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URDU TRANSLATION AND STANDARDIZATION OF ADULT TEMPERAMENT QUESTIONNAIRE (LONG FORM)

Original Research

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ABSTRACT

Background: Temperament plays a foundational role in shaping personality and behavioral outcomes, making its accurate assessment vital for psychological research. Standardized temperament measures are widely used in Western populations, but culturally adapted tools for non-English-speaking contexts remain limited. Translating and validating temperament inventories, such as the Adult Temperament Questionnaire (ATQ), into regional languages enhances their utility and relevance in diverse populations. This study aimed to translate and standardize the ATQ Long Form into Urdu, enabling its application in Pakistani adult populations.

Objective: To translate, culturally adapt, and assess the psychometric properties—construct validity, reliability, and convergent/divergent validity—of the Adult Temperament Questionnaire Long Form Urdu version.

Methods: The study was conducted in two phases. Phase I involved the translation of the 177-item ATQ using forward-backward translation by six bilingual experts. The final Urdu version was refined based on linguistic and semantic accuracy. In Phase II, a sample of 460 participants (59.3% female, aged 18–65) was recruited from public and private universities using purposive sampling. Exploratory factor analysis with Direct Oblimin rotation was used to assess construct validity. Internal consistency was evaluated using Cronbach's alpha, while test-retest reliability was assessed using intraclass correlation. Convergent and divergent validity were examined through correlations with the ATQ Short Form Urdu and Big Five Inventory-10 Urdu, respectively.

Results: Ten factors were extracted, accounting for 22.55% of the cumulative variance. The KMO value was 0.60, and Bartlett's test was significant ($p < 0.001$). Cronbach's alpha ranged from 0.09 to 0.84, with the full scale scoring $\alpha = 0.90$. The test-retest reliability was moderate (ICC = 0.25). A moderate positive correlation ($r = 0.30$, $p < 0.05$) was found with the ATQ Short Form and a moderate negative correlation ($r = -0.30$, $p < 0.05$) with the Big Five Inventory-10.

Conclusion: The Urdu version of the Adult Temperament Questionnaire Long Form demonstrated strong reliability but moderate validity. It is suitable for research purposes in Urdu-speaking populations, though not ideal for clinical use due to its length and mixed construct validity.

Keywords: Cross-Cultural Comparison, Psychometrics, Reproducibility of Results, Surveys and Questionnaires, Temperament, Test-Retest Reliability, Translation.

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INTRODUCTION

Temperamental traits have emerged as pivotal elements in understanding developmental psychopathology, offering vital insights into the early underpinnings of various psychiatric conditions. Defined as constitutionally based individual differences in emotional, motor, and attentional reactivity, as well as self-regulation, temperament provides a foundational lens through which behavioral and psychological outcomes can be anticipated (1). Rooted in ancient thought, the concept of temperament dates back to Hippocratic theory, which associated personality types with bodily humors—black bile, yellow bile, phlegm, and blood—giving rise to melancholic, choleric, phlegmatic, and sanguine temperaments, respectively (2). Modern research, however, has transitioned from these elemental ideas toward empirical models grounded in neurobiological and psychometric approaches. One such model, proposed by Rothbart and Bates, emphasizes dispositional attentional mechanisms like effortful control as central to understanding temperament, rather than cognitive abilities per se (3). A more integrative psychobiological framework developed by Cloninger categorizes temperament through three major self-concept dimensions: self-directedness, cooperativeness, and self-transcendence. These domains are systematically evaluated through the Temperament and Character Inventory (TCI), which distinguishes between normal and abnormal personality traits, making it a valuable tool in both clinical and research settings (4). Complementing this, Rothbart and colleagues have proposed a model comprising dimensions such as effortful control, extraversion/surgency, orienting sensitivity, negative affect, and affiliativeness—each of which captures the reactive and regulatory components of temperament (5).

Reactivity, which refers to physiological responses to internal and external stimuli, and self-regulation, or the control of those responses, are essential in shaping behavioral tendencies. Effortful control, in particular, is viewed as a core regulatory mechanism that modulates reactivity and aligns closely with psychological resilience and vulnerability (6). While these conceptual models are well-established, their empirical validation often relies on robust assessment tools. The most widely used methodology remains questionnaire-based assessment, which may involve caregiver reporting or self-reports using inventories, Likert scales, or binary (true/false) responses (7). Among these, the Children's Behavior Questionnaire (CBQ) and the Adult Temperament Questionnaire (ATQ) stand out for their reliability and psychometric strength. The ATQ, initially based on Derryberry and Rothbart's Physiological Reactions Questionnaire, includes both a 177-item standard form and a 77-item short form and is designed to evaluate core temperament dimensions in adults over 18 years of age (8). The assessment of temperament is not limited to self-report tools alone. Advances in neuroscience have enabled the incorporation of objective neurophysiological methods such as electroencephalography (EEG) and functional magnetic resonance imaging (fMRI), adding further depth to the understanding of individual differences in temperament (9,10). Despite these advancements, the cross-cultural applicability of temperament measures remains a concern. Straightforward translations often fail to preserve the cultural context and semantic integrity of the original instruments, leading to potential inaccuracies in interpretation (11). Therefore, rigorous translation procedures, including standardization and back-translation, are critical for ensuring cultural validity and enhancing the utility of these tools across diverse populations (12,13).

In the context of Pakistan, the adaptation and validation of temperament-related instruments such as the Borderline Personality Feature Scale-11 (BPFS-11) in Urdu have shown promising results, demonstrating the feasibility of brief, culturally tailored measures for identifying personality traits in young adults (14,15). However, further research is needed to expand culturally sensitive tools that assess a broad spectrum of temperament dimensions while maintaining psychometric robustness. Utilizing previously established tools like the ATQ, with validated translation protocols, provides an efficient approach to advancing cross-cultural temperament research. The current study aims to investigate the psychometric properties and cultural relevance of the Urdu-translated version of the Adult Temperament Questionnaire (Short Form) among Pakistani adults, with the objective of establishing its reliability, validity, and potential applicability in psychological and clinical research settings

METHODS

The present study was conducted in two distinct phases to translate, culturally adapt, and standardize the Urdu version of the Adult Temperament Questionnaire (ATQ-Short Form) for use among Pakistani adults. A cross-sectional design was employed. In Phase I, the ATQ was translated from English to Urdu using the standard back-translation method to ensure linguistic and conceptual equivalence.

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Following approval from the Institutional Review Board (IRB) and with formal permission from the original scale developer, the English version of the ATQ was independently translated into Urdu by three bilingual professionals, each holding a postgraduate qualification and proficient in both languages. These three versions were assessed by the research team for grammatical accuracy, conceptual clarity, and fidelity to the original content. The version that best met these criteria was selected. Subsequently, a separate group of three bilingual translators, who were blinded to the original version, independently retranslated the selected Urdu version back into English. These reverse translations were compared to the original ATQ to identify any inconsistencies. Items with conceptual discrepancies were revised in consultation with experts, and the final Urdu version of the ATQ was selected based on optimal scores in grammar, clarity, and semantic alignment with the original version.

Phase II involved the standardization and psychometric evaluation of the Urdu-translated ATQ. A purposive sample of 461 adults, both male and female, aged between 18 and 65 years, was recruited from one public and one private university. Participants were briefed about the study's objectives, and written informed consent was obtained. Inclusion criteria required participants to be within the specified age range, fluent in Urdu, and willing to participate voluntarily; individuals with known psychiatric diagnoses or cognitive impairments were excluded. The sample size was determined using G*Power analysis, ensuring sufficient power to detect meaningful effects. Participants completed a demographic data sheet followed by the ATQ-Urdu version. Data were processed using SPSS. Initial data screening included checks for completeness, missing values, and outliers. Descriptive statistics were computed to describe sample characteristics. Construct validity of the ATQ-Urdu was assessed through Exploratory Factor Analysis (EFA), applying Principal Component Analysis with varimax rotation to explore the factor structure. Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy were applied to verify suitability for factor analysis (16-18). Internal consistency was evaluated using Cronbach's Alpha to determine the reliability of the subscales. All psychometric testing adhered to established standards for instrument validation. Ethical approval was secured from the Institutional Review Board (IRB) prior to data collection. Informed consent was obtained from all participants, ensuring voluntary participation, anonymity, and confidentiality. Participants were informed of their right to withdraw at any time without penalty. All procedures were carried out in accordance with the Declaration of Helsinki.

RESULTS

The study involved 460 participants, with females constituting the majority (59.3%). Most participants were unmarried (66.3%), students (57.8%), and resided in Lahore (92.8%). The sample predominantly followed Islam (91.3%) and lived in nuclear family systems (80.2%). The participants' monthly family income ranged from PKR 120,000 to PKR 900,000, with a modal income of PKR 100,000. Educational background was largely at the bachelor's level (69.8%). To establish construct validity, exploratory factor analysis (EFA) was performed using the Direct Oblimin rotation method. Factor correlation matrix values exceeded 0.3, confirming suitability for oblique rotation. The Kaiser-Meyer-Olkin (KMO) value was 0.60 and Bartlett's test of sphericity was significant ($\chi^2 = 34455.83$, df = 15576, $p < 0.001$), indicating sampling adequacy and data suitability for factor analysis. Ten factors with eigenvalues greater than 1 were retained, collectively explaining 22.55% of the variance. Items with factor loadings above 0.30 were grouped into ten factors, labeled as Introspection, Sensitivity, Sociability, Cognitive Control, Procrastination, Imaginative, Insightful, Hopelessness, Irritability, and Stimulation. Introspection had the highest number of items and mean score (M = 138.46, SD = 22.77), whereas Hopelessness had the lowest (M = 20.19, SD = 4.66). Other factor means ranged from 20.84 to 50.07.

Cronbach's alpha values for internal consistency revealed high reliability for Factor 1 ($\alpha = 0.84$), moderate reliability for Factors 2 ($\alpha = 0.65$), 6 ($\alpha = 0.55$), and 7 ($\alpha = 0.64$), and low reliability for the remaining factors. Notably, Factors 3, 4, 5, 8, 9, and 10 had alpha values ranging from 0.09 to 0.28, indicating considerable within-factor variability. The overall ATQ-Urdu (Long Form) showed high internal consistency with a Cronbach's alpha of 0.90 and a mean item score of 4.19. Convergent and discriminant validity were assessed through correlations. A moderate positive correlation was found between the ATQ Urdu Short Form and the Long Form ($r = 0.30$, $p < 0.05$), confirming concurrent validity. However, a moderate negative correlation was observed between the Big Five Inventory-10 Urdu and the ATQ Long Form ($r = -0.30$, $p < 0.05$), suggesting divergence in constructs measured. Paired sample t-tests revealed statistically significant differences between the mean scores of the ATQ Long Form and both the ATQ Short Form ($t(49) = 18.639$, $p < 0.001$) and the Big Five Inventory-10 ($t(49) = 81.83$, $p < 0.001$), with the Long Form consistently yielding higher mean scores. Test-retest reliability analysis using a 2-way mixed-effects intraclass correlation model indicated moderate reliability (ICC = 0.25, $p < 0.05$), with confidence intervals ranging from 0.08 to 0.62, supporting acceptable temporal stability over time.

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Table 1: Frequencies and Percentages of Participants (N=460)

	Frequency	Percentage	Mode	Min-Max
Age			22	17-64
Family Income			100000	120000-900000
Gender				
Male	187	40.7%		
Female	273	59.3%		
Marital Status				
Married	155	33.7%		
Unmarried	305	66.3%		
Education				
Secondary	1	.2%		
Matric	3	.7%		
Intermediate	120	26.1%		
Bachelors	321	69.8%		
Masters	15	3.2%		
Religion				
Muslim	420	91.3%		
Christian	40	8.7%		
Profession				
Clerk	1	.2%		
Student	266	57.8%		
Government Employees	30	6.5%		
Housewife	85	18.5%		
Businessman	62	13.5%		
Model	02	.4%		
Private Employee	5	1.1%		
Farmer	02	.4%		
Teacher	03	.7%		
Doctor	01	.2%%		
Engineer	03	.7%		
Family System				
Nuclear	369	80.2%		
Joint	91	19.8%		
Residential Area				
Lahore	427	92.8%		
Others	33	7.2%		
Mental illness				
None	458	99.6%		
Anxiety	02	0.4%		
Medical illness				
None	459	99.8%		
Skin Allergy	01	.2%		

Table 2: Kaiser-Meyer-Olkin Measure and Bartlett's Test Results

KMO Sampling	Bartlett's Test of Sphericity		
	Approx. Chi-Square	Df	Sig.
0.60	34455.83	15576	.00

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Note. KMO= Kaiser-Meyer-Olkin Measure, df= degree of freedom

Table 3: Eigen Values, Percentage Variance, and Cumulative Percentage of Ten Factors

Variance Explained	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
Eigen Values	8.28	4.21	4.19	3.72	3.7	3.53	3.38	3.01	2.96	2.9
Percentage Variance	4.67	2.38	2.37	2.1	2.09	1.99	1.91	1.7	1.67	1.64
Cumulative Percentage%	4.67	7.05	9.42	11.53	13.62	15.62	17.53	19.24	20.91	22.55

Table 4: Factor Loadings of Adult Temperament Questionnaire LONG FORM Urdu for Adult Population with Varimax Rotation

Sr. No	Item No	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
1	4	-0.35	0.17	-0.06	-0.13	0.07	0.13	0.05	0.18	-0.04	0.21
2	11	0.31	0.03	-0.19	0.08	-0.01	-0.05	-0.04	0.12	-0.03	-0.01
3	12	0.47	-0.12	-0.02	0.11	-0.11	0.01	-0.12	0.09	-0.04	-0.05
4	13	0.45	0.00	0.04	-0.02	-0.21	0.14	-0.15	-0.04	0.22	-0.06
5	29	0.33	-0.05	-0.02	0.14	0.07	-0.12	-0.08	0.02	0.04	-0.29
6	31	0.40	-0.13	0.12	-0.17	0.08	0.02	-0.10	0.06	0.15	0.09
7	32	0.36	0.02	0.17	0.07	0.03	-0.21	0.13	-0.03	0.03	-0.13
8	33	0.36	0.26	0.01	0.12	-0.09	0.04	0.01	-0.08	0.00	0.13
9	34	0.55	-0.03	0.04	0.09	0.03	-0.07	-0.12	0.08	0.05	-0.16
10	35	0.41	0.11	0.07	-0.06	-0.32	0.03	0.01	0.04	0.03	-0.12
11	36	0.43	0.02	-0.12	0.11	-0.06	-0.02	-0.12	0.20	-0.03	-0.10
12	44	0.31	-0.01	-0.11	0.22	-0.01	0.03	-0.05	0.23	-0.06	-0.17
13	55	0.47	-0.07	0.02	0.12	0.07	-0.06	-0.16	0.09	-0.08	0.10
14	56	0.53	0.13	0.13	-0.01	-0.03	-0.04	-0.06	0.08	-0.11	-0.01
15	57	0.35	-0.07	0.09	0.27	0.05	0.05	-0.06	0.02	-0.06	0.15
16	58	0.30	0.18	0.01	0.08	0.03	0.14	-0.16	0.02	-0.25	0.00
17	64	0.38	0.14	0.08	0.01	-0.11	0.01	-0.05	-0.01	0.02	-0.02
18	68	0.50	0.12	0.03	-0.02	-0.11	0.22	-0.15	-0.23	-0.01	0.10
19	100	0.40	-0.10	0.01	0.20	-0.05	-0.03	0.10	0.07	0.08	0.17
20	101	0.39	0.04	-0.01	-0.02	0.05	0.07	0.08	-0.07	0.03	-0.12
21	103	0.43	0.10	0.07	-0.06	0.03	0.09	0.00	-0.03	0.04	0.01
22	104	0.34	0.00	-0.06	-0.09	-0.07	-0.10	-0.04	-0.01	-0.06	0.00
23	105	0.40	0.02	-0.06	-0.04	0.02	0.01	-0.02	-0.11	0.02	-0.09
24	107	0.41	0.05	-0.05	0.00	0.04	-0.04	-0.07	0.02	0.28	0.06
25	109	0.37	0.00	0.06	0.28	-0.04	0.08	-0.02	-0.07	0.23	0.06
26	111	0.48	-0.09	0.19	0.28	0.02	0.11	-0.03	-0.05	0.05	-0.07
27	120	0.38	0.01	-0.16	-0.02	0.00	-0.09	0.00	-0.02	0.15	0.00

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Sr. No	Item No	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
28	141	0.33	0.17	-0.04	0.10	0.00	-0.20	-0.19	0.14	0.08	0.11
29	142	0.35	0.05	0.06	-0.07	-0.13	-0.01	0.04	0.00	-0.17	-0.13
30	163	0.47	-0.14	-0.02	0.02	0.00	0.00	-0.04	-0.15	0.07	0.16
31	169	0.35	-0.22	-0.08	0.26	-0.17	0.07	0.05	-0.12	0.09	0.15
32	3	0.01	0.39	0.04	0.17	-0.17	0.04	0.11	0.10	-0.01	-0.19
33	21	0.05	0.31	0.06	-0.02	-0.11	0.11	0.03	-0.05	0.16	-0.16
34	26	-0.21	0.42	-0.16	-0.10	-0.06	0.04	0.28	0.08	0.03	0.03
35	39	0.12	0.35	0.15	0.02	0.15	0.19	-0.02	-0.05	-0.01	0.21
36	61	0.03	0.34	-0.01	0.24	0.02	0.17	0.00	0.02	-0.03	-0.09
37	89	0.12	0.35	-0.04	0.01	0.21	-0.12	-0.04	0.13	0.10	0.14
38	94	0.03	0.47	-0.17	0.07	0.05	-0.04	0.17	-0.04	0.07	0.03
39	71	0.11	0.31	0.09	0.30	0.14	-0.18	-0.08	0.08	0.14	0.03
40	98	-0.02	0.43	0.06	0.06	-0.06	-0.05	-0.03	0.03	0.03	0.23
41	146	-0.10	0.31	-0.01	0.26	-0.06	-0.08	0.10	0.18	0.08	0.04
42	139	0.08	0.37	0.02	0.13	0.03	-0.10	0.00	0.12	0.29	-0.04
43	16	0.12	-0.10	0.43	-0.03	0.19	0.30	0.15	-0.09	-0.03	-0.09
44	18	-0.10	-0.05	0.35	0.15	-0.08	0.28	0.17	0.04	0.11	0.03
45	22	0.21	-0.01	-0.32	-0.02	-0.06	0.02	0.09	-0.01	0.16	-0.12
46	67	0.06	0.10	0.34	0.09	0.06	0.09	0.06	0.16	-0.03	0.17
47	72	0.06	0.16	0.33	-0.10	0.13	0.16	0.09	0.05	-0.15	-0.04
48	85	0.07	0.05	0.44	0.00	-0.02	0.09	0.01	0.12	0.12	-0.03
49	95	0.09	-0.03	-0.36	0.13	-0.04	-0.18	0.32	-0.08	0.18	-0.10
50	128	0.03	0.18	-0.32	-0.01	0.16	-0.04	0.07	0.00	0.10	-0.06
51	133	0.06	0.06	0.44	-0.08	0.08	0.25	0.06	0.02	0.13	0.00
52	135	0.08	0.06	0.49	0.13	0.03	0.09	0.10	-0.05	0.05	0.03
53	158	0.01	0.13	-0.44	-0.02	-0.19	0.22	0.09	0.01	-0.05	0.19
54	174	0.10	-0.09	-0.42	-0.08	0.21	0.09	0.11	0.14	-0.15	-0.08
55	40	0.21	-0.11	0.05	0.34	0.10	-0.03	0.03	0.03	-0.04	-0.24
56	69	0.31	0.00	-0.01	0.36	-0.16	0.00	0.03	0.08	-0.21	0.03
57	75	0.06	0.10	0.07	0.39	0.06	0.16	-0.14	0.05	0.07	-0.06
58	81	-0.01	0.04	-0.03	0.38	0.02	0.05	0.20	0.02	0.04	0.02
59	83	0.05	-0.02	-0.10	-0.42	-0.02	-0.03	0.21	0.00	0.12	0.04
60	112	0.05	0.07	-0.13	0.39	0.09	0.03	-0.01	0.16	0.07	0.08
61	6	-0.11	0.04	-0.11	0.14	0.41	0.02	0.13	0.09	-0.11	0.15
62	14	0.16	0.04	0.03	-0.08	-0.36	-0.10	0.19	-0.08	0.04	0.04
63	20	0.09	-0.10	0.10	-0.01	-0.50	-0.05	0.18	0.11	0.02	-0.02
64	43	0.00	-0.04	0.18	0.04	0.45	0.01	0.05	-0.07	0.02	0.04

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65	62	-0.02	-0.01	0.12	0.14	0.36	0.11	0.12	0.08	0.20	0.05
66	96	0.21	0.07	0.14	0.12	-0.36	-0.17	0.21	-0.06	0.10	-0.04
67	173	0.18	0.03	0.12	-0.01	0.43	0.06	-0.04	0.02	0.02	0.26
68	24	-0.04	0.07	0.07	0.25	0.06	0.36	0.08	0.01	0.08	0.14
69	38	-0.07	0.12	-0.04	0.02	0.02	0.34	0.00	0.19	-0.13	-0.02
70	76	-0.07	0.05	0.08	-0.04	0.14	0.35	-0.04	0.02	0.22	0.09
71	124	0.02	0.12	0.11	0.13	0.01	0.47	0.04	0.08	0.13	-0.04
72	113	0.17	0.06	0.00	0.12	0.03	0.30	-0.02	0.00	0.01	-0.05
73	116	0.00	-0.13	-0.04	0.00	0.05	0.37	0.11	0.21	0.00	-0.08
74	134	0.06	0.11	0.17	-0.04	0.13	0.42	0.01	-0.06	-0.05	-0.06
75	160	-0.06	0.01	0.19	0.16	-0.02	0.33	0.00	0.07	-0.06	0.08
76	5	-0.23	0.23	0.00	0.12	0.00	-0.05	0.30	0.06	-0.07	0.00
77	10	-0.19	0.13	0.04	0.00	-0.02	0.20	0.34	0.03	0.06	0.04
78	41	-0.12	0.09	0.26	0.03	0.15	-0.09	0.34	-0.03	0.09	-0.10
79	132	-0.31	-0.01	-0.18	0.00	-0.10	0.07	0.31	0.23	0.11	0.01
80	102	0.01	-0.12	0.15	0.00	-0.05	-0.01	0.31	0.04	0.06	-0.01
81	123	-0.16	0.08	-0.06	-0.13	0.06	0.08	0.33	0.16	-0.02	0.10
82	129	-0.24	0.04	-0.09	0.20	0.05	0.08	0.38	0.12	0.17	0.16
83	130	-0.16	-0.05	-0.10	0.21	0.20	0.11	0.37	0.12	0.17	0.05
84	145	0.03	0.05	-0.28	-0.01	0.18	-0.03	0.37	-0.18	0.07	-0.05
85	136	0.00	0.14	0.01	-0.06	0.02	-0.01	0.35	-0.15	-0.11	0.09
86	159	-0.16	0.14	0.02	-0.08	-0.01	-0.02	0.41	0.13	-0.08	-0.01
87	157	0.23	0.26	0.02	-0.01	0.01	0.11	-0.04	-0.32	-0.04	0.18
88	1	0.03	-0.08	-0.07	-0.05	0.22	0.05	-0.04	0.33	0.11	0.05
89	8	-0.07	0.13	0.00	0.01	0.11	0.27	-0.06	0.38	0.15	0.14
90	27	-0.10	0.18	0.02	0.03	0.07	0.07	0.12	0.33	0.09	0.13
91	119	0.07	0.09	0.09	-0.04	-0.09	0.06	-0.02	0.32	-0.10	0.05
92	77	0.01	0.02	0.04	0.11	0.00	0.06	-0.06	-0.01	0.31	-0.07
93	91	0.03	0.06	0.15	-0.06	0.25	0.01	-0.04	0.00	0.32	0.13
94	93	0.13	0.17	0.15	0.23	0.01	0.02	-0.04	-0.05	0.39	0.01
95	110	0.12	0.03	-0.19	-0.14	-0.10	-0.04	0.08	0.14	0.34	-0.07
96	149	-0.17	0.11	-0.12	0.01	0.06	0.19	0.02	0.15	0.32	0.05
97	2	0.30	0.01	-0.30	-0.11	0.03	-0.08	-0.01	-0.10	0.17	-0.31
98	30	0.00	0.07	0.03	0.10	-0.01	-0.09	0.08	0.13	0.07	0.43
99	51	-0.11	0.12	0.10	0.02	0.15	0.11	0.10	0.06	0.04	0.37
100	59	-0.08	0.10	0.04	0.13	0.20	-0.01	0.05	0.13	-0.10	0.32
101	168	0.19	-0.03	-0.29	-0.08	0.06	0.01	0.00	0.13	0.17	-0.31

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Sr. No	Item No	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
102	7	0.19	-0.07	0.16	-0.06	0.29	0.06	0.10	0.25	-0.17	-0.11
103	9	0.29	-0.06	0.22	0.01	-0.07	0.09	-0.04	0.10	0.15	0.03
104	15	0.08	0.05	0.00	0.09	0.08	0.04	0.14	0.21	0.03	0.02
105	17	-0.12	0.04	-0.18	0.01	0.02	0.07	0.20	0.12	0.15	-0.23
106	19	-0.17	0.09	-0.06	-0.08	0.02	0.16	0.21	-0.01	-0.04	0.10
107	23	0.04	0.20	-0.05	0.16	0.23	0.20	0.01	0.15	0.02	-0.03
108	25	-0.15	0.27	-0.08	0.17	-0.08	0.03	0.12	-0.11	0.01	0.09
109	28	0.09	0.21	0.08	0.09	0.03	0.15	-0.05	0.07	0.00	-0.02
110	37	0.20	0.15	0.28	0.23	-0.13	0.06	0.10	-0.20	0.09	-0.01
111	42	0.01	0.22	0.07	0.24	-0.04	0.22	0.17	0.17	-0.16	0.06
112	45	-0.16	-0.06	-0.08	-0.26	-0.10	0.18	0.09	0.10	0.07	-0.04
113	46	0.10	0.13	-0.22	-0.11	-0.12	-0.19	0.06	0.28	0.05	-0.26
114	47	0.11	-0.21	0.01	-0.24	0.08	-0.11	0.10	0.20	0.21	-0.04
115	48	0.18	-0.22	0.08	0.13	-0.10	0.07	0.16	0.09	-0.06	-0.04
116	49	-0.18	-0.09	0.00	0.06	-0.05	0.08	0.07	0.26	0.03	0.09
117	50	-0.11	0.00	0.08	-0.09	0.29	0.01	0.23	0.14	0.26	-0.01
118	52	-0.18	0.23	0.05	-0.06	0.13	0.08	0.07	0.12	0.06	0.05
119	53	-0.10	0.00	0.15	0.19	0.17	0.08	0.01	0.17	0.10	0.14
120	54	0.29	0.13	0.14	0.02	0.26	-0.15	0.17	-0.08	-0.17	-0.02
121	60	-0.04	0.08	-0.01	0.03	0.15	0.14	0.06	0.03	0.13	0.29
122	63	0.16	0.02	0.17	0.06	0.27	0.23	0.08	-0.03	0.19	0.17
123	65	0.24	0.10	0.13	0.30	-0.03	0.09	-0.08	-0.07	0.03	0.10
124	66	0.20	-0.19	0.05	-0.03	0.10	0.20	0.13	0.14	-0.04	0.01
125	70	-0.02	0.08	-0.01	-0.01	0.26	0.19	0.07	0.19	0.06	-0.10
126	73	0.25	0.07	-0.12	0.29	0.00	0.07	-0.02	0.09	-0.07	-0.08
127	74	0.11	0.26	0.05	0.20	0.05	0.15	-0.14	0.07	0.16	0.04
128	78	0.28	-0.01	-0.03	0.23	0.03	0.07	-0.10	-0.06	-0.11	0.08
129	79	0.05	0.17	-0.02	0.26	0.16	-0.02	0.13	0.07	0.03	0.11
130	80	0.07	0.05	0.16	0.01	0.08	0.28	0.08	-0.06	0.02	0.15
131	82	-0.06	0.01	0.18	-0.13	-0.02	0.10	0.17	-0.01	0.20	0.11
132	84	0.19	0.25	0.16	-0.09	-0.20	0.12	-0.01	0.03	0.05	-0.05
133	86	0.10	0.28	0.15	-0.05	-0.02	-0.01	0.03	-0.09	0.03	0.13
134	87	0.22	0.11	-0.13	-0.07	-0.27	0.07	0.01	-0.06	0.02	0.03
135	88	0.26	0.23	-0.06	-0.05	0.10	-0.29	0.11	-0.01	-0.23	-0.12
136	90	0.24	0.19	-0.10	-0.02	0.06	-0.14	0.13	-0.10	-0.01	-0.07
137	92	0.08	-0.10	0.23	0.10	0.08	0.26	0.02	-0.15	0.13	0.01
138	97	0.27	0.13	0.06	0.10	0.10	0.14	-0.08	-0.26	0.23	-0.16

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Sr. No	Item No	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
139	99	-0.08	0.17	0.02	-0.02	0.12	0.15	0.10	0.15	0.17	0.06
140	106	0.26	-0.06	0.04	0.22	-0.18	-0.22	0.08	0.26	0.13	0.12
141	108	0.08	0.08	0.03	0.04	0.03	-0.22	0.08	0.00	0.24	-0.02
142	114	0.07	-0.14	0.06	0.10	0.09	0.07	0.13	0.24	0.17	0.15
143	115	0.24	-0.07	0.13	-0.21	0.11	0.11	0.09	0.24	0.01	0.19
144	117	0.11	0.06	-0.08	0.12	0.23	0.14	-0.07	0.30	0.06	-0.04
145	118	0.26	0.07	0.04	0.07	0.05	0.03	-0.16	0.22	0.00	-0.05
146	121	0.23	-0.04	0.08	0.11	-0.02	-0.09	0.26	0.00	-0.15	-0.23
147	122	0.16	0.22	0.21	-0.02	0.05	-0.01	0.16	-0.08	-0.08	0.22
148	125	0.26	-0.01	-0.04	0.27	0.09	-0.04	-0.04	-0.14	0.20	0.04
149	126	0.00	0.03	-0.14	0.02	0.19	0.14	0.18	0.23	0.24	0.15
150	127	0.06	-0.03	-0.29	0.20	-0.06	0.07	0.04	0.06	0.13	0.01
151	131	0.04	0.12	-0.10	-0.11	-0.02	-0.02	0.14	-0.05	0.28	-0.21
152	137	-0.08	0.21	-0.03	-0.03	0.19	0.12	0.12	0.08	0.12	-0.16
153	138	0.03	0.21	0.11	0.26	0.09	0.04	0.08	-0.12	0.00	-0.09
154	140	0.29	0.22	0.10	0.11	0.02	0.04	0.04	-0.09	-0.04	-0.17
155	143	0.25	-0.20	-0.12	-0.03	0.20	-0.05	0.02	-0.20	0.00	-0.06
156	144	0.18	-0.08	0.12	0.18	-0.06	0.04	0.04	-0.04	0.01	-0.24
157	147	-0.15	0.13	-0.15	0.15	0.07	0.09	0.20	-0.01	0.13	-0.26
158	148	-0.08	0.01	-0.22	0.13	0.17	-0.18	0.10	0.25	-0.05	-0.10
159	150	-0.17	0.25	0.14	0.01	0.06	0.12	0.16	0.16	-0.05	-0.08
160	151	0.06	0.18	0.29	-0.16	0.17	0.09	0.10	0.12	0.11	0.03
161	152	-0.10	0.13	0.00	-0.01	-0.03	0.12	0.23	0.07	0.12	-0.09
162	153	0.24	-0.01	0.09	-0.08	-0.09	0.05	0.19	-0.19	0.00	0.12
163	154	0.11	-0.02	0.01	-0.10	-0.11	0.09	0.15	0.08	0.26	0.09
164	155	-0.06	0.10	-0.28	-0.13	-0.06	0.00	0.15	0.09	0.00	0.00
165	156	0.07	0.15	0.12	0.18	0.12	0.10	0.16	0.02	0.05	-0.23
166	161	0.26	-0.16	-0.04	0.02	0.04	-0.06	0.09	0.00	-0.02	-0.08
167	162	0.13	-0.15	0.17	0.15	-0.01	0.20	-0.03	0.05	0.14	0.05
168	164	0.00	0.14	0.13	-0.08	0.28	0.26	0.09	0.14	0.16	-0.04
169	165	0.06	0.17	-0.16	0.19	0.06	0.03	0.05	-0.15	0.16	0.20
170	166	-0.08	0.06	0.09	0.12	0.29	0.14	0.14	0.15	0.19	-0.05
171	167	0.27	-0.01	-0.10	0.03	-0.21	0.08	-0.14	0.04	0.17	0.15
172	170	0.03	0.27	-0.10	0.14	0.13	0.07	0.08	-0.04	-0.12	0.09
173	171	-0.04	0.09	0.06	0.09	0.14	0.11	0.18	0.16	-0.08	0.02
174	172	0.21	0.25	0.03	-0.03	-0.02	0.17	0.06	0.07	0.07	0.00
175	175	-0.12	0.28	-0.09	-0.15	0.02	0.09	0.19	-0.02	-0.11	0.13

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Sr. No	Item No	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
176	176	0.03	0.26	-0.19	0.05	0.24	0.03	0.15	-0.08	-0.04	-0.24
177	177	-0.16	0.01	-0.03	0.17	0.15	0.17	0.04	0.04	0.08	0.02

Note. F = Factor, Factor loading >.30.

Table 5: Descriptive Statistics and Internal Consistency of Extracted Factors in Adult Temperament Questionnaire Long Form Urdu (N = 460)

Factor No.	Factor Name	No. of Items	Mean (M)	SD	Minimum	Maximum	Cronbach's Alpha (α)
Factor 1	Introspection	31	138.46	22.77	3.56	4.92	.84
Factor 2	Sensitivity	11	46.06	9.47	3.59	4.56	.65
Factor 3	Sociability	12	50.07	51.45	3.71	4.46	.22
Factor 4	Cognitive Control	6	25.95	5.30	3.75	4.74	.28
Factor 5	Procrastination	7	28.65	4.98	3.82	4.42	.09
Factor 6	Imaginative	8	34.57	7.10	3.70	4.59	.55
Factor 7	Insightful	11	42.17	9.39	3.49	4.19	.64
Factor 8	Hopelessness	5	20.19	4.66	3.49	4.29	.27
Factor 9	Irritability	5	21.56	5.06	4.21	4.46	.27
Factor 10	Stimulation	5	20.84	4.33	4.01	4.28	.09

Note. α = Cronbach alpha coefficient.

Table 6: Correlation and Mean Differences Between ATQ Long Form Urdu and ATQ Short Form Urdu (N = 50)

Variable	N	Mean (M)	SD	Correlation (r)	t (df)	p-value	95% CI (LL – UL)
Adult Temperament Questionnaire (Long Form)	50	431.740	34.083	–	–	–	–
Adult Temperament Questionnaire (Short Form)	50	336.260	26.637	0.30*	–	–	–
Paired Comparison: Long Form vs. Short Form Urdu	–	431.74	34.08	–	18.639 (49)	0.000	85.18 – 105.77

Note: *p < .05, ***p < .001; M = Mean, SD = Standard Deviation, CI = Confidence Interval, LL = Lower Limit, UL = Upper Limit.

Table 7: Validity, Reliability, and Scale Properties of ATQ Long Form Urdu with Big Five Inventory-10 Urdu (N = 50)

Variable Comparison / Measure	N	Mean (M)	SD	Correlation (r)	t (df)	p-value	95% CI (LL – UL)	Additional Metrics
Big Five Inventory-10 Urdu	50	25.74	2.95	–	–	–	–	–
Adult Temperament Questionnaire (Long Form Urdu)	50	431.74	34.08	–0.30*	–	–	–	Cronbach's α = .90, Mean Item Score = 4.19
Paired Comparison: ATQ Long Form vs. BFI-10 Urdu	–	431.74	34.08	–	81.83 (49)	0.000	396.02 – 415.97	–
Test-Retest Reliability (ATQ Long Form Urdu) – Intraclass Correlation	–	–	–	–	F = 4.86	0.000	0.08 – 0.62	ICC = 0.25 (2-way mixed-effects model)

Note: *p < .05, ***p < .001; M = Mean, SD = Standard Deviation, CI = Confidence Interval, LL = Lower Limit, UL = Upper Limit, ICC = Intraclass Correlation Coefficient, α = Cronbach's Alpha.

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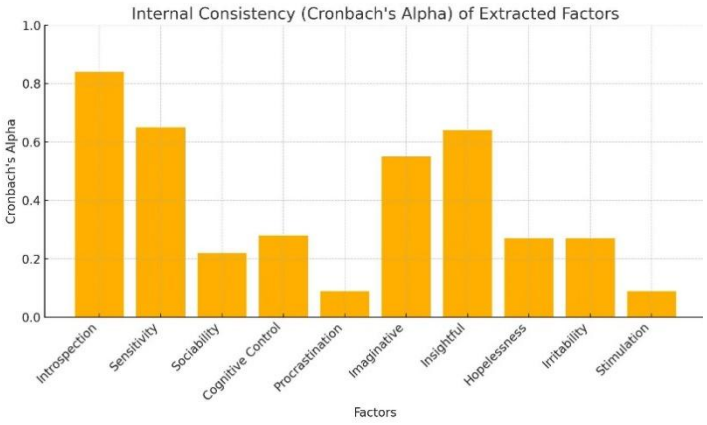


Figure 1 Internal Consistency (Cronbach's Alpha) of Extracted Factors

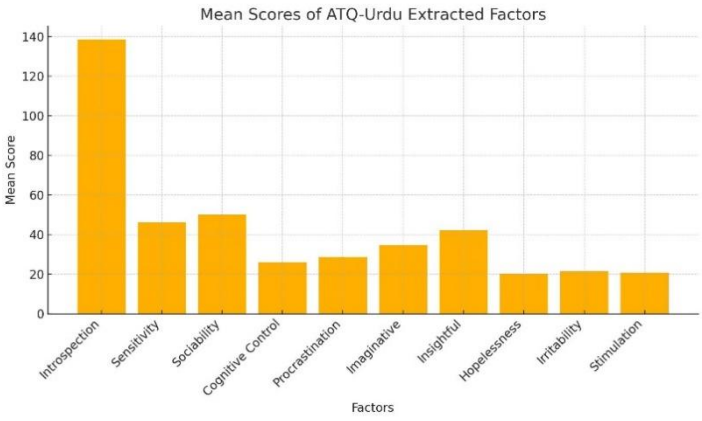


Figure 2 Mean Scores of ATQ-Urdu Extracted Factors

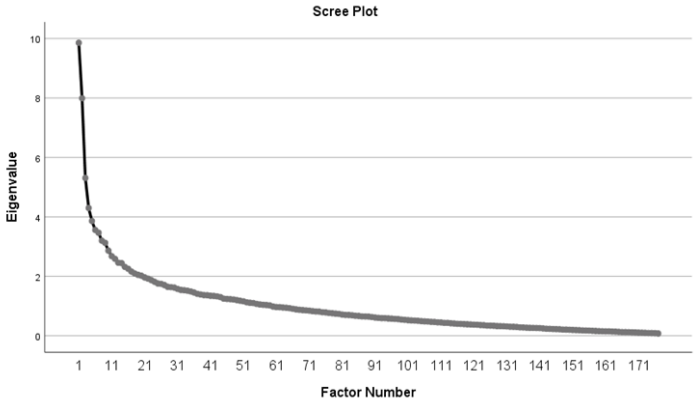


Figure 3 Scree Plot for Factor Structure Adult Temperament Questionnaire LONG FORM for 460 Adult Population.

DISCUSSION

The present study aimed to translate, culturally adapt, and psychometrically validate the Urdu version of the Adult Temperament Questionnaire (ATQ) Long Form. Through a methodologically rigorous approach that included forward-backward translation and exploratory factor analysis, the study provided foundational insight into the scale's applicability in the Pakistani adult population. The translation process followed internationally recommended protocols, ensuring linguistic and semantic equivalence across both versions of the instrument. The findings revealed that the Urdu-translated ATQ Long Form yielded ten factors, derived through parallel analysis and supported by an acceptable Kaiser-Meyer-Olkin (KMO) value of 0.60. Although this KMO score met the minimum threshold for sampling adequacy, it remained on the lower end of the acceptable range, indicating a limitation in sampling robustness (19). Factor analysis extracted interpretable dimensions that were thematically consistent with the theoretical constructs of temperament. However, internal consistency, as measured by Cronbach's alpha, revealed a concerning variability across the factors. While the first factor demonstrated strong internal consistency ($\alpha = 0.84$), most others fell below the acceptable threshold of 0.70, with several scoring as low as 0.09, suggesting limited cohesion among items within those dimensions and indicating potential measurement error or heterogeneous item content (20,21). The study's attempt to establish convergent and divergent validity using the ATQ Urdu Short Form and Big Five Inventory-10 Urdu, respectively, yielded fair correlations. A moderate positive correlation ($r = 0.30$) with the short form suggested fair but not strong convergent validity, while a moderate negative correlation ($r = -0.30$) with the Big Five Inventory-10 confirmed acceptable divergent validity. These findings were in alignment with existing psychometric benchmarks, where values between 0.21 and 0.40 are

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interpreted as fair correlations, but they fell short of the more robust relationships ($r > 0.50$) typically expected for solid convergent validity (22-24).

One of the critical issues highlighted was the challenge posed by the length of the questionnaire. The 177-item long form may have contributed to participant fatigue, reducing response accuracy and consistency. Prior research comparing short and long instruments of the same construct has found that shorter tools tend to yield higher validity and reliability, likely due to better participant engagement and reduced cognitive burden. Additionally, the sample size, though statistically acceptable, could have been larger to increase the stability of factor structure and improve the KMO score. Time constraints and logistical limitations restricted the ability to expand sampling or include multiple regions and populations, limiting the generalizability of findings. Despite these limitations, the study's strengths include the use of a culturally and linguistically appropriate translation methodology and the use of multiple psychometric strategies for validation, including test-retest reliability, which showed moderate stability over time ($ICC = 0.25$, $p < 0.05$). The overall internal consistency of the full Urdu version was high ($\alpha = 0.90$), indicating the questionnaire's potential utility for research settings.

The results support the research utility of the ATQ Long Form Urdu version but raise concerns about its suitability for clinical application due to length, administration burden, and psychometric variability across subscales (25,26). The short form, being less time-consuming and easier to complete, is recommended for future standardization and clinical deployment. Furthermore, future research should aim to conduct confirmatory factor analysis (CFA) to verify the factor structure established through exploratory methods. Subgroup analyses based on age, gender, and education should also be incorporated to examine the measurement invariance across demographics. Revising poorly performing items and conducting a split-sample validation study could enhance construct validity and overall scale efficiency. This study contributes significantly to the field of indigenous psychological assessment by providing a preliminary standardized temperament tool in Urdu. Its implications are particularly relevant for researchers and educators seeking to examine temperament in culturally relevant contexts. The scale may serve as a valuable foundation for the development of culturally grounded temperament models in Pakistan, though additional validation work is needed to fully establish its robustness and clinical applicability.

CONCLUSION

The study successfully translated and standardized the Adult Temperament Questionnaire (Long Form) into Urdu, offering a culturally adapted tool for temperament assessment within the Pakistani context. While the construct validity analysis revealed that only some factors demonstrated acceptable reliability, and the overall sample adequacy was limited, the scale showed moderate levels of convergent and divergent validity. Importantly, the Urdu version exhibited strong internal consistency and acceptable test-retest reliability, supporting its use as a dependable research instrument. Despite limitations in validity, the translated scale holds significant potential for advancing indigenous psychological assessment and can be confidently employed for academic and research purposes in Urdu-speaking populations.

AUTHOR CONTRIBUTION

Author	Contribution
Razia Bhatti*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Abia Nazim	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published

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