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Sex Differences on the Coloured Progressive Matrices in Sudan

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Data are reported for a standardization of the Coloured Progressive Matrices in Sudan. Boys obtained a higher average IQ of 2.7 points and showed greater variability. The sample obtained a British-scaled IQ of 81.5.
Key words: Sudan, Coloured Progressive Matrices, Intelligence, Sex differences, Variability

One objective of this paper is to present data on sex differences on the Coloured Progressive Matrices for a sample of 6-9 year old children in Sudan. Sex differences on the Coloured Progressive Matrices for this age group had been given in a meta-analysis of 15 studies, most of them from Western countries,

in which boys had an advantage of 0.21*d* equivalent to 3.2 IQ points (Lynn & Irwing, 2004). However, very little is known about sex differences in Sudan and other Arab countries, which are characterized by different sex roles and less effective school systems relative to Western countries. The second objective is to assess the performance level in Sudan in the international context, using norms from the British standardizations. British IQs for twelve studies of intelligence in Sudan have been given by Lynn and Vanhanen (2012) with estimates ranging between 64 and 86 and a median of 77.5.

Method and Results

The data have been published in Arabic as a standardization of Raven's Coloured Progressive Matrices (CPM) (Raven, Court & Raven, 1995) in Khartoum State, Sudan, in 2004 (Khatib, Mutwakkil & Hussain, 2006). The sample of 1683 school children (728 males, 955 females) was selected from public and private schools in the seven municipalities of Khartoum, the capital of Sudan, by stratified sampling. It was representative of all socio-economic levels. The subjects were tested in their schools by trained psychologists.

The results are shown in Table 1, separately for males and females of the four age groups of 6 through 9 years. This includes sample size N, mean raw scores and standard deviation (SD) on the CPM, the variability ratio (VR) calculated as male SD divided by female SD, the *d* values (average male score minus average female score divided by the average SD), and the t values as tests of the statistical significance of *d*. The last three columns compare the Sudanese scores with those in the British standardizations of 1982 and 2007 (Raven, Court & Raven, 1995; Raven, 2008). The lower percentile scores in the 2007 than the 1982 British standardization indicate strong Flynn effect gains for this age group in Britain during this 25-year period. The last column gives the Sudanese IQ according to British norms in 2004. It is calculated from IQs according to the 1982 and 2007 norm tables: IQ2004 = (IQ1982 x 3) + IQ2007 x 22) / 25. The calculation assumes constant yearly gains for British children between 1982 and 2007.

Discussion

There are four points of interest in the results. First, in all four age groups the boys obtained higher average scores than the girls. The average male advantage is 0.178 *d* and is equivalent to 2.7 IQ points. This male advantage is closely similar to the 0.21*d* (3.2 IQ points) male advantage given in the meta-analysis of 15 studies by Lynn and Irwing (2004) in which boys had an advantage of 0.21*d* equivalent to 3.2 IQ points. Second, boys showed greater variability than girls. This confirms numerous studies reporting that "Males have a slightly but

consistently wider distribution than females at both ends of the range" (Deary, Penke & Johnson, 2010).

Table 1. *Sex differences on the Coloured Progressive Matrices in Sudan. ** p<.01.*

Age	Sex	N	Score ± SD	VR	*d*	*t*	British percentile 1982	British percentile 2007	British IQ 2004
6.5	M	92	13.5±5.4	1.26	.206	1.53	21	7	78.5
	F	167	12.5±4.3				14	5	76
7.5	M	167	14.2±4.6	0.92	.042	0.43	11	2	70.5
	F	293	14.0±5.0				10	2	70
8.5	M	286	16.1±5.8	1.09	.144	1.81	16	0.9	66.5
	F	366	15.3±5.3				9	0.5	63.5
9.5	M	183	17.6±7.3	1.24	.318	2.80**	8	0.8	65
	F	129	15.5±5.9				4	0.3	60

Third, the mean IQ of the Sudanese sample relative to the British standard at the time of testing (2004) is 70.1 for boys and 67.4 for girls. This can be averaged to 68.75 rounded to 69.This figure needs to be corrected because the test was administered to groups rather than individually and the test has been standardized in Britain for individual administration. A previous study has shown that in an Arab sample of this age group that took the test individually and in groups, the group administration gave a score 12.5 IQ points lower than individual administration (Bakhiet & Lynn, 2014). Thus, we propose that 12.5 needs to be added to the 69 to give 81.5 as the best estimate of the British-scaled IQ of the present sample. This is reasonably consistent with the median IQ of 77.5 in Sudan of previous studies noted in the introduction.

Fourth, it will be noted that the British IQs of the Sudanese children declined with age. The 6 year olds obtained IQs of 78.5 (boys) and 76 (girls), while the 9 year olds obtained IQs of 65 (boys) and 60 (girls). This decline is consistent with Jensen's (1977) cumulative deficit hypothesis stating that an adverse environment has a depressing effect on intelligence that increases with age. Jensen had demonstrated such an effect for black children in the rural South of the United States.

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References

Bakhiet, S.F.A. & Lynn, R. (2014). A study of the IQ in Palestine. *Intelligence* 47: 10-11.

Deary, I. Penke, L. & Johnson, W. (2010). The neuroscience of human intelligence differences. *Nature Reviews Neuroscience* 11: 201-211.

Jensen, A.R. (1977). Cumulative deficit in IQ of blacks in the rural South. *Developmental Psychology* 13: 1841-1891.

Khatib, M., Mutwakkil, M. & Hussain, A. (2006). Tagneen l'khtibar al-masfofat al-mutatabia' al-mulawwan litalameez al-halaqa al-o'la bimarhalat al-asas biwilayat al-khartoum (Standardization of the Coloured Progressive Matrices for children in Khartoum State). Khartoum: Sharikat Matabi' al-Sudan lil-Omlah al-Mahdodah.

Lynn, R. & Irwing, P. (2004). Sex differences on the Progressive Matrices: A meta-analysis. *Intelligence* 32: 481-498.

Lynn, R. & Vanhanen, T. (2012). *Intelligence: A Unifying Construct for the Social Sciences*. London: Ulster Institute for Social Research.

Raven, J. (2008). *Coloured Progressive Matrices and Crichton Vocabulary Scale Manual.* London: Pearson.

Raven, J.C., Court, J.H. & Raven, J. (1995). *Coloured Progressive Matrices*. Oxford, UK: Oxford Psychologists Press.