

# Adaptation and Validation of Adult Temperament Scale (ATS)

**Zaia Bano**

University of Gujrat

**Umme Khuzaima**

University of Gujrat - Hafiz Hayat Campus: University of Gujrat

**mueen abid** (✉ [mueen.abid.uog@gmail.com](mailto:mueen.abid.uog@gmail.com))

University of Gujrat - Hafiz Hayat Campus: University of Gujrat <https://orcid.org/0000-0002-2066-5240>

---

## Research Article

**Keywords:** Translation, Adaptation. Validation, Adult Temperament scale

**DOI:** <https://doi.org/10.21203/rs.3.rs-327299/v1>

**License:** © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

---

## Abstract

The objective of the study was to translate, adapt and validate the Urdu version of Adult Temperament scale (ATS). In the current study the cross sectional study design was used. The study was conducted at both private and government educational institutions, residential, and occupational settings of district of different cities like Gujranwala, Gujrat, Jhelum, Sialkot, Rawalpindi and Wazirabad. The data was collected from adults using convenient sampling technique. Firstly, the translation of Adult Temperament scale was conducted in International language. The forward-backward translation method was used for translation which was followed by expert panel evaluation, linguistic and conceptual verification of measure and then a final translated version was finalized. Further, test-retest administration was used for field administration of these items over 250 adults by self-administration of questionnaires. For measuring psychometric properties, the scale was again administered on a sample of 300 participants. Moreover, for validation sample of 150 adults were selected by convenient sampling technique. The data was analysed with correlation, confirmatory factor analysis and reliability test. The results showed the correlation of test-retest administration in between .310 to .865 of the 26 items. The model fit summary of CFA showed a CFI of .905 p-value of .00 that is less than .05 so it confirmed the structure of the questions and their relations to the subscales were confirmed. The reliability of the subscales: choleric .970, sanguine .943, phlegmatic .744, and melancholic .766 and divergent validity was also confirmed using BFI-10. Finally, the translated English version of scale with 26 items was found reliable and valid at the end of analysis.

## Introduction

Human beings are the very complicated creatures. All humans appear to be same but in fact everyone is entirely different. Human development is basically a composite case which usually involves joint impact of individual dispositional features and socio-ecological conditions. Men came to this world with inceptive temperamental biases which also provides a sense of favouritism for them to interact with their environment in every specific way. In the present world, humans develop socio-emotional, behavioural as well as cognitive qualities with increasing number day by day which also distinguish them from one another and it's all because of interaction. (Chen & Schmidt, 2019)

According to the World Health Organization (WHO), an adult is considered a person older than 19 years of age (World Health Organization, 2013). Different cultures play a major role in a point at which a person advance from childhood to adulthood and the legal requirements usually shift between 16 and 21 years. (Caneo & Neirotti , 2017).

Adult can be defined as the person who has feature of cultural variance. It can also be defined as biological, psychological and chronological age, social responsibility and mature perspectives. An adult is seen as a person who has the complete ability to deal with the difficult situations and produce off-springs. (Beck,2016). An adult is considered as a person who has reached the age of maturity and is able to face challenges and accomplish tasks and regarded as independent and responsible. Adulthood is divided into three phases. Young adults (18 to 45), Middle adults (46 to 60), Old adults (61 and above) (Iqbal,2019).

In Pakistan, adult's number is increasing rapidly (Index Mundi, 2019). Without the contribution of the adults the society will be malfunctioned. There are many problems in the society that are faced by the adults and are taken into no account. One of the problem is the temperament. The process of human growth and development cannot be parted from the diverse environmental, social, and cultural impacts (Matsumoto, 2007) consequently ,it leads to different temperament (Allik & McCrae, 2004). According to Rothbart and Berry (1981), temperament is defined as individual differences existing in reactivity and self-regulation that are assumed to have a constitutional basis. It is biologically derived behavioural characteristic and tendency of individual and can be understood through three dimensions (EAS). First one is emotionality that refers to intense negative emotions like fear and anger. Second is related to hyperactive behaviours like impulsivity and impatience, and the last one is sociability reflecting the ability of individuals to have emotional warmth and social interaction. (Bojanowska & Zalewska,2016)

Temperament has a life long impression on the mental functioning of human beings (Gallitto, 2015; Rotella et al., 2015) and are supposed to be a risk factor for the development of different psychological problems (Nigg, 2006). Various researches have suggested that cultural influences play a very important role in the expression of temperament and these expressions varies differently across different cultures (Gartstein, Slobodskaya, Olaf Żylicz, Gosztyła, & Nakagawa, 2010).

In last decades , the interest in studying the temperament has been increased greatly. (Vorkapić & Lučev, 2014; Bhat et al., 2015).

The study of temperament shows the role of temperamental predispositions toward the health and illness and emphasized that the indigenous assessment tool should be developed that help in the screening of the individuals that has negative temperamental tendencies and also that the to measure whether the potential of individuals could be consume suitably in an effective manner.

A large number of scales have been developed that measures child temperament but as far as adult temperament is concerned, there is shortage of assessment tool. Only five scales are available in this perspective which are: Emotionality, Activity, and Sociability (EAS) Temperament Survey for Adults developed by Buss and Plomin in 1984, New York Longitudinal scale is an Early Adult Questionnaire developed by the Study conducted in 1982 (Thomas, Mittelman & Chess, 1982), Myers-Briggs Type Indicator (McCaulley, Myers, Quenk, & Hammer, 1998), Adult Temperament Questionnaire which is widely used now days (Evans & Rothbart, 2007) and Taylor-Johnson Temperament Analysis (Taylor & Morrison, 2012).

It has become evident through the literature that there is a dearth of adult temperament scale. It has remained a challenging task in history to explore the role of temperament across life settings, particularly to Asian countries. All the scales stated above were developed in English with western population As limited scales available in the native language so there was an outrageous need to develop the measure of measuring adult temperament which can be used in native Pakistan settings. In the context of Pakistan, the construct of temperament was not well developed. The available assessment tools are in English language and developed by emphasizing the western cultures which do not suit the Pakistani English comprehended population and when those instruments used in different cultures possible biases occurred. There was a dire need to translate, adapt and validate a scale according to Pakistani culture into official English language that was primarily developed in Pakistan in the indigenous settings. Accordingly, the study was chiefly concerned with the translation, adaptation and validation of Adult temperament scale (ATS) which is used for measuring the adjustment and psychopathology (Anjum, Bano, 2019).

## **Methodology**

### **Sample**

The data was collected from 250 participants who are the adults of various occupation from district Gujrat , Gujranwala , Jhelum, Sialkot , Rawalpindi and Wazirabad by using convenient sampling. 250 employed adults between age of above 19 to age 60 were selected from the above given category. The test retest was conducted in field administration of the scale.

### **Measure**

The study was conducted about translation, adaptation and validation of Adult temperament scale which is a reliable measure for adjustment and psychopathology was developed. The scale consists of 26 items , categorized into four subscales labelled accordingly (sanguine, phlegmatic, melancholic ,and choleric) . It was originally developed into Urdu language. Internal consistency of choleric subscale was .968, Melancholic subscale was .922, Phlegmatic subscale was .942 and Sanguine subscale was .943. Split half reliability coefficient was calculated. Split half reliability of choleric scale was .942, phlegmatic scale was .865, melancholic scale was .889 and sanguine scale was .892.in order to determine the validity of adult temperament scale correlation was calculated and the scale had high correlation for all the subscales .Inter

item correlation of phlegmatic subscale was .808, of choleric subscale is .801, of melancholic subscale was .798, of sanguine subscale was .826 (Anjum, Bano, 2019).

## **Procedure**

Firstly, copyrights of Adult Temperament Scale with the aim of translation into international language were obtained from the author of scale by fulfilling all the requirements. Although there was a shortage of literature related to the translation of the scales that would enable their appliance in a cross cultural setting and standardized of procedure, following steps were taken to translate the Adult Temperament Scale in international language (English). That involved forward-backward translation, expert and linguistic expert evaluation followed by the pilot study. Finally, a final English translated version was finalized. The data was collected after taking permission from the ethical committee of department for conducting study. Both written and oral informed consent was taken after briefing about the purpose of the study using self-reported questionnaire. The participants were attempted to read items carefully and respond accordingly.

## **Phase II: Measurement of psychometric properties**

### **Sample**

The data was collected from 300 employed adults that were selected from Gujrat by using convenient sampling age above 19 years. Participants were selected from private and government educational institutions, residential and occupational settings of district Gujarat.

### **Measure**

English translated version of Adult temperament scale was used for the measurement of temperament of the participants. The scale consists of four subscales with 26 items. To determine the psychometric properties of measure the tool was developed in which English version of Adult Temperament Scale (ATS) was used. Intense anger, active, strong build and inconsiderate would characterize the Choleric type of person. Calm, dependable, affectionate and passive characterizes phlegmatic scale. Melancholic subscale is characterized by the quality of melancholy, sensitivity, perfectionism, unsociability and being moody. The final subscale is sanguine subscale with characteristics of friendliness, cheerfulness, optimism and efficiency. (Anjum & Bano, 2019)

### **Data analysis**

After the completion of data collection, we check the psychometric properties of English version of Adult Temperament Scale. Evaluation of psychometric properties of final international version of adult temperament scale including Confirmatory Factor Analysis (CFA), and reliability test by using SPSS-21 and AMOS-21 for windows

## **Phase III: validation of the scale**

After the completion of translation, adaptation and measurement of the psychometric properties of scale , the final ultimate step was to validate the scale. For that purpose convergent validity was determined through BFI-10.

### **Sample**

For this purpose data was collected from 150 adults from district, Gujarat by using the convenient sampling technique with the age range of above 19 to up to 60.

### **Measure**

To determine the psychometric properties of scale a battery was formed that involved English version of the Adult Temperament scale (Anjum& Bano,2019) , and Big Five Inventory (BFI-10) (Rammstedt & John, 2006)

## Data analysis

The data were analysed by using Correlation by using SPSS-21.

## Results

The 26 items were reliable and valid.

**Table Bivariate correlation between the scores in Test Retest Administration (N=250)**

Serial no	Item no	R	Serial no	Item no	R
1	1	.821**	14	14	.812**

2                      2                      .834\*\*                      15                      15                      .788\*\*

3	3	.829**	16	16	.825**
4	4	.379**	17	17	.736**
5	5	.778**	18	18	.818**
6	6	.751**	19	19	.715**
7	7	.814**	20	20	.363**
8	8	.726**	21	21	.807**
9	9	.763**	22	22	.820**
10	10	.310**	23	23	.865**
11	11	.796**	24	24	.675**
12	12	.669**	25	25	.811**
13	13	.736**	26	26	.764**

The correlation of 26 items were in the range of .310 to .865 indicating moderate to above significant correlation.

**Table- Model Fit Summary of Confirmatory Factor Analysis (N=300)**

P Value	CMIN/DF	GFI	CFI	RMSEA	PGFI
.000	3.308	.818	.905	.088	.667

The confirmatory factor analysis indicated a p-value that is less than .005 thus confirming the model with CFI index near to the appropriate limit of .90. The indices of CMIN/DF,GFI and PGFI is in the model fit limit.

**Table-3.5: Cronbach Alpha of Subscales of Adult Temperament Scale (N=300)**

<b>Subscale</b>	<b>Total Items</b>	<b>Cronbach Alpha r</b>
choleric	8	.970
phlegmatic	7	.744
melancholic	6	.766
sanguine	5	.943

Note: \*\* P<.01

The reliability of the scale shows alpha value of choleric scale .970, for phlegmatic scale .744, for melancholic scale .766 and for sanguine scale .943.

	Choleric	Phlegmatic	Melancholic	Sanguine	Extra version	Agreeableness	Conscientiousness	Neuroticism	Openness
Choleric Pearson	1	.139	.186*	.067	-.196*	.216**	-.005	.010	.311*
Correlation		.089	.023	.418	.016	.008	.955	.904	.000
Sig (2-tailed)									
N	150	150	150	150	150	150	150	150	150
Phlegmatic Pearson	.139	1	.295**	.251**	.022	.025	.157	-.042	.071
Correlation	.089		.000	.002	.765	.054	.608	.388	
Sig (2-tailed)									
N	150	150	150	150	150	150	150	150	150
Melancholic Pearson	.186*	.295**	1	.158	-.101	.025	.080	-.088	.405*
Correlation		.000		.054	.218	.760	.333	.282	.000
Sig (2-tailed)									
N	150	150	150	150	150	150	150	150	150
Sanguine Pearson	.067	.251**	.158	1	.003	-.031	.047	.182*	-.195*

	Correlation				.966				
	Sig (2-tailed)	.002	.054			.706	.568	.025	0.17
	N	.418		150	150				150
		150	150	150		150	150	150	150
Extraversion		-			1				
	Pearson	.196*	.022	.101	.003				
	Correlation								
	Sig (2-tailed)	.792	.218	.966		.002	.377	.854	.053
	N	.016			150				
		150	150	150		150	150	150	150
		150	150	150					
Agreeable		.216**							
ness		.025	.205	-.031	-.253**	1			
	Pearson	.008			.002				
	Correlation		.765	.760	.706		.106	.838	.388
	Sig (2-tailed)	150			150	150			
	N	150	150	150		150	150	150	150
		150	150	150					
Conscientiousness		-.005	.157	.080	.047	-.073	-.132	1	
	Pearson								
	Correlation					.377	.106		
	Sig (2-tailed)	.955	.054	.333	.568				
	N	150	150	150	150		150	150	150
		150	150	150	150		150	150	150
Neuroticism		.010	-.042	.088	.182*	-.015	-.017	-.085	1
	Pearson								
	Correlation					.854	.838		
	Sig (2-tailed)	.904	.608	.282	.025			.299	.079
	N	150	150	150	150	150	150		
		150	150	150	150		150	150	150
Openness			.405**			-.158	.071		



	.311**	.071		.195*		.144	.022	1
Pearson Correlation	.000	.388	.000	.017	.053	.388	.079	.786
Sig (2- tailed)						150		150
N	150	150	150	150	150	150	150	150

Significant correlation results at the .01 level (two tailed). Divergent validity has been found between the temperament scale and BFI-10 scale.

## Discussion

In context of Pakistan the construct of dimensions of adjustment was not well developed. The available assessment tools are in English language and developed by emphasizing the western cultures and when those instruments used in different cultures possible biased result can be obvious. So, in this framework cultural difference mostly ignored when test administered on a population on which it is not originally developed (Swanepoel & Kruger, 2011).

Due to this dearth of standardized measures the need of culturally reliable tool was essential in the official language for easy comprehension for the concerned population. Furthermore, cultural variances might play a role in contaminating the responses on different items leading to false results. For filling this gap, the main purpose of the study was to translate, adapt and validate Adult Temperament Scale in international language (English). For this purpose, Forward-Backward translation method was used after which data was collected from 250 respondents in test retest administration.

The results showed a test retest correlation of 26 items were in the range of .310 to .865 indicating moderate to above significant correlation.. And literature findings also suggested that the correlation value between .300 to .700 shows moderate level of acceptance (Ratner, 2019). Rumsay(2018) has mentioned that the correlation is on moderate to strong continuum when it falls between the range 0.50 to 0.70 in establishing the statistical significance.

Further to conform the already established structure of temperament scale for adults Urdu version in English the confirmatory factor analysis was done. The model fit summary has given the p value of .000 which is less than .005, hence conformed the appropriateness of the structure of the English version as well. The structure was based on 4 factors that consist of choleric, phlegmatic, sanguine, and melancholic and current research also confirmed the same factors.

The CFI of the scale was .905 that is with in the acceptable limit for model fit in literature (Hu & Bentler, 1999). The indices of CMIN/DF and RMSEA were 3.308 and .088 respectively. Byrne (2006) confirmed that the CMIN/DF value should not exceed 3 whereas RMSEA is acceptable, if it is less than 0.05 (Fabrigar, MacCallum, Wegener, & Strahan, 1999) therefore, the results are near to the ideal values which can be considered acceptable because supported by literature. In case of GFI the acceptable value is 0.90 or greater (Hooper, Coughlan, & Mullen, 2008) the current study shows a value .818 that is near to .900 hence confirming the model.

The reliability of the scale shows alpha value of choleric scale .970, for phlegmatic scale .744, for melancholic scale .766 and for sanguine scale .943, literature review indicated that the reliability value of .70 or greater is considered as statistically significant (Mendhi & Mendhi, 2015). This shows that this English version of Adult Temperament Scale is a reliable measuring instrument. Divergent validity has been found between the temperament scale and BFI-10 scale. Significant correlation results at the .01 level (two tailed). The results confirmed the convergent validity of the scale. According to the

statistically acceptable limits the values of translated, adapted and validated version of Adult Temperament Scale were in significant ranges.

## Conclusions

A translated, adapted and valid English version of Adult Temperament Scale is successfully developed with 26 items. Strong psychometric properties including good reliability, and good convergent validity of ATS shows that the original Urdu language version was well duplicated. The translated and adapted version of ATS as well as the original one can also be of immense interest and usefulness for both the researchers and the clinicians. It will be helpful for educational institutions, clinical settings, work places, industries. It not only help in identification and measurement but also help in reducing and eliminating the present illness of English speaking populations. The research could be helpful in generating new researches regarding temperament.

## Declarations

Funding: no

Conflict of interest: no

Informed consent: Yes

## References

1. Allik, J., & McCrae, R. R. (2004). Toward a geography of personality traits: Patterns of profiles across 36 cultures. *Journal of Cross-Cultural Psychology, 35*(1), 13-28.
2. Anjum, R., & Bano, Z. (2019). Development and Psychometric Properties of Adult Temperament Scale: A reliable measure for adjustment and psychopathology. *Rawal Medical Journal, 44*(1), 121-125.
3. Beck, J. (2016). When are you really an adult?. Retrieved from : [www.theatlantic.com/health/archive/2016/01/when-are-you-really-an-adult/422487/](http://www.theatlantic.com/health/archive/2016/01/when-are-you-really-an-adult/422487/)
4. Briggs-Mayers, I., McCaulley, M. H., Quenk, N. L., & Hammer, A. L. (1998). *A Guide to the Development and Use of the Myers-Briggs Type Indicator*. Consulting Psychologists Press.
5. Bojanowska, A., & Zalewska, A. M. (2017). Happy temperament? Four types of stimulation control linked to four types of Subjective well-being. *Journal of Happiness Studies, 18*(5), 1403-1423.
6. Buss, A. H., & Plomin, R. (1984). Theory and measurement of EAS. *Temperament: Early developing personality traits, 84-104*.
7. Byrne, B. M. (2006). Structural equation modeling with EQS: Basic concepts, applications, and programming (2nd ed.). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.
8. Canêo, L. F., & Neirotti, R. (2017). The Importance of the Proper Definition of Adulthood: What is and What is Not Included in a Scientific Publication. *Brazilian journal of cardiovascular surgery, 32*(1), 60-60.
9. Chen, X., & Schmidt, L. A. (2015). Temperament and personality. *Handbook of child psychology and developmental science, 1-49*.
10. Durrani, S. M., Mahmood, Z., & Saleem, S. (2017). The Development and Validation of Temperament Scale for University Students. *FWU Journal of Social Sciences, 11*(1).
11. Evans, D. E., & Rothbart, M. K. (2007). Developing a model for adult temperament. *Journal of Research in Personality, 41*(4), 868-888.
12. Fabrigar, L. R., MacCallum, R.C., Wegener, D.T., & Strahan, E.J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods, 4*(3), 272-299.

13. Gallitto, E. (2015). Temperament as a moderator of the effects of parenting on children's behavior. *Development and Psychopathology*, 27(3), 757-773.
14. Gartstein, M. A., Slobodskaya, H. R., Olaf Zylicz, P., Gosztyla, D., & Nakagawa, A. (2010). A cross-cultural evaluation of temperament: Japan, USA, Poland and Russia. *International Journal of Psychology and Psychological Therapy*, 10(1).
15. Hooper, D., Coughlan, J., Mullen, M. (2008). Structural Equation Modelling: Guidelines for Determining Model Fit. *Electronic Journal of Business Research Methods*, 6(1), 53-60.
16. Hu, L., & Bentler, P.M. (1999): Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives, *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55.
17. Mendi, B., & Mendi, O. (2015). Evaluation of Validity and Reliability of the Turkish Version of the E-lifestyle Instrument. *Journal of Yasar University*, 10(40), 6624-6632.
18. Nigg, J. T. (2006). Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry*, 47(3-4), 395-422.
19. Rammstedt, B., & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of research in Personality*, 41(1), 203-212.
20. Ratner, B. (2019). The Correlation Coefficient: Definition. Retrieved from <http://www.dmstat1.com/res/TheCorrelationCoefficientDefined.html>.
21. Rotella, F., Fioravanti, G., Godini, L., Mannucci, E., Faravelli, C., & Ricca, V. (2015). Temperament and emotional eating: A crucial relationship in eating disorders. *Psychiatry research*, 225(3), 452-457.
22. Swanepoel, I., & Kruger, C. (2011). Revisiting validity in cross-cultural psychometric-test development: A systems-informed shift towards qualitative research designs. *South African Journal of Psychiatry*, 17(1), 10-15
23. Taylor, R. M., & Morrison, L. P. (1984). Taylor-Johnson Temperament Analysis (T-JTA). *Los Angeles: Psychological Publication*.
24. .
25. Thomas, A., Mittelman, M., Chess, S., Korn, S. J., & Cohen, J. (1982). A temperament questionnaire for early adult life. *Educational and Psychological Measurement*, 42(2), 593-600.
26. World Health Organization. (2013). HIV/AIDS. Retrieved from <https://www.who.int/hiv/pub/guidelines/arv2013/intro/keyterms/en/>