



CODEN [USA]: IAJPB

ISSN: 2349-7750

INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

<http://doi.org/10.5281/zenodo.3529537>

Available online at: <http://www.iajps.com>

Research Article

VALIDITY AND RELIABILITY OF TAAPU FOR ASSESSMENT OF ARTICULATION AND PHONOLOGICAL DISORDERS IN URDU LANGUAGE; A STUDY IN PAKISTAN

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Article Received: September 2019 **Accepted:** October 2019 **Published:** November 2019

Abstract:

Objective: To determine the validity of the tool named Test for Assessment of Articulation and Phonology in Urdu (TAAPU) which is used for evaluation of speech sound production ability of bilingual Pakistani Children. **Study Design:** Validation Study **Place and duration:** The duration of the study was 8 months from March 2016 to October 2016. The study was conducted in speech therapy clinics of Punjab, Baluchistan, KPK and Sindh (in the cities of Lahore, Rawalpindi, Islamabad, Sargodha, Quetta, Abbotabad, Peshawar, Karachi). The population of interest was 4-8 years old bilingual children with APD. **Methodology:** In the study TAAPU was statistically standardized by executing it on bilingual children of the four provinces of Pakistan. Convenience sampling technique was deployed for the collection of data from the four provinces of Pakistan; a sample of 35 was from each province was selected. Primary data was collected from Punjab and KPK provinces by the researcher and data from Baluchistan and Sindh was collected by a local speech therapist on behalf of the researcher. Statistical Package for Social Sciences (SPSS- Version 21.0) was used in the study to determine the validity and reliability of TAAPU in all four provinces. **Results:** Validity of TAAPU was measured using factor analysis that illustrated only 7 factors /p/, /b/ and /m/, /v/ substitution, omission and distortion, had Eigenvalues greater than 1, so these error types were those for which no or least frequent error was received. Further content validity was determined by showing the tool to experts of the field. Cronbach's Alpha reliability was 0.899 for entire sample of 140. Substantial and almost perfect (0.61-0.80) agreement was found among raters in determination of inter-rater reliability. **Conclusion:** The data analysis results illustrated that TAAPU is a valid tool for assessment of APD in children who can interact in the Urdu language in Punjab, Baluchistan, Sindh and KPK along with their mother tongue.

Key words: TAAPU, Articulation And Phonological Disorder, Validation, Reliability

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Please cite this article in press Sadaf Noveen et al., *Validity And Reliability Of Taapu For Assessment Of Articulation And Phonological Disorders In Urdu Language; A Study In Pakistan.*, Indo Am. J. P. Sci, 2019; 06(11).

For Urdu language, TAAPU is the tool to clearly identify and help in evaluation and decision making about intervention at an early stage. TAAPU was conceived and developed to provide easily identifiable, commonly used, cultural and language appropriate items for development of further tests in the field of communication disorders in Pakistan. TAAPU includes an oral motor examination form to guide to exam oral motor structure and function. TAAPU provides a list of words that matches Urdu vocabulary and phonology.

A test needs to meet certain criteria on the basis of which it can be considered as a standardized test. Mccauley and Swisher gave ten psychometric criteria which comprised of standardization sample, an adequate sample size, use of systematic item analysis, measures of central tendency and variability, concurrent validity- categorization of child as normal or impaired, predictive validity, test- retest reliability, inter-examiner reliability, sufficient detail of test administration procedures in the manual and specific qualification requirement of test administrator (need to be precisely mentioned in the manual) ³.

Clinical Questions:

When assessing speech sound production among bilingual Punjabi-Urdu and Baluchi-Urdu Pushto-Urdu and Sindhi-Urdu speaking children with articulation and phonological disorders whether the developed Test for Articulation and Phonology in Urdu (TAAPU) executed to be a valid test or not?

RESULTS:

3.1 Reliability:

3.1.1 Cronbach's Alpha

Table 3.1.1 - Reliability Statistics

Cronbach's Alpha	N of Items
.899	102

Table 3.1.1 represents the value of overall Cronbach's Alpha of TAAPU all over Pakistan. The internal consistency coefficient was calculated as 0.899 for the entire sample of 140.

Table 3.1.2- Reliability of TAAPU

Provinces	N of Items	Cronbach's Alpha
Punjab	102	.872
Baluchistan	102	.879
KPK	102	.896
Sindh	102	.921

The objectives of the study are illustrated as follows:

- To determine the validity of TAAPU for assessment of APD among bilingual children 4-8 years old in Punjab, Baluchistan, KPK and Sindh speaking their native as well as the national language.
- To determine the reliability of TAAPU for the assessment of APD in the national language.

METHODOLOGY:

The research presents the results of a validation study conducted to determine the validity of TAAPU for assessment of APD among bilingual children (4-8 years of age) in four provinces of Pakistan.

In the study, TAAPU was standardized by executing it on bilingual children of the four provinces.

The data was collected with the aim to standardize the tool by executing TAAPU on bilingual children of the four provinces of Pakistan (Punjab, Baluchistan, KPK and Sindh). Data was collected from the speech clinics in the cities of Lahore, Rawalpindi, Islamabad, Sargodha and Quetta, Peshawar, Abbotabad, Karachi. The duration of the study was 8 months from March 2016 to October 2016. The population of interest was 4-8 years old bilingual children with APD. Convenience sampling technique was deployed for the collection of data from the four provinces of Pakistan; from each of the four provinces, a sample of 35 was selected.

Table 3.1.2 represents the values of Cronbach's Alpha for four provinces of Pakistan including Punjab, Baluchistan, KPK, and Sindh (N=35 each). The values of Cronbach's Alpha are from 0.872 to 0.921. The results tabulated in the above table revealed that Province Sindh had the highest value (0.921) of Cronbach's Alpha.

3.2 Content validity

Before collecting data, content validity of research tool was determined. The instrument was presented to the field experts and refinement was incorporated as per their proposal and then the pilot testing was conducted on N=20, to determine Cronbach's alpha reliability was determined.

Table-3.2 Alpha Coefficient (N=20 or 5 from each province)

Provinces	No. of errors	Alpha Coefficient
Punjab	102	.781**
Baluchistan	102	.714*
KPK	102	.677
Sindh	102	.870**

Table 3.2 represents the values of Cronbach's Alpha for 102 errors studied for single sounds. A sample of

5 was taken from each province to evaluate the reliability of TAAPU among bilingual children having APD (N=20). The results tabulated in the above table revealed that the values of Cronbach's Alpha are from 0.677 to 0.870 and in Sindh, the value of Cronbach's Alpha was the highest (0.870) of Cronbach's Alpha. The internal consistency coefficient of TAAPU was calculated as 0.761 among all provinces of Pakistan.

3.3 Validation

The table shows the factors and commonalities or the extraction% for each.

Symmetric Measures	TAAPU		
	Test	Retest	P Value
Pearson's R	0.890	0.794	0.025
Spearman Correlation	0.864	0.841	0.027
Kappa Agreement	100%	100%	0.000

In this study, only 7 factors had Eigenvalues greater than 1, so these error types (/p/,/b/ and /m/, /v/ substitution, omission and distortion) were those for which no or least frequent error was received. % of variance column shows that extent of variability accounted by each component/factor.

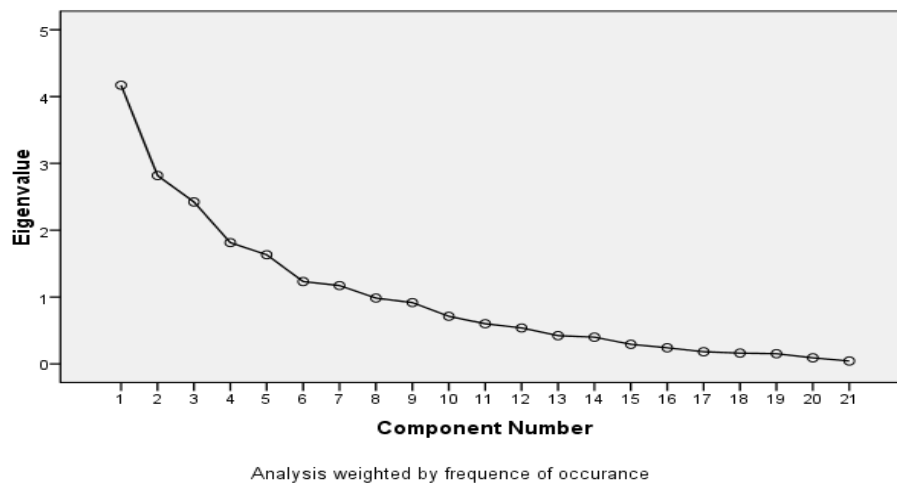


Figure 1- Factor Analysis

Figure-1 Scree plot shows the component matrix indicating the contribution of each sound per each element. The factors which met our criterion are only shown here. There were total 7 factors which had Eigenvalues greater than 1 in the study, for rest of items, frequent errors were received. It was observed that /s/ omission /z/ omission /ʃ/ omission /dʰ/ omission /t/ omission /ʈ/ omission and /k/, /g/ substitution contributed more than other sounds in APD. No addition errors were found.

DISCUSSION:

As per results, TAAPU was proved to be a valid and reliable test for articulation and phonological disorders among bilingual children in Punjab, Baluchistan, KPK and Sindh. While the process of development of TAAPU was administered on children with and without APD and the study was experimental and reliability was determined. When assessing speech sound production among bilingual Punjabi-Urdu, Baluchi-Urdu, Pushto-Urdu and Sindhi-Urdu speaking children with articulation and phonological disorders the developed Test for Articulation and Phonology in Urdu (TAAPU) executed to be a valid test because it contained easily recognizable, linguistic and culture appropriate pictures extracted from text books of Urdu syllabus in Pakistan². The reliability and validity of the test were also proved to be authentic when it was critically evaluated in the criterion mentioned in previous research studies. Below are the four research models which prove TAAPU to be a valid and reliable tool.

Messick gave an enthralling theory of construct validity which proved to be the foundation of test development^{10,12}.

Statistical Conclusion Validity of TAAPU

All three criteria of statistical construct validity^{11,13} met by TAAPU are mentioned below:

Standardization Process

Standardization criteria were followed as suggested by McCauley and Swisher³. Out of 10 criteria, TAAPU met the below mentioned 3 criteria:

1. Sample size
For the process of standardization, test needs to be administered on the sample of 100 or more. TAAPU justifies the lower limit for appropriate sample sizes. The sample of 35 from each province was taken which makes a total of 140.
2. Validity and Reliability
Quantitative methods namely cross tabulation, Cronbach's Alpha and Factor analysis were used in the study to evaluate individual item difficulty and item validity.
3. Evidence of concurrent validity
To pass this criterion the empirical evidence is required to show that the results given by the test and other methods are identical. In development phase TAAPU was administered on children with APD and without APD; the results of TAAPU were identical to the clinical judgments on the case history form prior to the administration of TAAPU.

CONCLUSION:

TAAPU is a valid and reliable tool for assessment of APD in children who interact in the Urdu language in Punjab and Baluchistan. The preliminary results suggest that the phonetic and phonological system of bilingual children speaking Urdu along with Punjabi and languages are spoken in Baluchistan is similar. Error types of APD in both groups were successfully detected and substitution error was found to be most prevalent. It is an applicable tool for detailed assessment of articulation and phonological process disorders in Urdu. The test inventory containing 60 easily recognizable colorful pictures meets the evaluation criteria for Urdu phonology. TAAPU also showed high test-retest and inter-examiner reliability. Although TAAPU is reliable and valid to detect APD in bilingual children of Punjab and Baluchistan who speak the Urdu language, yet the examiner should be familiar with the dialectal characteristics of other languages.

RECOMMENDATIONS

1. TAAPU is recommended to be used for determination of speech development norms.
2. TAAPU is advised to be used to determine the intelligibility of speech in children with a hearing deficit, intellectual disability, neuromotor speech sound deficit and phonological disorders in Urdu speaking children.

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