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Dysgenic fertility, intelligence and family size in Libya

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ABSTRACT

The Standard Progressive Matrices (SPM) was administered to a sample of 592 16 year old school students in Libya. There was a small negative correlation of −0.14 between SPM scores and the number of siblings, indicating only marginal dysgenic fertility. Supplementary material giving the data is given online.

1. Introduction

The term dysgenic fertility for intelligence designates a negative relation between the intelligence of adults and their number of children. The presence of dysgenic fertility for intelligence in Western nations began to be discussed in the middle decades of the nineteenth century by Francis Galton (1869) in his book *Hereditary Genius*., where he wrote that in the early stages of civilization what he called "the more able and enterprising men" were the most likely to have children. It has been shown in a number of studies that Galton was right in believing that in pre-industrial Europe at least, the wealthy and high-status people usually had more children than others (Clark & Hamilton, 2006; Skirbekk, 2008). Galton went on to argue that in older civilizations, like that of Britain, various factors operated to reduce the number of children of these and to increase the number of children of the less able and enterprising. He wrote that the effect of this was that "there is a steady check in an old civilisation upon the fertility of the abler classes: the improvident and unambitious are those who chiefly keep up the breed. So the race gradually deteriorates, becoming in each successive generation less fit for a high civilisation" (Galton, 1869, p. 414).

In the twentieth century a number of studies were carried out to examine the relationship between IQs and number of siblings. A review of these by Lynn (2011) summarises fifteen of these studies carried out in the United States and Britain between 1925 and 1958 in all of which the correlation between IQ and numbers of siblings was negative, i.e. the higher a child's IQ, the fewer the number of his or her siblings. The correlations ranged between −0.19 and −0.40 with a median of −0.26.

Those who collected these data from the 1920s onward argued that children's IQs are on average the same as those of their parents. Hence, they argued that the negative correlation between children's IQs and their number of siblings implied that there is also a negative correlation between adults' IQs and their number of children, i.e. couples with low IQs must be having larger numbers of children, entailing the negative correlation found among children between their IQs and their number of siblings.

These studies were all carried out in economically developed countries. We have only found one study of the relationship between intelligence and fertility in an economically developing country. This is a study in Kuwait reporting a correlation of −0.05 between intelligence tested with the Standard

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Progressive Matrices and number of siblings in a sample of 4643 8–15 year olds (Abdel-Khalek & Lynn, 2008). This very low correlation indicates virtually negligible dysgenic fertility for intelligence in Kuwait. To contribute a further study of the possibility of dysgenic fertility in economically developing countries, we report the relation between intelligence and family size in Libya.

2. Method

A sample of 592 (286 male and 308 female) of Libyan secondary school students aged 16 years old was tested in 2008 with Raven's Standard Progressive Matrices (SPM, Classic form) (Raven, 1981). The sample came from public schools in Al-Beida and Shahat cities. According to the General Authority of Information in 2006, Al-Beida city is divided into six administrative districts (Alsog algadem, Algareka, Werdamah, Al Zaweya Algademah, Al-Beida Algharbiya and Al-Beida Alshargeya) and Shahat city is divided into four administrative districts (Shahat Aljadedah, Shahat Algademah, Amalsfsf and Almansora). The selections of school districts were conducted using a stratified random-sampling procedure.

The schools were contacted by a letter from the sector of education explaining the purpose of the study and the procedure to be followed in selecting and testing the students. At each school on the day of the SPM testing, students were randomly selected from grade 11 (students aged 16 years) from the sample framework of students' names in the selected classrooms with the help of the student affairs and student admission manager. A representative school was chosen for each administrative boundary in these two cities. A place for testing the students was made available at each school. The testing was carried out in most cases in either the school theatre or library where each student had his or her own table and chair. Participants' code was based on school location, name of city, name of school, gender and finally the number of the participant. All participants were given an information sheet and were asked to sign a consent form before participation in the study. None of the participants declined to sign the consent form. The test was administered, untimed, in group settings with instructions given in the colloquial Libyan Arabic language. Students in Libya begin school at the age of 6.0 years and boys and girls are educated together. This ensures that the boys and girls are matched for educational experience and family background.

3. Results

The scores for children in each family size from 1 (i.e. only children) through 11+ are shown in Table 1. Although there were a number of families with 10 or more children, this is not attributable to polygamy which is negligible in modern Libya. The correlation between SPM scores and family size is −0.14 and is statistically significant at $p<.01$.

A principal components analysis was carried out to ascertain whether the items in the SPM contained a general factor and any factors. In this procedure the number of significant factors is normally taken to be those with eigenvalues greater than unity. The analysis found only one significant factor. This had a large eigenvalue of 3.3 and accounted for 65.5% of the variance. A scree-plot of the eigenvalues showed three additional smaller factors with eigenvalues between 0.5 and 0.3. These are well below unity Simulation has shown that the scree-plot is a consistently good indicator of the number of significant factors (Zwick & Velicer, 1986). These results are interpreted as showing that there is only one significant factor in the test.

4. Discussion

The principal objective of this study was to examine whether there is a negative relation between intelligence and number of siblings in Libya. The result finding a correlation of −0.14 between SPM scores and family size is statistically significant at $p<.01$ but is very low, indicating that dysgenic fertility for intelligence is only marginally present in Libya. This result is consistent with the study in Kuwait finding a very low correlation of −0.05 between intelligence and number of siblings in Kuwait reported by Abdel-Khalek and Lynn (2008). These correlations are lower than those in the United States and Britain between 1925 and 1958 which (as noted in the introduction) ranged between −0.19 and −0.40 with a median of −0.26. The implication of these results is that both Libya and Kuwait have begun to enter the demographic transition that appeared in European populations in later decades of the nineteenth century. This is confirmed by the total fertility rates in 2005 of 3.28 in Libya and 2.91 in Kuwait given in the CIA (2006) *The World Factbook*. These total fertility rates are intermediate between natural fertility of between 6 and 8, and fertility below 2 present in all economically developed economies in which the demographic transition has been completed given in CIA (2006) and Lynn & Harvey (2008).

The study contains three other points of interest. First, the mean SPM score of the sample was 40.34. This is equivalent to the 20th percentile on the 1979 British standardisation of the SPM given in Raven (1981) and is equivalent to a British IQ of 87. This result is consistent with four other studies of intelligence in Libya summarised by Al-Shahomee (2012) that have obtained British IQs of 86 (CPM), 78 (SPM), 85 (WISC-R) and 81 (SPM).

The principal components analysis showed that there is only one significant factor in the test in the present sample. This is consistent with many studies in the United States and Britain, and has been interpreted as showing that the Progressive Matrices test provides a pure measure of Spearman's g (Jensen, 1980).

The very low associations between SPM scores and numbers of siblings in the present study and also in Kuwait is contrary to Zajonc's (1983) "confluence" theory that attempted to explain

Table 1
SPM scores in relation to family size.

Number children	43	82	88	76	78	70	37	34	36	33	15
Family size	1	2	3	4	5	6	7	8	9	10	11+
SPM scores	39.5	41.9	42.0	41.2	40.7	39.4	39.2	39.1	37.3	35.1	38.7

the negative association between IQ and sibling size generally present in studies in the United States and Britain by positing that children in larger families receive less cognitive stimulation from parents than those in smaller families and this impairs their intelligence. Contrary to this theory, only children in this sample scored lower than those in 2, 3, 4 and five child families. If Zajonc's theory were correct, the negative association between IQ and sibling size should be a universal phenomenon, and the present results show that this is not the case and that the "confluence" theory is not universally valid. The present results confirm the conclusion advanced by Rodgers, Cleveland, van den Ord, and Rowe (2000) and Rodgers (2001) who have shown that there are no within-family effects of birth order on IQs and hence argued that Zajonc's (1983) "confluence" theory is invalid. The present results are consistent with this conclusion.

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