesting that the model fits the data reasonably well. The RMSEA value of 0.267 suggests a relatively poor fit, as it exceeds the typical threshold of 0.08, indicating that the model may not adequately represent the data. The GFI value is 0.881, which is relatively good but could be improved. The NFI/CFI values are 0.862/0.890, which suggest a relatively good fit, but there is room for improvement. The BIC value is 436.875, which represents a balance between model fit and complexity. Lower values indicate better fit relative to model complexity. The ECVI value is 0.953, representing the expected predictive error for the model. The Helter value of 105 suggests adequate sample size to support the model's stability and generalizability.

4. Discussion

The primary aim of the current study was to assess the psychometric properties of Urdu translated version Climate Change Anxiety Scale (CCAS) in Afghan migrants living in flood affected areas of Nowshera and Charsadda districts KPK Pakistan. The finding of the

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Table 1
Regression Coefficient for Predictors of Outcomes (N=320)

Outcome Variables		Predictors	Estimate	S.E	C.R	p
CCA1	<------	CEI	.694	.065	10.660	<.001
CCA2	<-------	CEI	.613	.050	12.213	<.001
CCA3	<------	CEI	.470	.049	9.613	<.001
CCA4	<------	CEI	.659	.055	11.958	<.001
CCA5	<-----	CEI	.722	.060	12.054	<.001
CCA6	<-----	CEI	.964	.060	16.113	<.001
CCA7	<-----	CEI	.931	.058	15.934	<.001
CCA8	<-----	CEI	1.000			
CCA13	<-----	FI	1.000			
CCA12	<-----	FI	1.083	.102	10.586	<.001
CCA11	<-----	FI	1.058	.103	10.282	<.001
CCA10	<-----	FI	1.077	.108	10.010	<.001
CCA9	<-----	FI	1.113	.111	10.038	<.001

Table 2
Standardized Regression (Default Model)(N=320)

			Estimate
CCA1	<---	CEI	.562
CCA2	<---	CEI	.632
CCA3	<---	CEI	.513
CCA4	<---	CEI	.621
CCA5	<---	CEI	.625
CCA6	<---	CEI	.791
CCA7	<---	CEI	.784
CCA8	<---	CEI	.806
CCA13	<---	FI	.624
CCA12	<---	FI	.723
CCA11	<---	FI	.694
CCA10	<---	FI	.669
CCA9	<---	FI	.671

Covariance :-(Default Model)

			Estimate	S.E.	C.R.	p
CEI	<-->	FI	.450	.056	8.083	<.001
CEI	<-->	F1	.794			

Table 3
Variances: (Default Model) (N=320)

	Estimate	S.E.	C.R.	p
CEI	.808	.092	8.804	<.001
FI	.397	.066	6.016	<.001
e17	.841	.067	12.523	<.001
e16	.457	.037	12.219	<.001
e15	.499	.039	12.679	<.001
e14	.559	.046	12.276	<.001
e13	.656	.054	12.255	<.001
e12	.448	.042	10.691	<.001
e11	.437	.040	10.807	<.001
e10	.434	.042	10.413	<.001
e29	.622	.053	11.672	<.001
e30	.425	.040	10.549	<.001
e31	.480	.044	10.964	<.001
e32	.570	.051	11.256	<.001
e33	.601	.054	11.229	<.001

study revealed that the Urdu translated version of CCAS is a reliable and valid instrument for the assessment of climate change anxiety in targeted populations.

Confirmatory factor analysis indicated that the scale was satisfactory result on Cognitive/Emotional Impairment and Functional Impairment, which similar to the originally adapted scale (Clayton & Karazsia, 2020).

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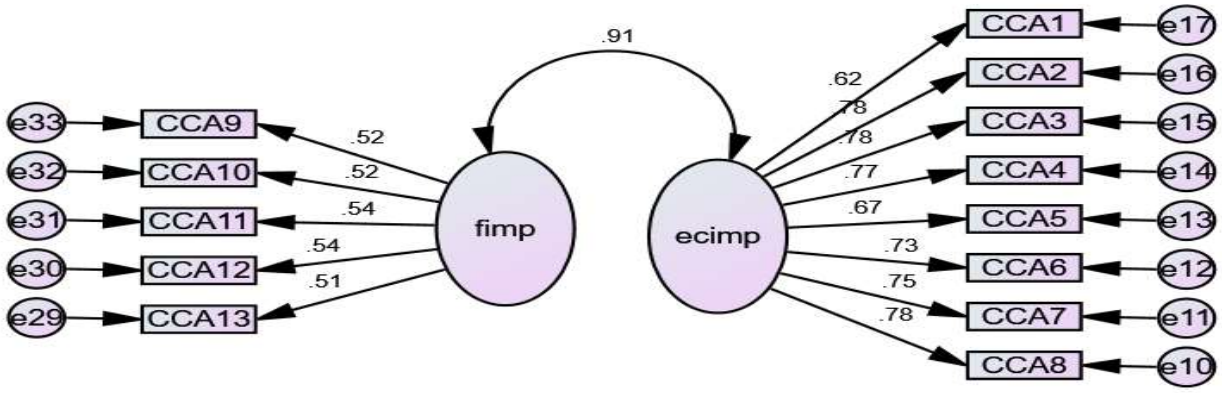
Table 4
Factor Score (Default Model) (N=320)

	CCA9	CCA10	CCA11	CCA12	CCA13	CCA8	CCA7	CCA6	CCA5	CCA4	CCA3	CCA2	CCA1
FI	.112	.115	.134	.154	.097	.040	.037	.038	.019	.021	.016	.023	.014
CEI	.032	.033	.039	.045	.028	.187	.173	.175	.089	.096	.077	.109	.067

Model fit

Model	CMIN/DF	RMSEA	GFI	NFI/CFI	BIC	ECVI	HOELTER
Default	4.355***	.098***	.881	.862/.890	436.875	.953	105
Saturated			1.000	1.000/1.000	533.072	.521	
Independence	25.959***	.267***	.323	.000/.000	2100.938	5.876	18

Figure 1, Standardized Factor Loadings in CFA of Climate Change Anxiety Scale (N=320)



Additionally, the results of the current study demonstrate strong reliability for the Urdu translation of the CCAS, with a Cronbach's alpha of 0.88, confirming its reliability as a tool for assessing the psychological effects of climate change among vulnerable populations and across diverse cultural groups. Furthermore, the study's confirmatory factor analysis (CFA) indicates good fit indices (CFI = 0.89; GFI = 0.88; RMSEA = 0.09***), suggesting that the factor structure is consistent across cultures(Ojala et al., 2021). Moreover, The CMIN/DF ratio of 25.959 indicates a significant chi-square ($p < 0.001$) and suggests a poor model fit. The RMSEA values (0.098 and 0.267) reflect mixed results, with 0.098 showing reasonable fit and 0.267 indicating poor fit as it exceeds 0.08. The GFI of 0.881 is decent but could be improved. NFI and CFI values of 0.862 and 0.890 indicate a fair fit with potential for enhancement. The BIC of 436.875 balances model fit and complexity, while the ECVI of 0.953 estimates predictive error. Lastly, the Hoelter value of 105 supports the model's stability and generalizability. This result is in line with the previous findings(Clayton, 2020; Reser et al., 2012), may demonstrate similar finding. The results repeat that using CCAS is useful for assessment of climate change anxiety across cultures? The Urdu CCAS,

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therefore, provides a cultural way to grasp and assess mental health challenges due to climate among diverse population groups including Afghan migrants displaced and struggling with flood-related difficulties (Sarfaraz & Faisal, 2023).

Conclusion

The finding of the current study of the Urdu Climate Change Anxiety Scale (CCAS) have satisfactory Confirmatory analysis in Afghan migrant living in KP Pakistan. The findings highlight the need for culturally relevant climate anxiety assessment tools in diminished communities where mental health services are lacking. The Urdu CCAS would be a key aspect for professionals, policymakers and researchers to jointly respond towards climate related challenges in South Asia.

Limitations

The study has some valuable insights, however also several limitations. Firstly, purposive sampling was used which may have generalizability issues. The results may not be generalize to all those Afghan migrant living in Pakistan. Secondly, the cross-sectional design was used, which may limit the association of drawing causal conclusions about climate change anxiety and psychological well-being. A longitudinal study might be helpful to make a strong association between climate change anxiety and environmental stressors. Thirdly, in the current study a self-report questionnaires which may create social desirability biasness, not capturing the full depth of psychological complexity involved in climate change anxiety. Other strategies, for example interviews or focus groups, would add to data triangulation and create a more complete image about what transpires with the participants.

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