

Application of PROGRESSIVE MATRICES IN THE SUDAN

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Abstract

This report intended to reveal the efforts which took place in the Sudan to identify the psychometric properties, standardization, & norms of the progressive matrices tests. The report showed the studies on standard progressive matrices (SPM), & coloured progressive matrices (CPM), from 1998 to 2007 and reported its results.

Introduction

Although the first application of intelligence tests in the Sudan was done by a pioneer British educator, Scott in 1944, and supervised by Vernon the greatest psychologist (Scott, 1946, 1948, 1950), Scott measured Sudanese intelligence at that time by using adaptive version of Ballard intelligence test, and he did not use the famous British test Standard progressive matrices (SPM), which is founded in 1938.

The standardization of SPM was belated five decades after the trials of Scott, the test has been standardized by Alkhateeb & Almotwakel in 1998, from that history the test was available for researchers, but the report of their study was published in 2001 (Alkhateeb & Almotwakel, 2001). The CPM, Coloured progressive matrices was standardized by Alkhateeb, Almotwakel, & Hussein, in 2006. Now there is study running to standardize the APM. The SPM after its standardization in Sudan is mainly used in researches specially in MA thesis & PHD dissertations, also it used for Identification of gifted, and occupational selection.

Standard progressive matrices

The first study in the Sudan to standardize this test was done by (Alkhateeb & Almotwakel, 2001) in the academic year 1997/1998 in Khartoum State, and because of the lack of scientific periodicals in the Sudan, the results of this study was not published until 2001, when it is published in small book.

Alkhateeb & Almotwakel (2001) administered the test to a sample of (6877) individuals, males (3135), and females (3742), in the ages (9-25) years.

They get the reliability of the test by two methods, half split and the formula of Koder Richardson no 21, the coefficient of reliability was got by half split for all ages which was between (0,540 – 0,928) with median (0,848), and after modifying by Spearman-Brown the reliability coefficient is ranging between (0,701 – 0,963) with median (0,918). The coefficients of reliability by the formula of Koder Richardson no 21 for the sample of males is between (0,8 – 0,916) with median (0,89), and for females is (0,839- 0,946) with median (0,895), and for the total sample males and females is ranging between (0,876-0,971) with median (0,901).

Alkhateeb & Almotwakel (2001) get the validation of the test with three methods; discriminative validity, gradual difficulty of the groups, and age discrimination. The discriminative validity between peripheral groups (upper and lower quartiles for each sub-set, separately; and for the total test, was significant with a level of significance of (0.001). The gradual difficulty of the groups is seen in the means of the groups (subtest), the mean of group (A) is the biggest one, and the mean of (E) is the

smallest one, and this is recognized in all ages, also the mean of (B) is bigger than (C), and the mean of (C) is bigger than (D), and the mean of (D) is bigger than (E), in all ages. The age discrimination is clearly seen between the ages specially between (9 to 16) years, in the old ages the increase is relatively small, the differences according ages is significant between the ages: (9-10), (10-11), (11-12), (12-13), (13-14), (15-16), (18-19).

The Norms of The SPM in the Sudan

Alkhateeb & Almotwakel (2001) produce the percentiles norms of the test, for males, females, and the total sample. The tables bellow show the norms of the test:

Table (1):The Percentiles norms of the total sample (males and females)

ages	Percentiles						
	5	10	25	50	75	90	95
9	10	11	14	21	29	36	40
10	10	11	14	23	33	40	42
11	10	12	15	28	37	43	46
12	10	12	16	29	40	47	50
13	12	15	26	37	44	49	50
14	17	21	33	41	47	51	52
15	18	22	34	43	49	52	54
16	19	25	35	44	49	52	54
17	19	26	36	44	49	52	54
18	20	29	36	44	49	53	55
19	20	30	37	46	50	54	56
20-25	20	28	35	44	49	53	55

(Alkhateeb & Almotwakel,2001)

Table (2): The Percentiles norms of the males

age s	Percentiles						
	5	10	25	50	75	90	95
9	10	12	14	21	26	40	42
10	11	12	16	25	34	41	42
11	11	12	16	29	37	42	44
12	11	12	16	31	39	46	48
13	11	15	25	36	44	49	51
14	18	23	31	39	45	50	52
15	18	23	33	42	47	52	53
16	18	25	35	42	47	52	53
17	20	26	35	42	47	52	53
18	20	32	35	43	49	53	57
19	22	32	37	46	50	54	57
20-25	20	31	36	46	50	53	56

(Alkhateeb & Almotwakel,2001)

Table (3): The Percentiles norms of the females

age s	Percentiles						
	5	10	25	50	75	90	95
9	9	10	13	18	29	36	39
10	10	11	13	19	33	38	41
11	10	11	13	27	37	45	49
12	10	11	13	28	40	48	50
13	12	15	26	38	44	49	50
14	16	21	35	43	47	52	53
15	18	22	37	44	49	52	54
16	19	24	38	45	49	52	54
17	19	27	39	45	49	53	54
18	20	29	39	45	49	53	55
19	20	30	39	45	50	54	56
20-25	20	27	35	44	49	52	57

(Alkhateeb & Almotwakel,2001)

The study of Attallah (2003)

The study of Alkhateeb & Almotwakel (2001) was not included individuals from the age (8) years, hence Attallah (2003) studied The Psychometric properties of The Standard Progressive Matrices, for the Children of (8) years of age in Khartoum State, The sample consisted of (145) children of the age group of (8) years; to (8 and 11 months) years, with a median of (8 years and (7) months) selecting by stratified method; (47%) of whom were males, and (53%) were females.

The study proved a good efficacy for the test items; as the correlation between the items and the total test, was between (0.035-0.721); and (0.004-0.773) between the items and their sub-sets. All the correlations were significant at (0.05) or (0.01); except for (5) items which were weak. This clearly indicates that most of the items had a good efficacy. The tested groups, also, correlated together and with the total test. Hence, the correlation was between (0.342-0.908) and they were significant at the level (0.01).

It was also of a discriminative validity between its peripheral groups (upper and lower quartiles for each sub-set, separately; and for the total test, with a level of significance of (0.001). the test groups gradually became difficult; except for the groups (c) and (d) which were equal in difficulty. The test groups constituted one factor; which goes to prove that there a factorial validity.

As for the reliability coefficients which exposed the internal consistency ; such as, Alpha Chronbach test, half-split coefficients, Spearman - Brown Coefficients and Guttman

formula, were good. Alpha coefficient ranged after omitting one of the items from the sub-set, or the total test- between (0.598-0.938). This shows that the test items had approximate relative importance.

The Norms of The Children in 8 years

Table (4): The Percentiles norms of the Children in 8 years

Gender	Percentiles							
	5	10	25	50	75	90	95	99
males	10	12	17	28	35	41	42	53
females	11	12	14	22	33	41	44	47
Total sample	11	12	15	23	34	41	44	50

(Attallah,2003)

The study of Attallah,et al (2007)

This study is done by (Attallah, Almotwakel, Haseeb, Gumaa,& Alhassan), the study deals with the psychometric properties of the standard progressive matrices (SPM) among the pupils their age is ranging from 8 to 12 years in the basic schools in Kusti city (a city at the southern middle of the Sudan in White Nile state), The sample consisted of 440 pupils (218 males; 220 females). SPSS is used for statistical analysis. Results revealed that the scale has a good validation which is proved by: item analysis, internal consistency, concurrent validity (with age), and factorial validity, the five groups of the scale makes only one factor. Chronbach formula (alpha coefficient) was used to get the reliability for the five groups ,its reliability was ranging between (0.64 – 0.85) , and for the whole scale between (0.92 – 0.94) , also the split half method was used, the reliability by Spearman – Brown formula was ranging between (0.75 – 0.89) , and by Guttman formula is ranging between (0.69 – 0.89), all these procedures revealed that the scale is reliable, It is concluded that the scale could be use in Kusti , the study recommended to use it in researches, educational and clinical assessment.

Attallah (submitted a) produce the percentiles norms in a sample of (537) among the pupils their age is ranging from 8 to 12 years in the basic schools in Kusti city it was like the table below:

Table (5)The Percentiles norms of the total sample in Kosti (males and females)

age	Percentiles							
	5	10	25	50	75	90	95	99
8	6	8	13	17	22	32	38	43
9	8	8	12	16	25	33	36	41
10	8	10	15	22	32	40	44	48
11	10	11	14	22	35	42	44	46
12	12	14	20	28	36	42	46	49

Table (6):The Percentiles norms of the males in Kosti

age	Percentiles							
	5	10	25	50	75	90	95	99
8	6	9	14	18	22	30	36	38
9	7	8	11	15	20	33	36	41
10	7	10	15	21	25	36	40	44
11	8	11	14	18	28	40	41	44
12	10	13	17	29	37	43	46	49

Table (7): The Percentiles norms of the females in Kosti

age	Percentiles							
	5	10	25	50	75	90	95	99
8	6	8	12	16	21	36	40	43
9	7	9	13	17	26	32	36	41
10	9	10	14	28	34	42	45	48
11	10	11	14	32	40	44	45	46

Study of Attallah (submitted b)

This study deals with the psychometric properties of the standard progressive matrices (SPM) among the students of Arts college at AL-Imam Al-mahadi university in the Sudan. The sample consisted of 393 students (56,9% males; 53,1% females).

Results revealed that the scale has a good validation which is proved by: item analysis, internal consistency, factorial validity; the five groups of the scale makes only one factor, and the test groups gradually became difficult. Chronbach formula (alpha coefficient), and half split were used to get the reliability for the five groups, both of them revealed that the scale is reliable, It is concluded that the scale could be use at the mention society.

Coloured progressive matrices

Alkhateeb, Almotwakel, & Hussain (2006) administered the CPM to a sample of (1683) individuals males (728), and females (955), in the ages (6-9) years, in Khartoum State. They get the reliability of the test by two methods, half split (Spearman – Brown & Guttman formulas), and Chronbach formula (alpha coefficient). Reliability with alpha coefficient for all ages is ranging between (0,720- 0,910) with median (0,701); with Spearman – Brown formula is (0,630-0,830) with median (0,700); and with Guttman formula is (0,630- 0,810) with median (0,695).

The validation of the test is get by : internal consistency & age discrimination. The correlation coefficients between the three groups (sub scales) each other, and the whole test was significant at the level of (0,001), the three groups & the whole test were correlated to chronological age at a level of significance of (0.001), also the 36 items of the test was significantly correlated to its sub scale.

The Norms of The CPM in Khartoum state

Table (8): The Percentiles norms of the males in Khartoum

age	Percentiles						
	5	10	25	50	75	90	95
6	5	7	10	13	17	21	23
7	8	9	11	13	17	21	24
8	8	9	12	15	19	24	27
9	9	10	12	16	23	29	31

(Alkhateeb, Almotwakel, & Hussain ,2006)

Table (9): The Percentiles norms of the females in Khartoum

age	Percentiles						
	5	10	25	50	75	90	95
6	6	7	9	12	15	18	21
7	7	8	11	13	16	21	25
8	8	9	11	14	18	23	27
9	8	9	12	15	18	24	30

(Alkhateeb, Almotwakel, & Hussain ,2006)

Table (10): The Percentiles norms of the total sample (males & females) in Khartoum

age	Percentiles						
	5	10	25	50	75	90	95
6	6	7	10	13	15	19	22
7	8	9	11	13	16	21	24
8	8	9	12	15	19	24	27
9	9	10	12	15	20	28	31

(Alkhateeb, Almotwakel, & Hussain ,2006)

In addition Seddig (2007) has administered the CPM to deaf children in the ages (9-12) in Khartoum state, & she get the reliability & the validity of the test for the mentioned group, but she did not produce the norms because the sample was too small.

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