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New evidence for dysgenic fertility for intelligence in the United States

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ABSTRACT: Data were taken from the 1994 National Opinion Research Center survey of a representative sample of American adults to examine the relation between the intelligence of adults aged 40+ and their numbers of children and their numbers of siblings. The correlations were found to be significantly negative at −0.05 and −0.09, respectively, indicating the presence of dysgenic fertility. Further analysis showed that dysgenic fertility is present only in females. The correlation for females between intelligence and ideal numbers of children was effectively zero, indicating that if women had the numbers of children they consider ideal, dysgenic fertility would be reduced.

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There has been a long standing concern that the intelligence of modern populations may be deteriorating as a result of the tendency of the more intelligent to have fewer children than the less intelligent. This phenomenon has become known as dysgenic fertility or dysgenics. Anxiety about the probable existence of dysgenic fertility was voiced in the nineteenth century by Galton (1869) and in the twentieth century by numerous biological and social scientists including Fisher (1929), Cattell (1937), and Muller (1963).

The theory and evidence for the existence of dysgenic fertility have recently been reviewed by Lynn (1996). There are four types of evidence pointing to the presence of dysgenic fertility throughout the twentieth century in the economically developed nations. These are, firstly, the extensive evidence for a negative association between intelligence and numbers of siblings, suggesting that more intelligent individuals have fewer children; secondly, the extensive evidence for a negative association between educational level, taken as a proxy for intelligence, and numbers of children; thirdly, the extensive evidence for a negative association between socioeconomic status, taken as another proxy for intelligence, and numbers of children; and fourthly, the less extensive evidence for a negative association between the intelligence of adults and their numbers of children.

Of these four classes of evidence, the last must be considered the most direct and persuasive, because the first three are less direct, subject to error, and open to other explanations. However, the last is also the class of evidence for which comparatively little data exist and for which such data as do exist are contradictory. Despite the long-standing concern over the probable existence of dysgenic fertility, it was not until the 1960's that direct evidence on the relationship between the intelligence of adults and their numbers of children began to be published. Most of these studies were carried out in the United States. The first were by Higgins et al., (1962) and Bajema (1963) and found that the relationship between intelligence and numbers of children was slightly positive and therefore that fertility was not dysgenic. However, neither of these studies was based on representative samples of the population which is an important requirement for studies of this issue. In the 1980's and 1990's four studies based on more representative samples of the American population found that fertility was dysgenic (Vining, 1982, 1995; Van Court and Bean, 1985; Retherford and Sewell, 1988; Herrnstein and Murray, 1994).

Only the third of these studies presented an estimate of the magnitude of the deterioration of intelligence arising from the negative association between intelligence and fertility. Retherford and Sewell estimated the difference between the parental and child generations in their sample at 0.81 IQ points. This difference is known as the selection differential and represents what may be called the "notional" decline of intelligence, that is, the decline which would be present if environmental influences on intelligence were the same for the parental and child generations. It may be useful to note that the Retherford and Sewell sample population (1) was born about the year 1940; (2) consisted almost entirely of whites, so was not representative of the American population; (3) did not include high-school drop-outs; and (4) was age 35 when the fertility of the sample was recorded, so that fertility was not yet complete. For these reasons it was not a perfect sample for a study of the presence and magnitude of dysgenic fertility. Nevertheless, the authors made reasonable adjustments for these shortcomings of their sample.

There have been two recent contributions to the debate on whether dysgenic fertility is present in the United States. Williams and Ceci (1997) present data showing that black-white and socioeconomic-status differences in intelligence have narrowed over the past few decades. They argue that if dysgenic fertility had been present, the differences should have widened. This argument is not a valid one for the reasons given by Loehlin (1997). The fallacy in the argument is that environmental effects have acted more powerfully to raise the IQ's of lower IQ groups which has masked the less powerful genetic effects caused by dysgenic fertility. As Loehlin (1997, p. 1237) correctly observes in a commentary on their paper, their data "have little or no bearing on the hypothesis of dysgenesis."

Loehlin presents data which do have a bearing on the issue of dysgenic fertility, that is, the fertility of American women aged 35–44 in 1992 in relation to their educational level. The relationship is negative. Loehlin assigns IQ's to six educational levels and estimates the IQ of the child generation at 0.80 IQ points lower than that of their mothers in the case of whites and 0.75 IQ points lower in the case of blacks.

It should be noted that dysgenics (the genotypic deterioration of the population) is not only caused by a negative association between intelligence and numbers of children but can also be caused by generation length. If there is a tendency for the less intelligent to have children at a younger age than the more intelligent, then the numbers of less intelligent individuals in the population will increase even in the absence of any association between intelligence and completed fertility. A useful discussion of this issue and the formula for calculating the effect of generation length is given by Cavalli-Sforza and Bodmer (1971, p. 297, Equation 6.5). The magnitude of dysgenics is determined by what is known as the "intrinsic rate of increase" of people with low intelligence as compared with people of high intelligence. This rate of increase is determined by two factors: (1) the association between intelligence and numbers of children; and (2) the association between intelligence and generation length. The second of these factors has been discussed and some evidence for its existence adduced by Herrnstein and Murray (1994), but apart from this source it has received little empirical attention. It is nevertheless important to note its existence as a component of dysgenics.

In this paper I present new data on the relationship between intelligence and fertility for a more representative sample of American adults and for an age at which fertility is virtually complete.

MATERIALS AND METHODS

The data for this study are for the United States and are drawn from the General Social Survey for 1994 carried out by the National Opinion Research Center (NORC). A description of the sampling and other particulars of the survey are given by Davis and Smith (1996). The sample consisted of 2,992 English-speaking individuals aged 18 years and older selected as a national probability sample from continental United States, but excluding individuals resident in institutions.

The NORC surveys are carried out each year and obtain a large amount of information from the respondents. These surveys consist of a number of core questions which are asked every year, and a number of additional questions which are asked in some years but not in others. The 1994 survey is particularly useful for our present purpose because the questions include a verbal reasoning intelligence test and ask respondents for their numbers of children, their ideal numbers of children, and their numbers of siblings. From these questions it is possible to examine the relationship between intelligence and numbers of children, and hence whether fertility was eugenic or dysgenic. The relationships between intelligence and ideal numbers of children and numbers of siblings provide additional interesting information.

The verbal reasoning test consists of 8 similarity questions. The first is "In what way are an orange and a banana alike?" The questions become progressively more difficult, and the last one is "In what way are praise and punishment alike?" The responses are scored as correct, partly correct, incorrect, and don't know. In order to derive a verbal reasoning score, I have awarded 2 points for each correct answer, 1 point for each partly correct answer, and zero points for incorrect and don't-know answers. Thus, there is a maximum possible score of 16 and a minimum of 0. The numbers of children recorded in the survey are the numbers alive at the time of the interview. This figure is the most useful for our present purposes, because children who die in childhood are of little or no interest from a eugenic viewpoint.

RESULTS

For a consideration of the problem of whether the fertility of a population is eugenic or dysgenic in respect to intelligence, it is important to examine completed fertility. The reason is that the more intelligent tend to have their children later than the less intelligent. Thus, among a population in their twenties there might be an inverse or dysgenic relationship between intelligence and fertility because the more intelligent tend to delay their childbearing, but this inverse relationship might diminish or even reverse among the same sample in their thirties or forties. For this reason, the relationship between intelligence and fertility in samples below the age of 40 cannot provide a definitive answer to the problem of whether fertility is dysgenic. Hence, my first step was to discard the respondents aged 18–39 and to consider only those aged 40 and above. The 40-year-olds in the sample were born in 1954, and the sample of 40+-year-olds can be considered as approximately the 1930–54 birth cohort. The choice of the age of 40 is arbitrary and is based on the assumption that by this age fertility is virtually complete. This restriction of the sample to those aged 40 and above reduces the sample size to 1,645.

The most straightforward way to examine the data to determine whether fertility is eugenic or dysgenic is to compute correlations between intelligence and numbers of children. These correlations can be calculated for the total sample and for subsamples of males and females and blacks and whites. These correlations are shown in Table 1. Reading down the lines, we see that the salient points in this table are as follows. The first line gives the data for the total population. The correlation between intelligence and number of children is −0.05 and is therefore dysgenic. The correlation between intelligence and ideal number of children is −0.04. Notice, however, that this correlation is based on substantially fewer respondents because only 59 per cent of the sample gave an answer to this question which could produce a distorted result. The correlation between intelligence and numbers of siblings is also negative at −0.09. This finding suggests that fertility was dysgenic for intelligence in the parental generation of the sample, as explained in the discussion section of this paper.

The remainder of Table 1 shows the correlations for a number of subsamples. Line 2 gives the correlations for all males; Line 3, for all females. Notice that it is female fertility that is dysgenic (−0.09) while male fertility is neutral (−0.01). Female ideal fertility is not dysgenic (−0.01), suggesting that if females had the numbers of children they considered ideal, dysgenic fertility would be reduced.

Lines 4, 5, and 6 give the data for whites for both sexes combined and for males and females. As whites make up the great majority of the total sample, the results are closely similar to those of the total sample. Lines 7, 8, and 9 give the data for blacks for both sexes combined and for males and females separately. Among blacks, fertility is slightly but not significantly eugenic. This finding is contrary to the results obtained by Herrnstein and Murray (1994) and Vining (1995), who found fertility more dysgenic among blacks. However, the number of blacks in our sample is only 191, and it is doubtful that any significance can be attached to this result. It may be noted that the numbers of blacks and whites are fewer than the number of the total sample. The explanation is that the total sample contained 46 respondents classified as "other" than black or white.

TABLE 1

CORRELATIONS BETWEEN INTELLIGENCE AND NUMBER OF CHILDREN, NUMBER OF SIBLINGS, AND IDEAL NUMBER OF CHILDREN[a]

Sample	No.	No. Child.	No. Sibs	No.	No. Ideal
Total	1,645	−05[b]	−09[c]	971	−04
Males	686	−01	−09[c]	387	−08
Females	959	−08[c]	−09[c]	584	−01
Total white	1,408	−06[b]	−09[c]	842	−02
White males	589	−01	−10[c]	335	−03
White females	819	−11[c]	−09[c]	507	00
Total black	191	05	−02	101	−14
Black males	72	03	03	32	−17
Black females	119	06	−06	64	−11

[a]Decimal points omitted.
[b]$p < 0.05$.
[c]$p < 0.01$.

We now look at the distribution of intelligence and the mean numbers of children at different intelligence levels. For this purpose, the sample was divided into eight intelligence bands based on vocabulary scores 0–2, 3–4, 5–6, etc., and the mean numbers of children of males and females was calculated for each band. The results are shown in Table 2. The interest of this table is that Higgins, et al. (1962) proposed that those with very low IQ's had very few children, which explained why there were negative correlations between intelligence and numbers of siblings but a positive correlation, in their sample, between intelligence and number of children. Individuals with no children are not represented in the sibling studies. However, we see in Table 2 that there is no tendency for those with very low IQ's to have few children. On the contrary, those in the low IQ bands have more children than those in the higher IQ bands.

We now consider ideal numbers of children in relation to the same intelligence bands. The data are shown in Table 3. If ideal numbers of children are compared with actual numbers of children in the different intelligence bands given in Table 2, we see that, among women, the three lowest IQ bands have more children than they regard as ideal, while the four highest intelligence bands have fewer children than they consider ideal.

We turn now to the magnitude of the decline of intelligence implied by the significant negative correlation between the intelligence of adults aged 40+ and their numbers of children. If intelligence has some heritability, the result will be that the "genotypic intelligence" of the child generation will be lower than the "genotypic intelligence" of the parental generation. The term "genotypic intelligence" means the genetic component of intelligence. To estimate the magnitude of the decline of genotypic intelligence, we adopt the method of Retherford and Sewell (1988). First, we calculate the mean IQ of the sample and obtain a figure of 9.25, s.d. = 3.22. Second, we estimate the mean IQ of the children of the sample by assuming that children have the same IQ's as their parents, which gives a figure of 9.12. The difference between the two scores is 0.13 and is the selection differential. As explained in the introduction, this figure is the notional decline of intelli-

TABLE 2

DISTRIBUTION OF INTELLIGENCE, NUMBER OF SUBJECTS, AND NUMBER OF CHILDREN

INTELLIGENCE SCORES	MALES		FEMALES	
	No. Subj	No. Child.	No. Subj.	No. Child.
0–2	17	2.70	27	2.52
3–4	42	2.64	41	2.61
5–6	86	2.31	112	2.77
7–8	138	2.25	196	2.45
9–10	150	2.46	219	2.34
11–12	137	2.31	208	2.39
13–14	88	2.52	118	2.05
15–16	28	2.36	38	2.32

TABLE 3

DISTRIBUTION OF INTELLIGENCE, NUMBER OF SUBJECTS, AND IDEAL NUMBER OF CHILDREN

INTELLIGENCE SCORES	MALES		FEMALES	
	No. Subj.	Ideal Child.	No. Subj.	Ideal Child.
0–2	13	3.31	13	2.46
3–4	25	2.40	26	2.27
5–6	48	2.54	60	2.53
7–8	73	2.52	125	2.44
9–10	81	2.37	126	2.49
11–12	77	2.38	128	2.48
13–14	52	2.54	76	2.34
15–16	18	2.44	30	2.40

gence, i.e., the decline which would be present if environmental influences were constant for the two generations. The selection differential can be expressed in conventional IQ terms by calculating it in s.d. units. It amounts to 0.04 s.d. units which is the equivalent of 0.60 IQ points. The genotypic decline is obtained by multiplying the selection differential by the heritability of intelligence. If a heritability of 0.80 is assumed, as argued by Lynn (1996), the genotypic decline is 0.48 IQ points for this generation. Those preferring alternative figures for heritability can make their own calculations.

DISCUSSION

The results contain six principal points of interest. First, they confirm previous studies summarized in the introduction that fertility was dysgenic for American birth cohorts born in the middle decades of the twentieth century. Second, the present data should be regarded as the most satisfactory hitherto adduced for an examination of the presence of dysgenic fertility, in so far as they comprise a sample representative of continental United States with completed fertility. Third, the magnitude of the selection differential in the present study of 0.60 IQ points is similar to the figure of 0.81 obtained by Retherford and Sewell (1988) and of 0.80 by Loehlin (1997), showing a satisfactory degree of consistency among the three studies. Fourth, dysgenic fertility was found to be present in females but not in males, confirming the results of Retherford and Sewell and of Vining.

Fifth, the data for ideal numbers of children considered in relation to actual numbers of children (shown in Table 2) throw some light on the reasons for dysgenic fertility. Looking at the females, we see that women in the four lowest IQ bands have more children than they consider ideal. Possibly the explanation lies in contraceptive failures which are likely to be more frequent among the less intelligent. On the other hand, women in the four highest IQ bands have fewer children than they consider ideal. Possibly the explanation for this is that some more intelligent women delay their childbearing until too late to have as many children as they desire, either because of the onset of infertility or because they have difficulty in finding satisfactory marriage partners. We see from Table 1 that if women had the number of children they consider ideal, there would be a reduction in dysgenic fertility ($r = -0.01$).

Six, the negative correlations between IQ's and numbers of siblings, shown in Table 1, confirm the results of numerous other studies summarized in Lynn (1966). They should be interpreted as measures of dysgenic fertility in the parental generation of the sample, i.e., in the birth cohort born around 1900–30. The explanation is that a negative correlation between intelligence and numbers of children produces a negative correlation between intelligence and numbers of siblings in the child generation, as explained in the classical analyses of this phenomenon by Cattell (1937) and others. Thus, the data presented in this paper indicate the existence of dysgenic fertility for the first two American generations of the twentieth century.

Finally, it should be noted that the magnitudes of dysgenic fertility estimated from this data set and from those of Retherford and Sewell (1988) and Loehlin (1997) do not take account of generation length. As noted in the introduction, if the less intelligent have a shorter generation length than the more intelligent, i.e., tend to have their children at younger ages, the effect is dysgenic because the numbers of the less intelligent increase more rapidly in the population. Some evidence that this is the case is provided by Herrnstein and Murray (1994, p. 351–352) who show that in the National Longitudinal Study of Youth data set women in the highest cognitive ability group had their first child at an average age of 27.2 years and that age at first birth declined progressively through five cognitive groups to an average age of 19.8 among the lowest cognitive ability group. The data set analyzed in this paper do not contain information on the ages at which women had their children, and it is not possible to estimate the dysgenic impact of this factor. However, it should be noted that because generation length is not entered in the analysis, the calculation of the magnitude of dysgenics is almost certainly an underestimate.

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