



Chapter 17

The Standard Progressive Matrices in Pakistan

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Abstract

The objective of the present study was to develop norms and conduct reliability and validity analyses for the Classic form of the Standard Progressive Matrices (SPM) in Pakistan. A sample of 1,662 Pakistani school students aged 11.11-18.11yrs responded to the test, which was administered, untimed, in group sessions. Pakistan is regionally divided into four provinces (NWFP, Baluchistan, Sindh & Punjab). In the present study, data were collected from the urban areas of each province. Besides the norms, the test's reliability and validity were estimated. The split half reliability was 0.89. In a separate validity study, SPM (Classic Form) scores were correlated with scores on the "Draw a Person" test for a sample of 200 school children aged 6 years 11 months to 11 years and 11 months. The correlation was 0.26. The Pakistani norms are compared with similar data accumulated in urban and tribal areas of India.

Introduction

The objective of the present study was to develop the norms, and to conduct reliability and validity analyses, for the Classic form of the *Standard Progressive Matrices* (SPM), which is widely used in Pakistan.

A particular incentive to conducting the study was Lynn's (1991) report that, while the average IQ (as assessed by General Intelligence Tests) of people living in Britain and the US is about 100, that of people living in North East Asia is around 105 and that of the peoples of Sub Saharan Africa around 70. In the light of such apparently large differences





between different nations it seemed unfair to compare an individual residing in Pakistan with norms developed in Britain. A standardization in Pakistan would make it possible to correctly assess the present level of functioning of individuals in the context of norms for the culture in which they survive.

Apart from the expected cultural differences between nations, even within Pakistan there are vast differences between the mental abilities of people from different areas. The environmental, economic and traditional differences between the people residing in different regions of Pakistan suggest a need for norms, taking into consideration the representation from all these areas.

Method

The Norm Sample

A sample (N=1,662) of Pakistani school students aged 11.11-18.11yrs responded to the Classic form of Raven's *Standard Progressive Matrices*. The test was administered, untimed, in group setting. The sample was stratified to ensure equal representation by age, sex, and race. However, some data were discarded for technical reasons during statistical analysis. An attempt was made to make the sample characteristics homogeneous.

Age

Six groups of adolescent children between the age ranges of 11 years 11 months to 18 years 11 months, with the mean age of 14 years 07 months, were selected. Table 17.2a indicates the age intervals and the number of subjects within each group by gender.

Regional Distribution

Pakistan is regionally divided into four provinces (NWFP, Baluchistan, Sindh & Punjab). In the present study data were collected from the urban areas of the capitals (Peshawar, Quetta, Karachi & Lahore) of each province. Other than the capitals, big cities from each province (except Baluchistan) including Rawalpindi and Islamabad (Punjab), Abbotabad (NWFP) and Hyderabad (Hyderabad), were also included in the sample to ensure the appropriate participation of all ethnic groups in the sample. Representation from Baluchistan is limited only to its capital due to





tribal influences in other areas of Baluchistan. Table 17.2b indicates the breakdown of each region by age and gender.

Gender

Male and female were sampled equally in proportion, however, some data was discarded for different technical reasons, and therefore participation of both male and female is approximately equal, 51.32% male and 48.67% female (Table 17.2a).

Table 17.1 a*. Demographic Data by Socio-Economic Status

	Lower SES	Middle SES	Higher SES
Average monthly income	14,000 and below	14,000 to 30,000	30,000 and above
Most common educational level of parents	Nil / Primary / Middle / Matric / Skilled vocational	Intermediate / Bachelor / Master Degree	Bachelor / Master Degree
Most common occupations	1. Clerical/Sales/ Service 2. Drivers/ Peons/ Soldiers 3. Laborers	1. Clerical/Sales/ Service 2. Lecturers/ teachers 3. Doctors	1. Professionals 2. Business personnel 3. Bureaucrats
Most common family structure	Extended / Joint	Joint / Nuclear	Nuclear

**Development of Norms and Application of Wide Range Achievement Test 3 in Pakistan - Trends in Adolescence*. Riaz Ahmad, Zaema Riaz, & Sarwat Jahan Khanam. Institute of Clinical Psychology, University of Karachi (2005) pp. 8-9.

Table 17.1 b. Profile of Participating Students

School	SES	School Type	Gender (M & F)
A	L	G	Approximately Equal
B	L	NG	-
C	M	G	-
D	M	NG	-
E	H	NG	-

L = lower SES; H = higher SES; M = middle SES;
G = Government School; NG = Non-government School;
M = male; F = female



**Socio-Economic Level**

A Demographic Information Form was established to determine the socio-economic level of the subjects. Three major components were used to determine the socio-economic status are (a) Father's and Mother's level of education, (b) Father's and Mother's occupation, and (c) Family income. Other variables (such as residential area, family structure, number of siblings, earning members in the family) were also considered (Table 17.1).

Another important area i.e., the school system (government and private) that determines the Socio-Economic Status (SES) of children in Pakistan was also considered in the present study. In most of the Pakistani government schools, due to their lower fee structure, most of the pupils belong to the lower and lower middle SES groups. The participation of children in the present study of both school systems was approximately equal. Both non-government schools and government schools were selected within predetermined SES areas. The following profile was thus created.

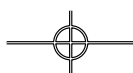
Procedure

Permission from the authorities was initially taken after providing information regarding the present project. The administrator of schools was provided a letter for consent describing the research project and inviting participation, along with a sample of the SPM (Response Book & Answer sheet). The students were briefed on the nature of the research and were asked for their consent. After establishing rapport, the SPM

Table 17.2 a. *Standard Progressive Matrices in Pakistan*
Sample Composition by Age Group and Gender

GROUP	AGE	MALE	FEMALE	TOTAL
GROUP I	11.11 – 12.11	108	111	219
GROUP II	12.11 - 13.11	143	103	246
GROUP III	13.11 - 14.11	144	113	257
GROUP IV	14.11 - 15.11	142	116	258
GROUP V	15.11 - 16.11	103	135	238
GROUP VI	16.11 - 17.11	90	107	197
GROUP VII	17.11 - 18.11	123	124	247
TOTAL	11.11- 18.11	853 (51.32 %)	809 (48.67%)	1662





was administered by a group of competent and trained psychologists. In every class, testing was carried out by a psychologist and an assistant. The test was given without time limits. Standard instructions from SPM manual were given to subjects. The test was administered to randomly selected participants in groups of 20 in a classroom setting. Only those participants were included who willingly volunteered to participate in this project. The testing was carried out during the years 2004-2006.

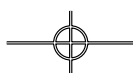
Table 17.2 b. Age Group with Gender Breakdown of Four Provinces of Pakistan (N=1662)

AGE GROUP	AGE		Provinces							
			SINDH		NWFP		BALUCHISTAN		PUNJAB	
			MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
GROUP I	11.11-12.11	N	22	28	25	25	33	23	28	35
		%	44	56	50	50	59	41	45	55
GROUP II	12.11 - 13.11	N	27	23	31	30	41	25	44	25
		%	54	46	49	51	62	38	64	36
GROUP III	13.11 - 14.11	N	35	35	43	31	19	17	47	30
		%	50	50	58	42	47	53	61	37
GROUP IV	14.11 - 15.11	N	48	40	33	29	25	23	36	24
		%	55	45	53	47	52	48	60	40
GROUP V	15.11 - 16.11	N	13	37	27	30	38	38	25	30
		%	26	74	47	53	50	50	54	46
GROUP VI	16.11 - 17.11	N	7	38	25	25	40	23	18	21
		%	16	84	50	50	63	37	46	54
GROUP VII	17.11 - 18.11	N	40	60	27	29	21	23	35	12
		%	40	60	48	52	48	52	74	26
TOTAL	11.11- 18.11	N	192	261	211	199	217	172	233	177

* % rounded off

Table 17.2 c. Percentages of Norm Sample within Region by Grades

PROVINCES	GRADES					
	SIX	SEVEN	EIGHT	MATRIC	INTERME- DIATE	GRADUATE
NWFP	19	48	46	171	126	0
PUNJAB	12	41	61	211	80	5
BALUCHISTAN	0	89	61	36	187	16
SIND	7	30	48	196	69	103
TOTAL	38	208	216	614	462	124



**Table 17.3. Descriptive Characteristics of Data***

	Age						
	TWELVE	THIRTEEN	FOURTEEN	FIFTEEN	SIXTEEN	SEVENTEEN	EIGHTEEN
N	219	246	257	258	238	197	247
Mean	31.89	32.37	36.74	37.86	40.47	40.65	41.31
Median	34.00	34.50	39.00	39.00	41.00	42.00	43.00
Std. Dev	10.29	10.87	10.69	9.74	10.33	9.67	10.46
Skewness	-0.32	-0.36	-0.86	-0.74	-0.53	-1.27	-0.90
Kurtosis	-0.44	-0.84	0.38	0.77	-0.23	1.94	0.60

* Figures are rounded off upto two decimals

**Table 17.4 a. Standard Progressive Matrices (Classic Form)
Self-Administered or Group Test Norms for Adolescents in Pakistan
(Smoothed) (N=1662)**

Percentiles	AGE							
	11.11 -12.11	12.11 - 13.11	13.11 - 14.11	14.11 - 15.11	15.11 - 16.11	16.11 - 17.11	17.11 - 18.11	
95	49	50	53	54	57	57	59	
90	45	47	49	51	53	54	56	
75	40	41	43	49	50	51	51	
50	32	33	36	38	40	42	43	
25	24	25	28	31	35	35	35	
10	17	19	20	23	26	27	28	
05	13	14	15	17	19	21	21	
N	219	246	257	258	238	197	247	

**Table 17.4 b. Standard Progressive Matrices (Classic Form)
Self Administered or Group Test, Smoothed Pakistan Norms for Adolescents
by Gender (N=1662)**

Percentiles	AGE													
	11.11 - 12.11		12.11 - 13.11		13.11 - 14.11		14.11 - 15.11		15.11 - 16.11		16.11 - 17.11		17.11 - 18.11	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
95	50	49	50	50	52	53	54	54	56	56	57	57	58	58
90	43	43	44	44	46	46	48	48	50	50	51	51	52	52
75	38	37	39	39	41	41	43	43	46	45	47	46	47	48
50	33	33	34	34	36	36	38	38	41	40	43	41	43	42
25	27	25	28	27	30	29	33	32	36	34	38	36	38	37
10	19	17	20	19	23	21	26	25	29	27	32	29	32	30
05	13	11	14	12	15	14	18	17	21	20	23	22	23	24
N	108	111	143	103	144	113	142	116	103	135	90	107	123	124





**Table 17.4 c. Standard Progressive Matrices (Classic Form)
Smoothed Norms for Adolescents in Pakistan
In the Context of 1997 Norms for Pune and Mumbai (Bombay), India and
2006 Norms for Indian Tribal Areas***

Percentiles	Age											
	12 P&M	12 TR	12½ TR	12½ PK	13 P&M	13 TR	13½ TR	13½ PK	14 P&M	14 TR	14½ TR	14½ PK
95	52	40	41	49	53	43	44	50	54	45	56	53
90	49	38	39	45	51	40	41	47	52	42	43	49
75	45	31	33	40	47	34	35	41	48	36	37	43
50	39	20	22	32	41	23	24	33	43	26	27	36
25	30	13	13	24	33	13	14	25	36	15	15	28
10	18	10	10	17	23	10	10	19	27	11	11	20
05	14	8	8	13	17	8	9	14	20	9	9	15
N	1293	284	426	219	1310	320	463	246	1344	287	449	257

Percentiles	Age											
	15 P&M	15 TR	15½ TR	15½ PK	16 P&M	16 TR	16½ TR	16½ PK	17 P&M	17 TR	17½ TR	17½ PK
95	55	47	48	54	56	49	49	57	56	49	48	57
90	53	44	45	51	54	46	46	53	54	46	45	54
75	49	37	39	49	50	40	40	50	50	41	41	51
50	44	29	30	38	45	32	33	40	45	34	35	42
25	38	17	19	31	39	20	22	35	39	24	26	35
10	29	12	12	23	31	12	13	26	31	14	15	27
05	24	10	10	17	23	11	11	19	26	11	11	21
N	1108	341	479	258	1192	262	352	238	769	243	251	197

Percentiles	Age					
	18 P&M	18 TR	18½ TR	18½ PK	19 TR	19½ TR
95	55	48	47	59	46	46
90	53	45	45	56	44	44
75	49	41	41	51	40	39
50	44	35	35	43	34	33
25	37	28	29	35	28	27
10	30	16	17	28	16	15
05	25	12	13	21	12	12
N	287	131	144	247	83	87

*Norms for Pune & Mumbai, India (1997) [P&M] and for Indian tribal areas (2006) [TR] from Deshpande, C.G., & Patwardhan, V. (2006). *previous chapter*





Scoring and Statistical Analysis

The protocols were scored according to the standard method of scoring Raven's Standard Progressive Matrices. The analyses were carried out using standard statistical packages.

Reliability

Split Half Reliability

As a measure of internal consistency, the correlation between odd-item and even-item scores was computed by Pearson's method. The correct items were added up for half rows by balancing technique i.e., total of first, fourth, fifth, eighth, ninth and twelfth row were added, other remaining rows were added for the second half. Then the two resulted sums were used as two halves in the analysis. This procedure was acquired due to progressive difficulty level in the items and in the sets, due to which adding up of odd and even items was not supposed to be that much adequate.

Reliability-Comparison with Other Studies

Numerous researchers have reported on the split half reliability of the Classic SPM (see Raven, Court and Raven, 2000, updated 2004, and Court and Raven, 1995). The figure reported in Table 17.5 (0.89) is well within the range of those reported in other well-conducted studies.

Validity

The Classic form of the *Standard Progressive Matrices* is reported to have good psychometric characteristics (Murphy & Davidshofer, 1998; Kline, 2000). Therefore, it has gained widespread acceptance and is used in many countries all over the five continents (Irvine & Berry, 1988). A

Table 17.5. *Standard Progressive Matrices (Classic Form)*
Split Half Reliability in Pakistan (Ages 11.11-18.11)

N	MEAN		STD. DEVIATION		R	SIG
	ODD	EVEN				
1551	18.1870	18.6380	5.3253	5.7216	0.891	0.000





huge body of published research bears on its validity (Gregory, 1992). Validity is a useful tool to assess the fact that any Psychological measure in use assesses the abilities for which it claims or purports. The most frequently used way to evaluate validity is to relate it to other measures having the same purpose. Harris (1959), while using the SPM with 100 Kindergarten children selected to be representative of the US urban occupational distribution, found a correlation with the Goodenough, revised, of 0.22 (dealing with raw scores). While evaluating validity of SPM, as the measure of intelligence or say, spatial abilities and all for which it claims for, its relation to DAP (Goodenough, 1926) would be of more importance than with other tests, as Draw a person test measures children's ability to draw the figure of a man, children's handling of quantitative and spatial concepts.

In the course of the present project, the Classic SPM was administered to a sample of 200 school children whose ages ranged from 6 years 11 months to 11 years 11 months, with equal representation of both males and females. The sample was approached at three elementary schools; each belonging to the residing area of one of three socioeconomic classes i.e. low, middle, and high in order to make the equal representation of all SES possible. All the subjects were required to give demographic information (teachers were interviewed in case of young subjects). The pupils also completed the Draw A Person Test (Goodenough, 1926) according to standard procedure. Instructions were given in groups as well as individually for better understanding.

Table 17.6. Correlation between Raven Standard Progressive Matrices and Draw A Person (DAP) Test Pakistani Elementary School Children (Age 6.11-11.11)

<u>Measures</u>	Mean	Std. Dev	Pearson's r	Sig
Draw A Person Test	33.0390	7.6131		
Standard Progressive Matrices	36.7013	9.0555	0.256	0.025





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