Research Paper

Psychometric Evaluation of the Receptive Picture Vocabulary Test for Persian-speaking Children

Nahid Jalilevand[1,2] , **Reyhane Mohamadi**[1,2] , **Ali Ghorbani**[1,2] , **Mohammad Kamali**[2,3*] , **Nafise Hassanpour**[2] , **Saba Heydarpanahi**[1] , **Tahmine Maleki**[2] , **Fatemeh Ashrafi**[1]

1. Department of Speech Therapy, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran, Iran.
2. Rehabilitation Research Center, Iran University of Medical Sciences, Tehran, Iran.
3. Department of Rehabilitation Management, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran, Iran.

ABSTRACT

Background and Objectives: Measuring children's receptive vocabulary skills requires the use of valid and reliable tools. This study aims to assess the reliability of the receptive picture vocabulary test for Persian-speaking children (RPVT-P).

Methods: In the first phase of this cross-sectional, descriptive, and analytical study, 434 normal children aged 30 to 71 months participated. In the second phase of the study, 2 groups participated, 16 children with Down syndrome (DS) a mentally age-matched typically developing (TD) peers. The internal consistency (Cronbach's α coefficient), construct validity, and discriminant validity of the RPVT-P was evaluated.

Results: Cronbach's α was calculated as 0.825, indicating good internal consistency for the total score of the RPVT-P. The Spearman correlation coefficient of 0.83 showed a positive correlation between age and the total score of the RPVT-P (P=0.0000). The correlation between most of the subtest scores and the total score of the RPVT-P was found from 0.70 to 0.87, showing acceptable construct validity. A significant difference was observed between the DS and TD groups for the total scores of the RPVT-P (P=0.0000), indicating good discriminant validity of the RPVT-P.

Conclusion: The RPVT-P is a test with acceptable validity and reliability to determine the ability of preschool Persian-speaking children in receptive vocabulary.

Keywords: Psychometrics, Vocabulary, Test, Child

* Corresponding Author:

Mohammad Kamali, *PhD.*

Address: Department of Rehabilitation Management, School of Rehabilitation Sciences, Iran University of Medical Sciences, Tehran, Iran.
Tel: +98 (21) 2222 0946
E-mail: kamali.mo@iums.ac.ir

↑ *What is "already known" in this topic:*

Hydarpanahi et al developed the second version of the receptive picture vocabulary test for Persian-speaking (RPVT-P). They reported that the mean values of the content validity ratio and content validity index were 0.91 and 0.93, respectively. In their study, 1.5 typically developing Persian–speaking children aged 30-71 months participated. The results showed that the RPVT-P has acceptable reliability and internal consistency.

➤ *What this article adds:*

Most researchers suggested a minimum sample size of 100 people and a good sample size for data analysis of 300 people. The sample in this study included 434 typically developed Persian-speaking children aged 30-71 months and 16 children with Down syndrome (DS). The results showed that the RPVT-P as a valid and reliable tool is suitable to measure the ability of preschool Persian-speaking children in receptive vocabulary.

Introduction

Word comprehension is one of the essential skills for language development and communication. All words that a person can understand mean receptive vocabulary. In the first months of life, normal toddlers begin to understand words before they start to use words for speaking. By the age of 12 months, toddlers recognize about 20 words but rapidly expand their receptive vocabulary to about 1000 words by age three [1]. Children with language disorders or developmental language disorders have communication problems in early childhood [2], therefore, they should be referred to a speech and language pathologist (SLP). One of the assessment tools is a receptive vocabulary test to determine the children's word comprehension skills. The SLP assess children to determine their abilities to understand words and whether they need clinical practice to improve word comprehension skills [3]. The clinicians can use a norm-referenced test and compare the client's scores with the characteristics of normative data [4]. One of the norm-referenced tests for receptive vocabulary assessment is the Peabody picture vocabulary test (PPVT) the 4th edition (PPVT-4), which can be used to evaluate English-speaking adults and children. It consists of 228 items, which are divided into 19 item sets [5]. Many authors who used PPVT in their research concluded that bilingual children's scores were lower than monolingual peers [6]. Some researchers reported adaptation and psychometric properties of the PPVT in their language, for example, Greek, African, Brazilian Portuguese, and Mexican languages [7-10].

So far, no prior study has been conducted on the Persian version of the PPVT. However, Hasanpour et al developed the first version of RPVT-P for children aged 30-71 months and reported its validity and reliability. The RPV included 240 color pictures (items) divided into 15 subtests, each subtest consisted of 16 pictures. The vocabulary subtests include tools, objects, body parts, verbs, clothes, edibles, animals, means of transportation, adjectives, occupations, animals, body parts, places, plant components, colors, and nature. The first version of RPVT-P was a paper-based; the pictures of vocabulary in the paper were shown to the children by the examiner. Hassanpour et al. reported psychometric properties of the RPVT-P. The study participants included 91 normal children in 7 age groups with an age group of 6 months. A value of 0.909 was reported for Cronbach's α, indicating good internal consistency. The seven–day test-retest reliability using intra-class correlation (ICC) was estimated at 0.81 considered good reliability. The results of the analysis of variance (ANOVA) test showed a significant difference between the age groups in the mean total score of the RPVT-P (P=0.000). No significant differences were reported between gender and the total scores of the RPVT-P (P>0.05) [11].

Hydarpanahi et al [12] developed the second version of the RPVT-P. The second version of RPVT-P was computer-based, therefore the examiner showed the pictures of vocabulary on a computer to the children. The experts approved the quality of the pictures of the second version of the RPVT-P. The mean content validity ratio and content validity index were 0.91 and 0.93, respectively. In their study, 1.5 typically developing Persian-speaking children aged 30-71 months participated. A statistically significant difference was reported between age groups in the mean total scores of the RPVT-P (P<0.05). A value of 0.95 for Cronbach's α was reported as a good internal consistency. The value of the ICC for the receptive picture vocabulary test was 0.89. The results demonstrated that the RPVT-P has sufficient psychometric properties.

They concluded that the RPVT-P is a suitable tool to assess the receptive vocabulary of children aged 30-71 months [12].

According to most statisticians, the minimum sample size is 100 people [13]. It is recommended that the sample size should not be less than 250 [14]. The current study aims to determine the psychometric properties of the RPVT-P using a convenience sampling method. According to the law of the sample-to-variable ratio, 15 to 20 samples per variable were considered, [15]. Hence, as the number of the RPVT-P subtests (variables) is 15, the maximum acceptable sample size is 300 people. The researchers suggested 300 people as a good sample size for data analysis.

The current study was conducted to evaluate internal consistency (Cronbach's α coefficient), construct validity, and discriminant validity of the RPVT-P and to compute Z- scores for raw scores (total scores) of the RPVT-P.

Materials and Methods

The current study was designed in 2 stages:

Stage1

Participants

The sample included 434 typically developed Persian-speaking children aged 30-71 months from kindergartens in 3 Iranian cities, Tehran, Rey, and Isfahan.

The inclusion criteria included age between 30 and 71 months, good general health based on age and stage questionnaire [16], Persian language, good verbal communication ability, no history of seizure, motor or visual impairment, cerebral palsy, genetic syndromes based on medical records and SLP informal assessment.

Materials

The second version of the RPVT-P is a computer-based test, including 240 color pictures divided into 15 subtests and each subtest consisted of 16 pictures. The name of each subtest is as followed:

Tools, home appliances, body organs, verbs, clothes, animals, fruits and foods, vehicles, related to animals, adjectives and opposites, jobs, places, plant words, nature words, and colors.

The pictures of the RPVT-P were displayed from labtop screen to each participant by the examiner (Appendix 1 shows one of the pictures of the RPVT-P). In a quiet room, the examiner encouraged the child to show one picture of 4 pictures on a page that he was listening to. If the child pointed with her/his finger correctly, the examiner marked (√) on the test form. The examiner calculated all the correct answers as the total score for each subtest and the total score for all items.

Statistical analysis

The data were analyzed descriptively and inferentially using the skewness and kurtosis values to assess the normality of the data distribution. For a sample size >300, the normality of the data depends on the absolute values of skewness and kurtosis. The skewness value ≤2 and kurtosis value ≤4 were used as reference values to determine data normality [17]. The normal distribution of data was confirmed and parametric statistical tests were used. The statistical significance level was P<0.05.

The internal consistency of the RPVT-P was evaluated by Cronbach's α coefficient and Cronbach's α in case of item deletion. The correlation between the items was measured using the Pearson correlation coefficient.

The t-test was used for the difference between the sexes, and Pearson's correlation coefficient was used to verify the correlation between the variables of age and the total scores RPVT-P. To obtain standard scores, the raw score (total score) of the subjects was converted to the Z score. In this study, the raw score with a mean of 100 and a standard deviation of 15 was converted into a standard score.

A confidence interval of 95% and a significance level of 0.05 were considered. The SPSS software, version 21 was used to analyze.

Stage 2

Stage 2 aimed to evaluate the discriminant validity of the RPVT-P.

Participants

The participants in the second stage of this study included 32 children in 2 groups, group 1: 16 Down syndrome (DS) children aged between 7.3 and 14.4 years compared to 16 normal children in group 2 aged 4-5.9 years, who were matched in terms of general intelligence. The normal developing children have no history of hearing problems, neurological disorders, or speech

and language problems. They attended kindergartens in Tehran. The participants with DS were recruited from the Down Syndrome Association in Tehran City, Iran.

The Stanford–Binet intelligence scale test was used to calculate the mental age of children. The children with DS and typically developing (TD) peers were matched for non-verbal mental age based on the Stanford–Binet intelligence scale test.

Statistical analysis

The data were analyzed descriptively and inferentially using the Kolmogorov-Smirnov test to assess the normality of the data distribution. The normal distribution of data was confirmed and parametric statistical tests were used. The statistical significance level was $P<0.05$. T-test for the difference between the 2 groups in the means to-

tal scores of RPVT-P. A confidence interval of 95% and a significance level of 0.05 were considered. The SPSS software, version 21 was used to analyze.

Results

Stage 1

In the first stage of the current study, 227 boys (52.3 %) and 207 girls (47.7%) aged 30-71 months participated. Table 1 presents the descriptive statistics of the age and gender of participants in 6-month intervals. Table 2 presents the descriptive statistics of the total scores of the RPVT-P for each age group. Table 3 presents the Mean±SD of the total scores of each item of the RPVT-P for each group. Internal consistency of the RPVT-P was revealed with a Cronbach's α coefficient of 0.825. Cronbach's α did

Table 1. Descriptive statistics of participants (n=434)

Groups (y)	Age		No. (%)	
			Sex	
	No. (%)	Mean±SD	Girls	Boys
30-35	55(12.7)	33.13±1.61	26(47.3)	29(52.7)
35-41	63(14.5)	38.43±1.77	32(50.8)	31(49.2)
42-47	59(13.6)	44.17±1.77	27(45.8)	32(54.2)
48-53	63(14.5)	50.19±1.75	31(49.2)	32(50.8)
54-59	65(15.0)	55.94±1.519	27(41.5)	38(58.5)
60-65	65(15.0)	62.40±1.62	34(52.3)	31(47.7)
66-71	64(14.7)	68.33±1.76	30(46.9)	34(53.1)
30-71	434(100)	0.88±11.855	207(47.7)	227(52.3)

Table 2. Descriptive statistics of the total scores of the RPVT-P (n=434)

Group	Mean±SD	Min	Max	Q1	Q2	Q3
35-30	163.8±18.03	129	184	142	172	177
41-36	195.6±12.26	161	214	186	197	205
47-42	205.5±13.78	171	227	196	209	217
53-48	213.5±10.48	186	236	206	214	221
59-54	219.4±8.04	202	235	215	221	225
65-60	222.7±7.29	207	234	218	224	229
71-66	229.28±5.81	214	238	226	230	234

Table 3. The Mean±SD of the total scores of each item of the RPVT-P (n=434)

Items	Mean±SD						
	35-30	41-36	47-42	53-48	59-54	65-60	71-66
Tools	10.89±1.53	11.6±1.77	12.46±1.92	13.17±1.50	13.55±1.47	14.06±1.66	14.94±1.30
Objects	12.38±2.11	14.17±1.82	15.20±1.21	15.59±0.71	15.63±0.76	15.77±0.58	15.58±0.75
Body parts	12.11±1.34	14.17±1.23	13.88±1.59	14.13±1.50	14.43±1.23	14.43±1.13	15.34±0.94
Verbs	12.09±1.11	14.84±0.91	15.41±0.93	15.57±0.68	15.80±0.44	15.92±0.26	15.89±0.36
Clothes	12.13±2.11	14.65±1.51	14.76±1.34	15.29±0.92	15.20±1.06	15.48±0.86	15.67±0.56
Edibles	12.51±0.81	14.08±1.44	14.31±1.31	14.7±1.07	15.32±0.93	15.46±0.66	15.56±0.71
Animals	13.40±0.93	14.97±0.87	15.34±1.10	15.76±0.42	15.78±0.48	15.80±0.47	15.91±0.29
Means of transportation	11.13±1.79	13.49±1.50	14.63±1.23	14.83±1.00	15.45±0.83	15.60±0.68	15.52±0.89
Adjectives	9.67±3.31	11.41±2.38	12.05±2.66	12.38±2.32	13.17±2.10	13.95±1.75	15.02±1.35
Occupations	10.47±9.38	12.97±1.78	14.22±1.49	14.54±1.47	14.98±0.99	15.32±0.92	15.55±0.75
Animal body parts	9.38±2.23	11.65±1.77	12.54±2.20	13.40±1.77	13.91±1.41	13.97±1.68	15.31±0.83
Places	10.45±1.87	13.27±1.53	14.36±1.37	14.68±1.44	15.08±0.98	15.35±0.87	15.47±0.68
Plants components	8.51±2.16	10.89±1.51	12.17±1.59	13.21±1.77	13.83±1.34	14.03±1.29	14.58±1.13
Nature	9.60±1.32	12.48±1.51	13.12±1.75	13.79±1.51	14.51±1.16	14.86±1.05	15.11±0.83
Colors	9.15±1.76	11.02±2.54	11.14±2.31	12.51±1.66	12.82±1.57	12.71±1.68	13.84±1.69

not exceed the total coefficients after removing each item (Table 4). A significant item-total correlation coefficient was observed (P=0.0001). The Pearson's correlation coefficient between the total score of the RPVT-P and age was 0.795 (P=0.0001). Table 4 presents a significant correlation coefficient between the score of each item of the RPVT-P and age (P=0.0001). The results showed that the correlation coefficient between the score of each item of the RPVT was statistically significant (P=0.001) (Table 5).

Appendix 2 presents the Z scores of the RPVT-P in Persian language children aged 30-71 months. According to Appendix 2, if the children get a standard score between 90 and 110 based on their raw score, their scores are in the normal range of the RPVT-P.

Stage 2

Table 6 presents the description of the intellectual age, chronological age, and sex of the participants in stage 2. Table 7 presents the descriptive statistics for the total score of the RPVT-P and t-test results compared to Down syndrome and normal children. The t-test demon-

strated a significant difference between the two groups in the total score of the RPVT-P. Table 8 presents the Mean±SD of total scores of each item of the RPVT-P and t-test results comparing DS and TD.

Discussion

The indication of the adequate and accurate test is its good psychometric properties. Two crucial psychometric properties of a test are reliability and validity. Stability and consistency are two indicators of reliability. Validity describes whether a test measures what it is intended to measure.

Hydarpanahi et al [12] developed the second version of the RPVT-P, which is a computer-based test. They reported sufficient psychometric properties in research on 105 typically developing Persian-speaking children aged 30-71 months. Its psychometric properties are as followed:

The mean values of the content validity ratio and content validity index were 0.91 and 0.93, respectively. A Cronbach's α of 0.95, an ICC of 0.89 [12].

Table 4. Cronbach's α and correlation between item scores and total scores of the RPVT-P (n=434)

Items	Cronbach's α If the Item Deleted	Correlation Coefficient Between Each Item and Total Scores	Correlation Coefficient Between Score of Each Item and the Age
Tools	0.817	0.691	0.62
Objects	0.822	0.476	0.53
Body parts	0.819	0.715	0.47
Verbs	0.818	0.856	0.66
Clothes	0.818	0.788	0.51
Edibles	0.819	0.782	0.63
Animals	0.822	0.721	0.61
Means of transportation	0.816	0.818	0.67
Adjectives	0.812	0.785	0.56
Occupations	0.813	0.872	0.64
Animal body parts	0.812	0.857	0.67
Places	0.815	0.839	0.67
Plants components	0.811	0.873	0.72
Nature	0.813	0.854	0.71
Colors	0.816	0.704	0.55

P<0.05.

Statisticians believe that the minimum sample size is 100 people [13]. Because Hydarpanahi et al had a minimum sample size in their study, the present study aimed to report the psychometric properties of the RPVT-P using a good sample size for data analysis. Therefore, 434 normal children aged 30 to 71 months participated in the first stage of our study and the second stage was conducted on 32 children, including DS and TD peers. The results showed Cronbach's α of 0.825. Hydarpanahi et al reported the value of Cronbach's α coefficient of 0.95 [12]. Cronbach's α coefficient shows a degree of internal consistency. Cronbach's α values between 0.7 and 0.9 have been described as good internal consistency [18]. The Cronbach's α coefficient values in the current study and Hydarpanahi et al's study showed that the RPVT-P has good internal consistency.

The inter-item correlation matrix for each item ranged from 0.05 to 0.80. The highest value of the coefficient between the score of each item of the RPVT-P was above 0.3. A significant correlation was observed between most items. Based on Cohen's classification, the values of the correlation coefficient between 0.10 to 0.29 are small, between 0.30 to 0.49, it is medium, and between 0.50 to 1.00, it is high.

The item-total correlation coefficient values ranged from 0.476 to 0.873. The item-total correlation between 0.30 to 0.70 can be considered acceptable [19]. Therefore, the strength of the relationship between each item and the total score of the RPVT-P showed a good level of internal consistency of the RPVT-P.

The range of Cronbach's α coefficients was 0.811 to 0.822 if the item was deleted. After the deletion of each item, Cronbach's α did not exceed the total coefficient, indicating the consistency of all items. Cronbach's α showed that all 15 items significantly contributed to the acceptable internal consistency of the RPVT-P if an item was deleted.

Table 5. The correlations between the score of each item of the RPVT-P (n=434)

Items[*]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1.														
2	0.19	1.													
3	0.47	0.12	1.												
4	0.47	0.54	0.52	1.											
5	0.46	0.20	0.60	0.70	1.										
6	0.57	0.39	0.52	0.66	0.58	1.									
7	0.42	0.54	0.42	0.72	0.51	0.61	1.								
8	0.48	0.56	0.48	0.76	0.61	0.61	0.60	1.							
9	0.60	0.05	0.67	0.55	0.65	0.57	0.40	0.51	1.						
10	0.55	0.30	0.59	0.76	0.71	0.60	0.59	0.70	0.71	1.					
11	0.60	0.31	0.61	0.69	0.67	0.65	0.55	0.61	0.69	0.75	1.				
12	0.48	0.54	0.50	0.77	0.66	0.61	0.62	0.80	0.53	0.72	0.70	1.			
13	0.60	0.46	0.57	0.70	0.60	0.67	0.62	0.71	0.66	0.74	0.73	0.71	1.		
14	0.48	0.50	0.55	0.74	0.66	0.65	0.63	0.73	0.57	0.73	0.67	0.73	0.72	1	
15	0.49	0.15	0.57	0.51	0.54	0.53	0.45	0.43	0.61	0.57	0.57	0.43	0.54	0.56	1

[*]1: Tools; 2: Objects; 3: Body parts; 4: Verbs; 5: Clothes; 6: Edibles; 7: Animals; 8: Means of transportation; 9: Adjectives; 10: Occupations; 11: Animal body parts; 12: Places; 13: Plants components; 14: Nature; 15: Colors.

Table 6. Descriptive statistics of participants (n=32)

Groups	No. (%)	Mean±SD		No. (%)	
				Sex	
		Intellectual	Chronological	Girls	Boys
Down syndrome	16(50)	59.56±7.56	10.9±1.95	8(50)	8(50)
Normal	16(50)	62.88±5.39	4.8±0.52	8(50)	8(50)

Table 7. Descriptive statistics for total scores of the RPVT-P and t-test results comparing down syndrome and normal children (n=32)

Groups	Mean±SD	Min	Max	t	df	sig.	95% CI of the Difference	
							Lower	Upper
Down syndrome	194.02±22.87	136	226	-4.55	30	0.0001	-43.07	-16.42
Normal	223.81±12.58	197	239					

Jalilevand N, et al. Psychometric Evaluation of the Receptive Picture Vocabulary Test. Func Disabil J. 2022; 5:E73.

7

Table 8. The Mean±SD of total scores of each item of the receptive RPVT-P and t-test results comparing DS and TD

Items*	Mean±SD		df	t	P
	DS	TD			
Tools	12.00±2.47	13.75±2.40	30	-2.02	0.52
Objects	15.81±0.54	16.00±0.00	30	-1.37	0.17
Body parts	14.0±1.71	14.68±1.25	30	-1.29	0.20
Verbs	13.87±1.89	15.87±0.34	30	-4.15	0.0001*
Clothes	14.12±1.58	15.68±0.70	30	-3.60	0.0001*
Edibles	13.12±2.24	15.43±0.62	30	-3.96	0.0001*
Animals	15.50±2.24	15.93±0.25	30	-1.30	0.20
Means of transportation	13.87±2.12	15.75±0.57	30	-3.40	0.002*
Adjectives	9.93±3.12	13.56±2.82	30	-3.43	0.002*
Occupations	12.75±2.20	14.87±1.62	30	-3.10	0.004*
Animal body parts	11.93±2.59	14.06±1.56	30	-2.80	0.009*
Places	13.50±2.03	15.81±0.40	30	-4.46	0.001*
Plants components	11.56±3.32	14.68±1.44	30	-3.44	0.002*
Nature	11.68±3.43	14.62±1.50	30	-3.13	0.004*
Colors	10.18±1.42	13.00±1.50	30	-5.42	0.0001*

TD: Typically developing; DS: Down syndrome.

Construct validity was assessed by the correlation between the age and the total score of the RPVT-P. A significant correlation was observed between the total score of the RPVT-P and age. Pearson's correlation coefficient of r=0.795 (P=0.0001) as a strong positive correlation showed a strong construct validity of the RPVT-P.

In this study, the raw score (total score) of the RPVT-P was converted to standard scores. The standard scores are approximately normally distributed; therefore, not only they can be used in clinical assessment, but also they are valuable tools in research [20]. According to Table A, if the raw scores were calculated between 166 and 176 for children aged 30-35 months, their RPVT-P scores are in the normal range.

Intellectual disabilities and poor speech and language abilities are reported in children with DS [21]. Abbeduto et al reported low-level performance of language development, including expressive, receptive, and syntax in individuals with DS [22]. They used the Peabody picture vocabulary test–4th edition as a standardized norm-referenced test, including nouns, verbs, and adjectives [5] to measure receptive vocabulary. Abbeduto et al reported a significant correlation between chronological age and receptive vocabulary for participants with DS, but the chronological age of the DS group was older than the TD group. They found no differences in verb knowledge between DS and TD control groups [22].

The results of the current study in stage 2 demonstrated a significant difference between the DS and TD peers in the total score of the RPVT-P, which is evidence for the discriminant validity of the RPVT-P.

The current study also compared the item scores of the RPVT-P in DS and TD peers. The result showed that the DS group and TD peers had no difference in item scores, including tools, home appliances, body organs, fruits, and foods that are nouns. A significant difference was observed between the 2 groups in other item scores, including verbs, clothes, animals, vehicles, related to animals, adjectives and opposites, jobs, places, plant words, nature words, and colors.

8

Jalilevand N, et al. Psychometric Evaluation of the Receptive Picture Vocabulary Test. Func Disabil J. 2022; 5:E73.

In the current study, the DS group and TD peers had differences in verbs; however, Abbeduto et al reported no differences in verb knowledge between DS and TD control groups [22].

Conclusion

The results of the current research indicated the acceptable reliability and internal consistency of the RPVT-P. Therefore, the RPVT-P as a tool with sufficient psychometric properties is suitable to measure the ability of preschool Persian-speaking children in receptive vocabulary.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Ethics Committee of the Iran University of Medical Sciences, Tehran, Iran (Code: IR.IUMS.REC.1396.31461). All parents signed consent form to participate their children in this study.

Authors' contributions

Conceptualization: Nahid Jalilevand, Ali Ghorbani and Mohamad Kamali; Methodology: All authors; Data analysis: Nahid Jalilevand, Ali Ghorbani, Mohamad Kamali and Reyhane Mohamadi; Writing–original draft: Nahid Jalilevand, Reyhane Mohamadi; Writing–review & editing: Nahid Jalilevand, Reyhane Mohamadi, Ali Ghorbani and Mohamad Kamali.

Conflict of interest

The authors declared no conflict of interest.

References

[1] Owens Jr RE. Language development: An introduction. Boston:Pearson Education; 2015. [Link]

[2] Verhoeven L, Van Balkom H. Classification of developmental language disorders: Theoretical issues and clinical implications. New York: Psychology Press; 2003. [DOI:10.4324/9781410609021]

[3] Miller J, Paul R. The clinical assessment of language comprehension. Baltimore: Paul H Bookes; 1995. [Link]

[4] Turner SM, DeMers ST, Fox HR, Reed GM. APA's guidelines for test user qualifications: An executive summary. American Psychologist. 2001; 56(12):1099-113. [DOI:10.1037/0003-066X.56.12.1099]

[5] Dunn LM, Dunn DM. Peabody Picture Vocabulary Test--Fourth Edition. Circle Pines, MN: American Guidance Service; 2007. [DOI:10.1037/t15144-000]

[6] Blom E, Boerma T, Bosma E, Cornips L, van den Heuij K, Timmermeister M. Cross-language distance influences receptive vocabulary outcomes of bilingual children. First Language. 2020; 40(2):151-71. [DOI:10.1177/0142723719892794]

[7] Simos PG, Sideridis GD, Protopapas A, Mouzaki A. Psychometric evaluation of a receptive vocabulary test for Greek elementary students. Assessment for Effective Intervention. 2011; 37(1):34-49. [DOI:10.1177/1534508411413254]

[8] Pakendorf C, Alant E. Culturally valid assessment tools: Northern Sotho translation of the peabody picture vocabulary test-revised. South African Journal of Communication Disorders. 1997; 44(1):3-12. [DOI:10.4102/sajcd.v44i1.223]

[9] Capovilla FC, Capovilla AGS. [Desenvolvimento lingüístico na criança dos dois aos seis anos: Tradução e estandardização do Peabody Picture Vocabulary Test de Dunn & Dunn, e da Language Development Survey de Rescorla (Portuguese)]. Ciência Cognitiva: Teoria, pesquisa e aplicação. 1997; 1(1):353-80. [Link]

[10] Simon AJ, Joiner LM. A Mexican version of the Peabody picture vocabulary test. Journal of Educational Measurement. 1976; 13(2):137-43. [DOI:10.1111/j.1745-3984.1976.tb00004.x]

[11] Hassanpour N, Jalilevand N, Masumi E, Ghorbani A, Kamali M. [Development of a picture receptive vocabulary test and evaluation of its validity & reliability for normal 36-71 months Persian Children (Persian)]. Journal of Paramedical Sciences & Rehabilitation. 2015; 4(3)34-43. [Link]

[12] Heydarpanahi S, Ghorbani A, Jalilevand N, Kamali M. Revising the first version of receptive picture vocabulary test and design the first version of expressive picture vocabulary test based on it for normal Persian-speaking children aged 30 to 71 months. MEJDS. 2023. [Unpublished article]
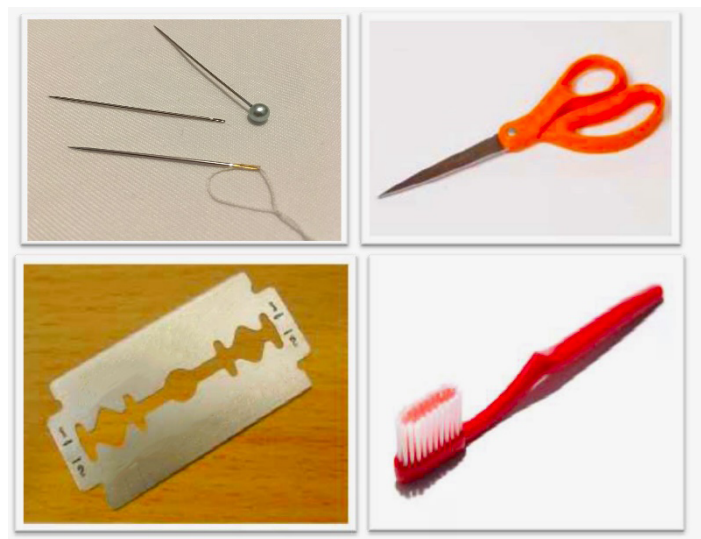
[13] Mundfrom DJ, Shaw DG, Ke TL. Minimum sample size recommendations for conducting factor analyses. International Journal of Testing. 2005; 5(2):159-68. [DOI:10.1207/s15327574ijt0502_4]

[14] MacCallum RC, Widaman KF, Zhang S, Hong S. Sample size in factor analysis. Psychol Methods. 1999; 4(1):84-99. [DOI:10.1037/1082-989X.4.1.84]

[15] Memone MA, Ting H, Cheah JH, Thurasamy R, Chuah F, Huei Cham T. Sample size for survey research: Review and recommendation. Journal of Applied Structural Equation Modeling. 2020; 4(2):i-xx. [DOI:10.47263/JASEM.4(2)01]

[16] Vameghi R, Sajedi F, Kraskian Mojembari A, Habiollahi A, Lornezhad HR, Delavar B. Crosscultural adaptation, validation and standardization of ages and stages questionnaire (ASQ) in Iranian children. Iranian Journal of Public Health. 2013; 42(5):522-8. [PMID]

Jalilevand N, et al. Psychometric Evaluation of the Receptive Picture Vocabulary Test. Func Disabil J. 2022; 5:E73.

9

[17] Kim HY. Statistical notes for clinical researchers: Assessing normal distribution (2) using skewness and kurtosis. Restorative Dentistry & Endodontics. 2013; 38(1):52-4. [DOI:10.5395/rde.2013.38.1.52] [PMID] [PMCID]

[18] Souza AC, Alexandre NMC, Guirardello EB. Psychometric properties in instruments evaluation of reliability and validity. Epidemiologia e Servicos de Saude. 2017; 26(3):649-59. [DOI:10.5123/S1679-49742017000300022] [PMID]

[19] Ferketich S. Focus on psychometrics. Aspects of item analysis. Research in Nursing & Health. 1991; 14(2):165-8. [DOI:10.1002/nur.4770140211] [PMID]

[20] Bishop DVM. Test for reception of grammar version 2(TROG -2). London: Pearson Assessment; 2003. [Link]

[21] Andreou G, Katsarou D, Language learning in children with down syndrome (DS): Receptive and expressive morphosyntactic abilities. Procedia - Social and Behavioral Sciences. 2013; 93:921-4. [DOI:10.1016/j.sbspro.2013.09.304]

[22] Abbeduto L, Murphy MM, Cawthon SW, Richmond EK, Weissman MD, Karadottir S, et al. Receptive language skills of adolescents and young adults with down or fragile X syndrome. American Journal on Mental Retardation. 2003; 108(3):149-60. [PMID]

10

Jalilevand N, et al. Psychometric Evaluation of the Receptive Picture Vocabulary Test. Func Disabil J. 2022; 5:E73.

Appendix 1. One of the picture of the RPVT-P

Appendix 2. Z Score Table

Raw Scores	Age Groups						
	35-30	41-36	47-42	53-48	59-54	65-60	71-66
129	71						
130	72						
131	73						
135	76						
136	77						
137	78						
138	78						
140	80						
141	81						
142	82						
144	83						
146	85						
161			58				
166	102		64				
167	103						
169	104						
170	105						
171	106		70	62			
172	107						
173	108						

Jalilevand N, et al. Psychometric Evaluation of the Receptive Picture Vocabulary Test. Func Disabil J. 2022; 5:E73.

11

Raw Scores	Age Groups						
	35-30	41-36	47-42	53-48	59-54	65-60	71-66
174	108						
175	109						
176	110	76					
177	111						
178	112						
179		80					
180	113		72				
181		82	73				
182	115		74				
183	116						
184	117						
185		87					
186		88		61			
187		89					
188		91	81				
189			82				
191		94	84				
192		96					
193		97					
194		98	87	72			
195		99	88				
196		100	89				
197		102	91	76			
199			93				
200		105	94				
201		107	95	82			
202		108		83	67		
203		109	97	85	69		
204		110		86	71		
205		111		88	73		
206		113		89			
207		114		91		68	

Jalilevand N, et al. Psychometric Evaluation of the Receptive Picture Vocabulary Test. Func Disabil J. 2022; 5:E73.

Raw Scores	Age Groups						
	35-30	41-36	47-42	53-48	59-54	65-60	71-66
208		115		92	79	70	
209		116	104	94	80		
210		118	105	95		74	
211		119			84	76	
212				98	86	78	
213			108	99	88	80	
214		122	109	101	90	82	61
215			110	102	92	84	
216			111	104	94	86	
217			112	105	95	88	68
218			114	106			71
219			115	108	99		73
220			116	109	101	94	76
221				110	102	96	79
222				112	105	99	
223				114	107	101	84
224			120	115	108	103	92
225				116	110	105	
226				118	112	107	
227			123	119	114	109	94
228					116	111	97
229					118	113	99
230				124	120	115	102
231				125	122	117	104
232					123	119	107
233				128		121	110
234					127	123	112
235					129		115
236				132			117
237							120
238							122

Jalilevand N, et al. Psychometric Evaluation of the Receptive Picture Vocabulary Test. Func Disabil J. 2022; 5:E73.

13

مقاله پژوهشی

ویژگی‌های روان‌سنجی آزمون تصویری درک واژگان برای کودکان فارسی زبان

ناهید جلیلوند[۲،۱]، ریحانه محمدی[۲،۱]، علی قربانی[۲،۱]، محمد کمالی[۳،۲]، نفیسه حسن پور[۲]، صبا حیدرپناهی[۱]، تهمینه ملکی[۲]، فاطمه اشرفی[۱]

۱. گروه گفتار درمانی، دانشکده علوم توانبخشی، دانشگاه علوم پزشکی ایران، تهران، ایران.
۲. مرکز تحقیقات توانبخشی، دانشگاه علوم پزشکی ایران، تهران، ایران.
۳. گروه مدیریت توانبخشی، دانشکده علوم توانبخشی، دانشگاه علوم پزشکی ایران، تهران، ایران.

چکیده

مقدمه ارزیابی مهارت‌های درک واژگان کودکان مستلزم کاربرد ابزار روا و پایا است. هدف اصلی این مطالعه ارزیابی اعتبار آزمون تصویری درک واژگان برای کودکان فارسی زبان است.

مواد و روش‌ها در مرحله اول از این مطالعه توصیفی-تحلیلی ۴۳۴ کودک از سن ۳۰ تا ۷۱ ماهگی شرکت داشتند. در مرحله دوم مطالعه، ۱۶ کودک سندرم دان و ۱۶ کودک طبیعی همتای سن ذهنی آن‌ها شرکت داشتند. ثبات درونی (آلفای کرونباخ)، اعتبار سازه و روایی تمایزی آزمون تصویری درک واژگان مورد ارزیابی قرار گرفت.

یافته‌ها مقادیر الفای کرونباخ ۰/۸۲۵ بدست آمد که نشانه ثبات درونی آزمون می باشد. مقادیر ضریب همبستگی اسپیرمن ۰/۸۳ بیانگر همبستگی مثبت بین متغیر سن و امتیا رکل آزمون می‌باشد (P=۰/۰۰۰۰). بین امتیازات اکثر زیر مجموعه‌های آزمون و امتیاز کل آزمون ضریب همبستگی بین ۰/۷۰ و ۰/۸۷ بود که نشانه اعتبار قابل قبول سازه است. تفاوت معنی‌دار بین امتیاز کل ازمون در دو گروه طبیعی و سندرم دان نشانه روایی تمایزی آزمون تصویری درک واژگان است (P=۰/۰۰۰۰).

نتیجه‌گیری آزمون تصویری درک واژگان برای تعیین توانایی درک واژگان کودکان فارسی زبان آزمون مفیدی است.

*** نویسنده مسئول:**
محمد کمالی
نشانی: تهران، دانشگاه علوم پزشکی ایران، مرکز تحقیقات توانبخشی.
تلفن: ۱۵۷۷ ۲۲۲۲ (۲۱) ۹۸+
رایانامه: kamali.mo@iums.ac.ir