World Journal of Environmental Biosciences

Available Online at: **www.environmentaljournals.org**

Volume 6, Supplementary: 1-5

ISSN 2277- 8047

Psychometric Characteristics and Standardization of Childhood Autism Spectrum Test

Zohre Akhlaghi[1], Mahdieh Salehi[2*]

[1]M.Sc. Student in Psychometrics, Department of Psychology, Faculty of Psychology and social sciences, Central Tehran Branch, Islamic Azad University, Tehran, Iran.
[2]Assistant Professor, Department of Psychology, Faculty of Psychology and social sciences, Central Tehran Branch, Islamic Azad University, Tehran, Iran.

ABSTRACT

Present study with aim to evaluate the psychometric properties of the childhood autism spectrum test has designed in the statistical population includes children from 3 to 10 years of regions 1, 3 and 6 in Tehran and they were implemented in the sample of 400 people in 8 groups, that were selected by multistage random sampling of clusters. Measuring tool of childhood autism spectrum questionnaire is paper and pencil tool which has 39 questions that are designed as "yes" or "no", that is "yes = 1" and "No = 0". This questionnaire examines four factors in autistic children that include: Communication, non-creative behaviors, self-management and social skills. Data was analyzed with both descriptive and inferential level especially exploratory factor. The findings suggest that questionnaire with 39 questions have validity of 95% and the average of questions are between 12% - 87%.

Keywords: *Autism, standardization, childhood*

Corresponding author: Mahdieh Salehi

INTRODUCTION

Autism is kind of Neural - Developmental Disorder that is characterized by severe damage in the social interaction and communication skills as well as behavior, interests and stereotyped activities (American Psychological Association, 2012) These children have disorder in sensory information processing, and therefore they show abnormal responses to sensory stimuli (such as avoidance responses and too reactions to them) (Kientz & Dunn, 1997; Jasmh et al., 2009). These children with have disorder and problems in emotions (Rapin, et al., 1991), movement skills and especially fine movement of hands, activities of daily living and play (Rastall Watling, 1994), learning language and natural speech) Corbett, 2005) and also problems with emulation of others. In fact, we can say that these children have an extensive range of psychological and medical disorders. Also, Autism is a kind of pervasive developmental disorders in children that is commonly known as neural – brain developmental disorder, but little information is available in exact origin, (Jarvinenv & Heaton, 2007). On the other hand, American psychological association (2015) has been classified autism in neural - developmental disorder sub group that is the result of central nervous system disorder. According to definition of this group, children with autism have problem in social interaction, verbal and nonverbal communication, interests, activities and imagination and also sensory and motor problems, stereotypes and obsessive behaviors, language difficulties and social problems, the whole range of psychiatric and medical disorders are seen in these children. In fact, it seems that autism is a genetic disorder that interaction of several genes involved in its creation (Klein, 2006). Wimpory et al., (2000) also have expressed social communication and communication problems of autistic children and believe that children less than two years with autism have lack of the necessary prerequisites to communicate through pointing and attract attention. The initial difficulties in establishing relationships affects social behaviorand this increases the gap between children with autism and their peers. According to Ragers (2000), the most important features of autism is the difference in social relations and growth and improvement of social skills are associated with long-term positive adaptations. In addition, the features associated with autism characteristics that are often not changed and may include symptoms of coexistence disorders. Persons with autism have other disabilities and show the other abnormal behaviors. According to (American Psychiatric Association, 2015), approximately 75% of autistic children have mental retardation. In addition, according to Frys (1993), autism is associated with other clinical and medical conditions including congenital rubella, chromosomal abnormality and brain attack. Coleman (1989) reports that mental retardation and epilepsy and blindness are major disabilities that occur with autism. In general, younger children and those with severe disabilities likely show more associated features. The importance of study and research about childhood autism spectrum test is so that Conner and Parker et al. (1995) have known important the formation of correct social interaction in children with autism and have emphasized teaching skills that are involved in social interaction. It's not surprising that biological stress and symptoms of anxiety (Morris et al, 1998) have been reported

frequently in people with autism. Mainly social variables can increase or decrease the anxiety responses (Levine and Maddy, 2003). But these difficulties in person with autism and its negative impact on his social interactions with the world around him has caused researchers focus a lot of attention to this disorder. All of these factors make important the work in the field of its diagnosis and medical intervention. So I hope that with the translation and investigation of psychometric properties of childhood autism spectrum test, the way for the development of diagnosis tools for this disorder and also more research in this area be provided and this early diagnosis causes a timelier interventions and this helps patient and also makes his family be health. So, childhood autism spectrum test provides new tools available to practitioners to determine that child is in which of the three levels of the autism spectrum that with accurate and timely diagnosis and measurement treat children. Finally, the relationship between this test and the GARS autism test is also considered that has a good reputation in this field. And the importance of choosing this test is for this reason that childhood autism spectrum tests, are newer than existing tools and has less number of questions than other tests which makes it is not out of the scope and power of the respondent individual and can be measured this disorder easily and with less time.

METHODOLOGY

This study is kind of correlational and survey research. The Statistical population of this study includes all children with autism that are in 25 centers in Tehran and their ages are between 3 to 10 years. In the sample of 400 people in 8 groups, which were selected by multistage cluster random sampling method, have been implemented. Questionnaire measuring tool of childhood autism spectrum is pencil and paper tool, which has 39 questions that is designed as "yes" or "no" that "yes = 1" and "No = 0". The questionnaire examines four factors in autistic children that include communication, non-creative behaviors, self-management and social skills. Childhood autism spectrum test implementation and its scoring are simple, but something that seems essential in the implementation of the two tests is that this examiner must know the subject well. So the people are suitable in implementation this test that could communicate with examinee at least two weeks, such as teachers, parents, or any other suitable person. Cronbach's alpha method is used to check the validity of autism spectrum and to check the validity of the questionnaire, exploratory factor analysis and principal component method (pc) were used.

RESULTS

Cronbach's alpha method was used to investigation of the childhood autism spectrum test reliability. Childhood autism spectrum questionnaire is a paper pencil tool that consists of 39 questions with answers "yes = 1" or "no = 0". In examination of reliability coefficient, correlation of 13 questions (6-7- 9- 18-19- 25- 28- 29-30-32- 34- 36-37) with the total scores were negative. So the 12 questions were encoded in reverse order, i.e. "Yes = 0" and "NO = 1". Validity of 39-question questionnaire was equal to 0.95 through internal consistency coefficient calculation. By considering Table 1, average of questions was 0.12 to 0.87. Because the questions of the questionnaire were on scale of 2 options "0 to 1". In fact, the median number in this spectrum is 0.5. The mean of 7 questions (questions of 14, 16, 17, 20, 21, 33 and 38) were more than mediocrity and average the other questions were less than mediocrity. Correlation coefficients were 0.037 to 0.866. The minimum coefficient belonged to question 20 (Does he have unusual voice?) and the maximum coefficient belonged to question 11 (Can he continue a two-way conversation?). Based on the above data, the test reliability coefficient is so that the calculation of the reliability and the other operations can be continue based on that. Table 1 shows mean and standard deviation correlation coefficients each question with the total scores.

Table 1: Mean, standard deviation and correlation coefficients of each question with the total scores of questionnaires

question	mean	standard deviation	correlation coefficient	Alpha in the case of remove questions
1	.29	.455	.701	.945
2	.43	.495	.811	.944
3	.31	.461	.744	.944
4	.40	.491	.744	.944
5	.41	.493	.802	.944
6	.21	.408	.044	.949
7	.31	.461	.536	.946
8	.18	.380	.330	.947
9	.33	.472	.531	.946
10	.25	.432	.510	.946
11	.34	.473	.866	.943
12	.37	.483	.670	.945
13	.25	.431	.706	.945
14	.55	.498	.424	.947
15	.34	.473	.705	.945
16	.87	.342	.318	.947
17	.75	.433	.172	.948
18	.49	.500	.513	.946
19	.26	.436	.346	.947
20	.74	.438	.037	.949
21	.59	.492	.397	.947
22	.43	.495	.670	.945
23	.31	.462	.745	.944
24	.34	.473	.815	.944
25	.30	.457	.704	.945
26	.26	.441	.660	.945
27	.37	.483	.810	.944
28	.41	.492	.574	.946
29	.41	.492	.382	.947
30	.12	.328	.198	.950
31	.28	.447	.465	.946
32	.28	.448	.682	.945
33	.64	.481	.565	.946
34	.46	.499	.477	.946
35	.35	.478	.775	.944
36	.27	.446	.081	.949
37	.35	.478	.775	.944
38	.59	.492	.397	.947

39	.28	.448	.759	.944

Table 2: assumptions of factor analysis

The adequacy of sampling	Bartlett's test	meaningful
.713	15398.539	0/001

For validity of childhood autism spectrum, exploratory factor analysis with principal component analysis (pc) was used. First, initial assumptions of exploratory factor analysis i.e. the sampling adequacy and lack of multiplicity linear (Bartlett's test) was calculated. The results show that Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) 1 is equal to 0.713 and the level of characteristic Bartlett's test significance of is less

than 0.0001. Therefore, based on both criteria, it can be concluded that the implementation of factor analysis based on the correlation matrix in the studied sample group would be justified.

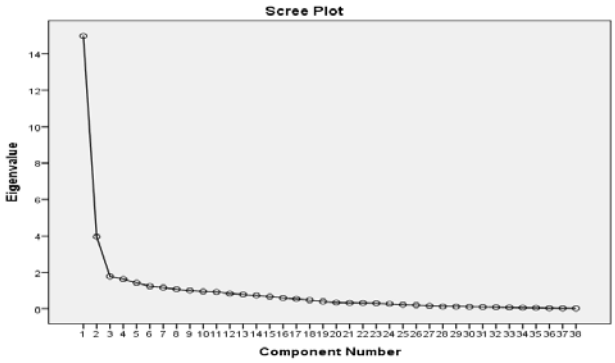

Figure 1: Rotated diagram of special values scree

In order to identify factors that might form the basis of the questionnaire's thirty-nine variables and also its simple structure, varimax rotation method was used with at least loadings factor 0.30 and three indicators of equity, percentage of variance and special values rotated charts scree were examined. From the scree plot (Figure 1), it can be deduced that the contribution of 4 prime factor in the variance of whole questions is significant and is different from the contribution of the rest factors. In fact, the slope from fourth factor is smooth.

Table 3: equity, variance percentage, density percentage of factors before and after the rotation

Factors			before rotation			after rotation
	equity	variance percentage	density percentage	equity	variance percentage	density percentage
1	14.997	34.476	39.465	13.101	34.476	34.476
2	3.955	14.361	49.873	5.457	14.361	48.837
3	1.776	5.264	54.547	2.000	5.264	54.101
4	1.632	4.741	58.842	1.801	4.741	58.842

Based on three above indicators, four factors were extracted, these 4 factors explained 58.842% of the total variance. The first factor justifies with equity 14.997% to 39.465% of the total variance and the second factor with equity 3.955% with size of 10.408% of the total variance and fourth factor with the equity 1.632% with size of 4.295% of the total variance justify. These numbers have been shown in Table 3. Given that equity factors after the rotation had more equal distribution, it was decided that Varimax rotation be used to extract factors. The minimum acceptable load factor was considered 0.30. Rotated structure matrix after rotation has been shown in Table 3.

Based on structure matrix of the factors, a set of questions that are associated with a factor form a factor. Questions of any factor includes: Questions 1 to 5-11 to 15-23 to 27 and 31-32-37-39 that this factor was named "social skills". Cronbach's alpha for this factor is 0.871. The second factor: Questions 6-7-16-18-19-21-22-28-34-36 that this factor is named "self-management". Cronbach's alpha for this factor was obtained 0.812. The third factor: Questions 8-10-20 that this factor is named "non-creative behavior". Cronbach's alpha for this factor was obtained 0.768 and the fourth factor: Questions 17-29-30-33 that this factor was named "communication". Cronbach's alpha for this factor was obtained 0.539.

Table 4: Rotated structure matrix of autism spectrum questionnaire with varimax method

Questions	F1	F2	F3	F4
q11	.879			
q5	.863			
q2	.836			
q27	.822			
q39	.819			
q4	.810			
q24	.806			
q35	.804			
q3	.798			
q23	.768			
q1	.764			
q37	.762			
q12	.751			
q15	.740			
q13	.721			
q26	.688			
q32	.674			
q25	.650			
q14	.643			
q31	.543			
q7		.732		
q19		.694		
q9		.685		
q34		.657		
q18		.637		
q28		.630		
q21		.628		
q6		.599		
q22		.539		
q36		.537		
q33				.430
q29				.369
q16		.325		
q10			.618	
q8			.495	
q20			.465	
q30				.704
q17				.495

According to the findings of Table 4, questionnaire has been saturated with four. Factors are "linked" "non-creative behavior," "self-management" and "social skills". Norm tables for interpretation of childhood autism test scores is that the

score of each child in his autism test is between "1-0" (in fact, scores in different questions are gathered and are divided to number of them). In autism test and its factors, when children's scores are low the autism disorder is diagnosed. To obtain the norm tables of autism scores and their factors, the child's score is diagnosed on the basis of a standard deviation lower than the average disorder, score between one standard deviation lower than the mean with weak disorder equal or higher than the average of normal child. Results has shown in following tables.

Table 5: Norm table for total scores (mean 0.40 and standard deviation 0.27)

distances	score	interpretation
Lower than one standard deviation	Score less than 0.13	Need a lot of support and care
A standard deviation lower than the average	Score between 0.13 to 0.40	Need to support
Higher than one standard deviation	Score higher than 0.40	Normal

Table 6: Norm Table for social skills (mean 0.42 and standard deviation 0.25)

distances	score	interpretation
Lower than one standard deviation	Score less than 0.17	Need a lot of support and care
A standard deviation lower than the average	Score between 0.17 to 0.42	Need to support
Higher than one standard deviation	Score higher than 0.42	Normal

Table 7: Norm table for management and self-sufficiency (mean 0.45 and standard deviation 0.22)

distances	score	interpretation
Lower than one standard deviation	Score less than 0.237	Need a lot of support and care
A standard deviation lower than the average	Score between 0.23 to 0.45	Need to support
Higher than one standard deviation	Score higher than 0.45	Normal

Table 8: Norm table for non-creative behaviors (mean 0.42 and standard deviation 0.25)

distances	score	interpretation
Lower than one standard deviation	Score less than 0.17	Need a lot of support and care
A standard deviation lower than the average	Score between 0.17 to 0.42	Need to support
Higher than one standard deviation	Score higher than 0.42	Normal

Table 9: Norm table for communication (mean 0.48 and standard deviation 0.23)

distances	score	interpretation
Lower than one standard deviation	Score less than 0.25	Need a lot of support and care
A standard deviation lower than the average	Score between 0.25 to 0.48	Need to support
Higher than one standard deviation	Score higher than 0.48	Normal

DISCUSSION AND CONCLUSION

In order to investigate the validity of childhood autism spectrum test, Cronbach's alpha was used and the test reliability coefficient is so that the calculation of the validity and other operations could be continued based on it and this coefficient indicates great reliability of the questionnaire that it can be used in diagnostic and therapeutic purposes. The results showed that the index of sampling adequacy (KMO) is equal to 713/0 and the level of significance for characteristic Bartlett's test is less than 0001/0. Therefore, based on both criteria, it can be concluded that the implementation of factor analysis based on the result correlation matrix would be justified in the sample group. In the norm tables for interpretation the childhood autism test scores, the scores for each child in his autism test is between the "0-1", in fact score in the different questions are gathered and are divided into its number. In autism test and its factors when the child's score is low, autism disorder is diagnosed. To obtain norm tables of autism score and its factors, the child's score is diagnosed by one standard deviation lower than the average of having disorder, score between one standard deviation lower than average having weak disorder and the score equal or higher than the average of normal child.

REFERENCES

1. Ahmadi, Seyed Jafar; Safari, Tayyebeh; Hemmatin, Mansoureh and Khalili, Zahra (2011). Study of autism psychometric diagnostic test Indicators (GARZ). Publications (SID).
2. Delavar, Ali. (2014). Theoretical and scientific and research foundations in the humanities and social sciences. Growth publications.
3. Denis Hovit and Donkenn Cramer. (2011). Statistical methods psychology and other behavioral sciences.

Translated by: Sharifi, Hassan Pasha. Tehran: Sokhan Publications.
4. Executive booklet for clinical version of DSM-5.
5. Gras Marnat, (2013). Handbook of Psychological Assessment. Translated by Hassan Pasha Sharifi and Mohammad Reza Nikkhou. Tehran: Sokhan Publications.
6. Homan, Heydar Ali, (1390) Analysis of multivariate data in the behavioral study. Tehran: Peyk Farhang publications.
7. Homan, Heydar Ali, (2002). Psychological and training measurement (technical preparation of tests and questionnaires). Tehran: Parsa publications.
8. Homan, Heydar Ali, (2005). Help of develop a research report, dissertation and thesis (second edition). Tehran: Peyk Farhang publications.
9. Kaplan and SadOUk (2015). Summary of psychiatry based on the DSM-5, translated by Farzin Rezaei (2015). Tehran: Arjmand publications.
10. Sharifi, Hasan Pasha and Sharifi, Nastaran, (2013). Psychometrics and mental testing principles. Tehran Publications.