Norms and Sex Differences for Intelligence in Saudi Arabia assessed by the Standard Progressive Matrices

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Results are reported for a standardization of the Standard Progressive Matrices in Saudi Arabia on a sample of 2935 males and 1724 females aged 8-24 years. The mean IQ of the sample in relation to a British IQ of 100 is estimated at 78.25.

Key Words: intelligence; Progressive Matrices; Saudi Arabia; gender differences

The Standard Progressive Matrices (SPM) is a test of non-verbal reasoning ability that has been used extensively for the measurement of intelligence in numerous countries throughout the world (Raven et al., 1998; Lynn, 2006; Lynn & Vanhanen, 2006). The test is considered to be an excellent measure of intelligence and, more specifically, of *g*, the general factor present in all cognitive tasks first identified by Spearman (1904) (Jensen, 1998; McGrew & Flanagan, 1998).

The Standard Progressive Matrices is designed for children from the age of 6.5 years and older and for adults. There is a similar test, the Colored Progressive Matrices (CPM), designed for children from age 4 to 11 years. There is also a more difficult test, the Advanced Progressive Matrices (APM), designed for more intelligent adolescents and adults.

Norms for the CPM and SPM have been reported for a number of countries in the Middle East including Bahrain (Khaleefa & Al Gharaibeh, 2002), Iran (Valentine, 1959), Iraq (Abul-Hubb, 1972), Jordan (Lynn & Abdel-Khalek,

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2009), Kuwait (Abdel-Khalek & Lynn, 2006), Oman (Abdel-Khalek & Lynn, 2008), Qatar (Bart et al., 1987; Khaleefa & Lynn, 2008d), Syria (Khaleefa & Lynn, 2008a), United Arab Emirates (Khaleefa & Lynn, 2008b), and Yemen (Al-Heeti et al., 1997; Khaleefa & Lynn, 2008c). These studies have found that the mean scores obtained on the test are lower than in Britain and other countries in northern and central Europe, and in the United States (Lynn, 2006; Lynn & Vanhanen, 2006). In terms of a British IQ of 100 and standard deviation of 15, mean IQs in these states range from 78 in Qatar to 87 in Iraq. In this paper we present further SPM data for the Gulf States consisting of a standardization of the Standard Progressive Matrices in Saudi Arabia.

Method and Results

A standardization of the Standard Progressive Matrices in Saudi Arabia has been carried out in 1976 and has been reported in Arabic by Abu-Hatab et al. (1977). The sample consisted of 8-24 year olds (N = 4659). The sample was selected from the towns of Makka, Jedda and Al-Ta'ef in the western region of the Kingdom of Saudi Arabia. The 8 to 18 year olds were students at primary, intermediate and secondary schools. The 19-24 year olds were students at teacher training institutes and universities. The collection of data began in March 1976 and continued for 2 years. At this time education was compulsory in Saudi Arabia for 6 to 12 year olds. Hence, if the less intelligent left school at the age of 13 (as seems likely), norms for those aged 13 and over may be too high.

The descriptive data for the results are given in Table 1. This shows the numbers, mean scores and standard deviations for males and females for each age group (8 = 8.0 years, etc.).

Table 2 gives the means for males and females combined for each age group. For the age group 8-15 years, these are followed by the British percentile equivalents of the mean scores, and the IQ equivalents of the percentiles on the British 1979 standardization sample (Raven, 1981). The average British IQ of these age groups 8 through 15 is 75.5. The Saudi data were collected in 1976, 3 years before the

British standardization of 1979. To equate for years of standardization we add 1 IQ point because the British IQ has been increasing at 2 IQ points a decade (Lynn & Hampson, 1986). This raises the Saudi IQ by 1 point (for the 3 years 1976-1979) to 76.5.

Table 1.
Descriptive statistics for the SPM in Saudi Arabia.

Age	Males			Females		
	N	M	SD	N	M	SD
8	144	16.20	7.11	143	12.91	6.10
9	77	19.99	9.60	85	13.59	5.89
10	116	20.32	9.91	117	14.09	6.24
11	198	21.62	10.72	135	16.85	8.62
12	324	26.23	11.68	102	20.63	10.56
13	237	28.92	12.62	142	23.05	11.36
14	259	32.75	13.17	132	26.36	12.35
15	292	35.46	12.25	158	34.12	12.52
16	276	36.86	11.51	147	34.60	12.66
17	177	36.32	11.84	93	36.30	12.45
18	131	38.26	10.23	89	37.40	12.19
19	118	38.44	10.64	83	37.65	13.70
20-24	586	38.75	10.27	298	39.72	11.55

There are no British norms for 16 and 19 year olds. For 18, 19 and 20-24 year olds there are American norms obtained in 1993 and given by Raven et al. (1998). The American percentile equivalents of the Saudi mean scores for the three age groups are given in the last three rows of the table, followed by the IQ equivalents. The average of the IQs of the three age groups is 78.2. Add 3.8 IQ points for the Flynn effect (19 years), and deduct 2 IQ points to equate to a British IQ gives an IQ of 80. The two results are averaged to give an IQ of 78.25.

The right hand column of Table 2 gives the variance ratios (VR) for males and females, calculated by dividing the

male variance by the female variance. Thus, a variance ratio greater than 1.0 shows that males have greater variance than females, while a variance ratio less than 1.0 shows that females have greater variance than males.

Table 2.
SPM means for Saudi Arabia, British percentiles, IQs and Sex variance ratios.

Age	Mean	British PC	IQ	Sex VR
8	14.6	12	82.3	1.36
9	16.8	10	81.0	2.66
10	17.2	5	75.3	2.52
11	19.2	1	65.0	1.55
12	23.4	3	71.8	1.22
13	26.0	4	73.8	1.23
14	29.6	4	73.8	1.14
15	34.8	10	80.8	0.96
16	35.7	-	-	0.83
17	36.3	-	-	0.90
18	37.8	7	77.9	0.70
19	38.0	7	77.9	0.60
20-24	39.2	8	78.9	0.80

Discussion

The principal result is that the mean IQ in Saudi Arabia measured by the SPM is 78.25, in relation to a British mean of 100. The mean is a little lower than has generally been obtained in other countries of the Middle East, summarized in the introduction, although the same IQ has been found in Qatar. This IQ for Saudi Arabia was obtained in 1976 and IQs may well have increased since then. A further study is needed to update the result.

Second, it is remarkable that the 19 year old and the 20-24 year old students in colleges of higher education obtain approximately the same IQ as the school students, as it would be expected that these would be selected for higher intelligence and would have scored higher.

Third, other points of interest in the results center on the sex differences. Males obtained consistently higher means than females for all age groups 8 through 19, although among the 20-24 year olds females obtained a fractionally higher mean than males. These results are

inconsistent with those obtained in other Arab countries of the Middle East, which have generally shown no significant differences in the means obtained by males and females. The higher mean obtained by females in the 20-24 year old group is also inconsistent with results in many western countries, where males typically obtain higher IQs than females on Raven's Progressive Matrices by approximately 4 to 5 IQ points in general population samples and also in university student samples (Lynn, 1994; Lynn & Irwing, 2004; Irwing & Lynn, 2005). The likely explanation for the higher mean obtained by females in the Saudi sample is that they are more highly selected. Note that there are 586 males in the 20-24 year old group, compared with 298 females.

Fourth, there are also some interesting sex differences in the variance ratios. It has often been stated that males have greater variability of IQs than females. This has been asserted since the early years of the twentieth century, when it was proposed by Havelock Ellis (1904) and restated by Thorndike (1910), and Terman (1916), and later reaffirmed by Eysenck (1981) and Hedges & Nowell (1995), and recently by Deary et al. (2007). The greater variability of the IQs of males is present in Saudi Arabia in the age groups 8-15 years, but from the age of 16 years and upwards females have consistently greater variance ratios than males. These inconsistencies have been found in several other countries of the Middle East and show that the greater variance of males is not a universal phenomenon.

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