IQ CORRELATES WITH HIGH EMINENCE

Herbert J. Walberg, Sue Pinzur Rasher,
& Keiko Hase
University of Illinois at Chicago Circle

Abstract

Indicators of eminence derived from word and citation counts in primary biographical articles in encyclopedias published at the turn of the century, in 1935, and 1974 correlate positively .33 overall with IQ estimates made from biographical sources on a select sample of 282 philosophers, scientists, non-fiction and fiction writers, musicians, artists, religious leaders, statesmen, revolutionaries, and soldiers. These results are striking since the sample is restricted to the higher end of the eminence distribution; the mean estimated IQ for the total group is 158.9. Indicators of eminence for some fields-- philosophers, musicians, and artists--vary from one period to the next. Individuals also shift in estimated eminence during the three time periods examined.

Reviews (Chambers, 1969; Stein, 1968) and recent evidence (Walberg, 1969, 1971) indicate that eminence in various fields requires minimal levels of estimated intelligence; but that beyond these levels, that may vary from one field to the next, the degree of attained eminence is unliked or weakly associated with intelligence, because perseverance, opportunity, and other factors may be relatively more important. The analysis of data reported below on 282 of the most eminent persons who lived in Western countries during the period of 1450 to 1850 show that IQ, estimated from biographical materials, and eminence correlate weakly but significantly at the highest levels of eminence.

According to the total space allotted to each, Cattell (1903) listed in rank order of eminence the top 1,000 persons that were mentioned at the turn of the century in at least two of six American, English, French, and German biographical dictionaries. Cox (1926) eliminated from the list aristocracy and nobility, those born before 1450, and those beyond the 510th name on the original ranking. Cox and several associates combed more than 3,000 sources including encyclopedias, biographies, and collections of letters in the Stanford and Harvard university libraries for information on the mental development of each person. From this information, Cox and two

associates each independently estimated the IQs from information on two periods in the life of each individual, before age 17 and between the ages of 17 and 26.

The corrulations among the estimates made by the three estimators (inter-rater reliabilities) average between .71 and .75 (Cox, 1926); and our calculation of the correlation of the before- and after- 17 mean estimates (a kind of stability reliability) is .82. The reliability of the estimates compares reasonably with that of intelligence tests now given to children in school classes (Cronbach, 1960).

The mean estimated IQ for the total group, 158.9, is far higher (three or four standard deviations) than the mean of about 100 which is found in unselected samples (the IQ score in the present analysis is the mean before-17 corrected estimate plus the mean of after-17 corrected estimate from Cox, 1926; divided by two). The variation within the group, however, is comparable to unselected samples, as indicated by a standard deviation of 14.0. The group ranges from Goethe, Leibnitz, and Grotius with estimated IQs between 195 and 200 and Masséna, Grant, and Drake between 120 and 125. Table 1 shows philosophers higher and soldiers lower in estimated IQ than the other groups. The F-ratio for the differences among the IQ means for the 10 groups is 27.6 ($p < .001$).

Table 1

Means and Standard Errors of IQ and Eminence Estimates and the Correlations of IQ and Eminence

Group	N	IQ	Standardized word counts			Citations[a]	Standardized word counts			Citations	Total[b]
			1903	1935	1974	1974	1903	1935	1974	1974	
Philosophers	22	173.0 ± 2.2	110.6 ± 4.2	102.8 ± 3.5	103.2 ± 3.4	2.6 ± .3	.02	.05	.07	.17	.05
Scientists	39	163.9 ± 1.7	99.7 ± 2.5	94.8 ± 2.2	98.2 ± 2.2	2.2 ± .2	.34*	.10	.05	.15	.21
Non-Fiction Writers	42	162.3 ± 1.4	92.0 ± 3.2	92.0 ± 2.7	92.8 ± 3.5	1.5 ± .1	.16	-.08	-.15	-.04	-.03
Fiction Writers	53	162.5 ± 1.6	103.3 ± 2.7	103.7 ± 2.8	102.1 ± 2.6	1.5 ± .1	.15	.36**	.19	.24*	.28*
Musicians	11	153.4 ± 2.7	87.9 ± 5.1	112.9 ± 7.4	116.6 ± 2.6	2.4 ± .2	.54*	.51	.34	.51	.63*
Artists	13	149.8 ± 3.0	105.1 ± 5.2	119.6 ± 4.9	116.0 ± 3.4	2.1 ± .2	.70**	.84***	.46	.54*	.77***
Religious Leaders	23	159.2 ± 1.9	102.3 ± 4.8	95.5 ± 4.6	98.7 ± 3.8	1.6 ± .2	.41*	.21	.13	.36*	.32
Statesmen	43	158.7 ± 1.8	100.0 ± 2.9	98.5 ± 2.6	96.4 ± 3.7	1.5 ± .1	.09	.13	.13	.20	.11
Revolutionaries	9	163.1 ± 2.7	98.2 ± 6.2	100.2 ± 7.8	94.8 ± 5.4	1.2 ± .3	.54	.18	.43	-.69*	.44
Soldiers	27	133.0 ± 1.2	99.0 ± 4.3	101.8 ± 4.8	99.6 ± 3.6	1.5 ± .2	.15	.13	.05	.02	.12

[a]Citations is the logarithm of the number of citations.

[b]Total eminence is the mean of the standardized word counts for these time periods.

* $p \doteq .05$

** $p \doteq .01$

*** $p \leq .001$

For additional estimates of eminence, we counted the number of words in the primary biographical articles on each of the 282 persons in the 1935 *New International Encyclopedia* and the 1974 *Encyclopedia Britannica* and the number of citations to other articles mentioning the person at the end of the primary article in *Britannica.* Because the relations of eminence and IQ may vary in different fields and because IQ and eminence means vary significantly (the F-ratios on 1903, 1935, and 1974 word counts and 1974 citation counts are respectively 2.3, 3.7, 3.5, and 6.0--all p's $<$ .01), we calculated the means and correlations (Table 1) for each field separately. 1

Table 1 shows that 36 of the 40 correlations between IQ and the four indicators of eminence for the ten groups are positive. The mean of the 40 correlations (using Fisher's Z transformation) is .24 (Dixon and Massey, 1969); the limits of the 95 percent confidence interval for this within-group correlation for the total sample are .13 and .37. Generally then higher eminence is associated with higher intelligence for this sample of highly eminent persons; however, estimated IQ only accounts for about 5 percent of the variance in eminence in the total sample.

Table 1 shows that the indicators of eminence for groups vary from one period to the next. Matched T-tests show four significant changes ($p < 05$): philosophers lost and musicians and artists gained in estimated eminence from 1903 to 1935; philosophers gained from 1935 to 1974. Individuals also shift in estimated eminence: for

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1 R.D. Bock suggested the transformation of the 1903 ranking to a normal distribution by calculating (rank -.5)/282 and converting the percentiles to Z-scores using the table in Ghiselli (1964, pp. 379-391). Before the transformation, each rank was subtracted from 283 to assign the person with highest eminence the highest rather than the lowest, score, the next highest, the second highest, and so on. Logarithms of the 1935 and 1974 word counts and 1974 citations were taken to normalize the distributions. The mean and standard deviation of the log of the number of citations are 1.74 and 0.97. The mean and standard deviation of the log of the counts for 1935 are 6.91 and 0.70; the figures for 1974 are 4.85 and 1.20; the log counts for these years were converted to Z-scores, $Z = (X-M)/S$. To form an index with all positive values, the Z-scores were multiplied by 20 and added to a constant of 100.

example, starting with the most eminent, the top ten on the 1903 estimates are Napoleon, Voltaire, Bacon, Goethe, Luther, Burke, Newton, Milton, Pitt, and Washington; on 1974 word counts the top ten in order are Samuel Johnson, Luthera, Rembrandt, Da Vinci, Napoleon, Washington, Lincoln, Goethe, Beethoven and Dickens; on 1974 citations, the top ten are Descartes)with 57 citations), Napoleon, Newton, Leibnitz, Luther, Hegel, Kant, Darwin, Galileo, and Da Vinci (with 36).

The total eminence estimate in Table 1 averages out some of the random errors of the word counts for the separate years and provides more stable, reliable figures. The mean correlation of the total estimate with IQ (Dixon and Massey, 1969) is .33 (accounting for about 11 percent of the variance); the 95 percent confidence-interval limits are .21 and .42. Even the total estimate, however, contains some errors of measurement; and the correlation reported here underestimates the association of IQ and eminence. Moreoever, as McNemar (1964) points out, when a sample is restricted to the high end (or any smaller part) of an eminence distribution, as in the present sample, the observed correlation underestimates the correlation that would be found in a less restricted sample. Because of two sources of underestimation, there seems little doubt that IQ and eminence are correlated positively.

On the other hand, it is possible that some unconscious bias entered the original IQ estimates of Cox and associates, and that they over-estimated to an unknown extent the IQs of the more eminent persons in the sample. Their careful work and independent checks on the IQ estimates suggests that they minimized such bias, but it cannot be completely discounted.

Although it may be concluded that IQ and eminence are positively correlated in the total sample, that analyses do not permit the confident inference that IQ is more critical in some fields. The categorization of people in fields (Cox, 1926) is somewhat arbitrary; for example, grouping Da Vinci with artists or Benjamin Franklin with statesmen ignores their contributions to science. Also, variations in the numbers of cases, means, and standard deviations in the ten fields as well as the instability of the eminence estimates disallow such an inference. Nor can it be inferred that IQ directly causes eminence since it may enable individuals to create opportunities in the family, schools, and other social institutions for ultimately attaining eminence (Stein and Meer, 1954). Moreover, as

Cox (1926) originally pointed out, perseverance and other traits may compensate for less than genius-level IQ.

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James B. Conant, former president of Harvard, died February 10, 1978 in Hanover, N.H. at the age of 84. After the advent of Sputnik, Conant played an important role in educational reforms directed towards the Academically Talented student, and was the chairman of the first national convention on this subject, sponsored by the National Educational Association in the spring of 1958. This occasion brought together for the first time many of the early workers in the field of giftedness, including your correspondent. It also spawned the very successful Carnegie project for the Academically Talented Student in the 1960's under the direction of Dr. Charles Bish.

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