

A Standardization of the Colored Progressive Matrices in Tripoli, Libya

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Results are reported for a standardization of the Colored Progressive Matrices on a sample of 2481 children aged 8.5 to 12.5 years in Tripoli. The sample obtained a British IQ of 82.5. The result is placed in the context of other studies using cognitive tests in Libya. The average of those studies that used population-representative samples is 77. The results are discussed in the context of social and political conditions in Libya.

Key words: Intelligence; Coloured Progressive Matrices; Libya

A research program to collect IQs for all nations in the world was initiated by Lynn (1978) and has been extended in a number of subsequent studies summarized in Lynn and Vanhanen (2012). In these studies, national IQs are scaled in relation to a British mean of 100 and standard deviation of 15. In a growing body of research, average intelligence in countries as measured by cognitive tests is related to a large number of social and economic characteristics. These include current level of economic development (Lynn and Vanhanen, 2012), economic growth rate (Weede and Kämpf, 2002; Meisenberg, 2014), good government (Kanyama, 2014), generalized trust (Carl, 2014), suicide rates (Voracek, 2009), innovation (Burhan et al., 2014a), cultural variation in beliefs and values (Meisenberg, 2004; Meisenberg et al., 2012) and rates of violent crime (Burhan et al., 2014b). Scholastic achievement, measured in international testing programs such as PISA and TIMSS, is the closest country-level correlate of psychometric intelligence (Meisenberg and Lynn, 2011). Indeed performance on

standardized IQ tests and performance on scholastic achievement tests can be considered alternative measures of intelligence.

For developing countries in particular, the development of higher intelligence through improved education is considered a prerequisite for economic development and the establishment of effective institutions (Rindermann, 2008). The present paper reports the results of a large normative study of IQ in Libyan children. The results will be compared with those of earlier studies of IQ in Libya and placed into the socio-cultural context of this country.

1. Method

The Colored Progressive Matrices (CPM) test was standardized in Tripoli, the capital city of Libya, in 2008 by Amtir (2009). The results are published in Arabic in an M.A. thesis of Al-Fateh University.

The standardization sample consisted of 2481 children aged 8.5 to 12.5 years. It was selected from 284 schools and included a representative 5 percent of all children in this age range in the city. The children were administered the Colored Progressive Matrices (CPM) test, which is the children's version of Raven's Progressive Matrices. The CPM can be described as a test of visuo-spatial ability and non-verbal reasoning ability. Its correlations with IQ measured by complex test batteries such as the Wechsler scales typically are between .5 and .7 (Raven, 2008a, pp. 49-52). Therefore it is considered a good measure of general intelligence (*g*). The CPM has been standardized for the age range of 4 or 5 years to 11 years in Britain and the United States.

Because they are non-verbal and do not depend on skills that are taught explicitly in school, the Raven tests are the most commonly used tests in cross-cultural intelligence studies (Lynn and Vanhanen, 2012). However, although the Raven tests are considered "culture-reduced," they are not pure tests of innate ability. This is evidenced by strong secular gains, known as Flynn effects, on these tests in western countries during the 20th century (Raven, 2008b). These secular trends show that performance on the Raven tests is quite sensitive to the effects of formal education or to other environmental factors that have been changing systematically over time in western countries.

The raw scores reported in the original study were scaled to the IQ metric according to the norm table for the British CPM standardization in 2007, reported in Raven (2008a). No Flynn effect adjustment was required to scale the raw scores to the contemporaneous British IQ.

2. Results

Table 1 presents the main results for three age groups consisting of children aged 8.5 to 9.4 years (mean age 9.0), 9.5 to 10.4 years (mean age 10.0), and 10.5 to 12.4 years (mean age 11.5). The table gives sample sizes, mean CPM raw scores, British percentiles according to the 2007 British standardization (Raven, 2008a), and the British IQs. The average IQ of the three age groups is 82.5.

There were no significant differences between the mean scores obtained by boys and girls in the present study confirming many other studies in numerous countries showing that boys and girls at these ages obtain the same average scores on the Colored Progressive Matrices and on the Standard Progressive Matrices (Lynn and Irwing, 2004).

Table 1. *Colored Progressive Matrices data for Tripoli.*

Age	N	CPM score	British percentile	British IQ
9.0	824	22.5	9	80
10.0	795	26.0	20	87.5
11.5	862	28.0	9	80

3. Discussion of Study Results

The mean British IQ of 82.5 obtained in this study is comparable with the results of earlier studies in Libya (discussed in the next section), and similar to results obtained in many other Muslim countries of North Africa and the Middle East, for example Syria (Khaleefa & Lynn 2008a), Yemen (Khaleefa & Lynn 2008b) and Saudi Arabia (Batterjee, 2011). This is likely to be slightly higher than the average in the country because urban samples tend to score higher than rural ones, not only in developing countries but also in more developed countries such as Greece (Alexopoulos, 1997). In several countries, average IQ has been found to be higher in the capital city than in the rest of the country, presumably because highly able persons from other parts of the country tend to move there (e.g., Almeida et al, 2011; Dutton and Lynn, 2014). It is also noteworthy that this is the only IQ study from Tripoli, which is located in the western part of Libya. The others have been done in and around the city of El-Beida in the east of the country.

4. Comparison with Other Libyan Studies

Table 2 lists the present study in the context of other Libyan IQ studies. In total there are 8 studies with a combined sample size of 8263. All are of recent date, being performed between 2006 and 2010, and all but one used a Raven

test, either the CPM or the Standard Progressive Matrices (SPM). Raw scores on the Raven tests were scaled to the IQ metric according to the norm tables for the British 2007 standardizations (Raven, 2008a,b).

Most of the 8 studies used samples of schoolchildren that appear to be representative for the school-aged population in the part of the country where the study was performed. The two adult studies (#5 and #6) used government employees as subjects. This may have introduced some elite bias because government employees tend to be office workers with above-average education and because the unemployed, for example, were excluded. The samples nevertheless appear to be at least somewhat representative for working-age adults in the country. One of the studies (#4) used students from the University of Omar Al-Mukhtar, located in Al-Beida and Al-Marj. Because university students are expected to score higher than the average of the general population, the results of this study were not used for the calculation of the country average. The average IQ of the remaining 7 studies is 78.4.

The only study that did not use one of the Raven tests is #2, which used the verbal part of the WISC-R. The IQ obtained in this study for the average of ages six through 16 was 81.7. However, the WISC-R was standardized in the United States in 1974, 33 years before the Libyan study (Wechsler, 1974). Performance on the WISC has increased by approximately 3 points per decade in the United States, but gains have been stronger on the performance than the verbal subtests (Flynn, 2007). Assuming a gain of 2 points per decade for the verbal WISC-R between 1974 and 2007, we have to deduct 6.6 points from the reported IQ, bringing us to a Flynn effect adjusted IQ of 75.

Developmental trends in children and adolescents are inconsistent across the Libyan studies. In study 1, IQ declined from 98 at age 6 to 72 at age 11. However, studies 2 and 3 found virtually no differences in scaled IQ between different ages. Secular trends in performance are difficult to assess because all studies were performed within a few years of each other. However, because people tend to maintain the cognitive level they reached as adolescents throughout adult life (Deary, 2014), strong secular gains (Flynn effects) predict that younger people score higher than the older generation in cross-sectional studies. This does not seem to be the case in Libya, since studies 5 and 6 did not find lower IQs in adults than the others found in children and adolescents. This indicates that secular gains were of similar strength in Libya and Britain. However, the adult samples in studies 5 and 6 were government employees, presumably office workers. If this was an elite group with substantially higher cognitive ability than the population average, Flynn effects may have been significantly stronger in Libya than in Britain.

Table 2. *Results of IQ studies from Libya*

#	Study year	N	Age	Birth cohort	Test	IQ	Source
1	2006	600	6-11	1995-2000	CPM	82.5	Lynn et al. 2008
2	2007	870	6-16	1991-2001	WISC-R	75	Lynn et al. 2009
3	2007-08	1800	8-17	1990-2000	SPM	70	Al-Shahomee & Lynn 2010a
4	2007-08	400 400	18-21	1986-1990	SPM	80 (sci) 76 (arts)	Al-Shahomee & Lynn 2010b
5	2010	600	23-37	1973-1987	SPM	78	Al-Shahomee 2012
6	2010	520	38-50	1960-1972	SPM	77	Al-Shahomee & Lynn 2012
7	2008	592	16	1992	SPM	84	Al-Shahomee et al. 2013
8	2008	2481	8-12	1996-2000	CPM	82.5	This report

5. Implications for Libya

Intelligence is both a cause and a consequence of economic growth and social change (Meisenberg, 2014). In the Libyan case, prosperity is (or was until recently) high by third-world standards thanks to oil revenues. Per capita gross national income reached \$28,000 in 2009, although more recent data are unavailable due to political disruptions. Therefore, poverty, nutritional deficiencies, or financial inability to maintain an effective educational system are unlikely impediments to cognitive development in the country. However, the average IQ that the studies show is quite low by regional standards. Tunisia (Lynn et al., 2008; Young, 1966) and Jordan (Bakhiet and Lynn, 2014a,b), for example, have higher average IQs than Libya. A more likely circumstance that may have impeded cognitive development in Libya is a political history of autocratic rule, which may have discouraged the critical thinking and intellectual openness that appears to favor cognitive development in democratic societies.

Conversely, intelligence is considered a precondition for successful democracy (Rindermann, 2008). It is also plausible that a certain level of cognitive development is required to solve internal disagreements peacefully (Rindermann et al., 2009). Low cognitive ability in countries has been postulated to be a cause of “failed state” status (Voracek, 2013). In the Libyan case, the results of the studies in Table 2 should be taken into consideration when trying to explain the precarious political situation that developed in the country after the demise of the dictatorship in 2012.

Acknowledgement: The authors are thankful to the Deanship of Scientific Research, College of Education Research Centre at King Saud University for funding this research.

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