



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

## Bright Children Become Enlightened Adults

**Citation for published version:**

Deary, IJ, Batty, GD & Gale, CR 2008, 'Bright Children Become Enlightened Adults', *Perspectives on Psychological Science*, vol. 19, no. 1, pp. 1-6. <https://doi.org/10.1111/j.1467-9280.2008.02036.x>

**Digital Object Identifier (DOI):**

[10.1111/j.1467-9280.2008.02036.x](https://doi.org/10.1111/j.1467-9280.2008.02036.x)

**Link:**

[Link to publication record in Edinburgh Research Explorer](#)

**Document Version:**

Peer reviewed version

**Published In:**

Perspectives on Psychological Science

**Publisher Rights Statement:**

This is an accepted manuscript of the following article: Deary, I. J., Batty, G. D. & Gale, C. R. (2008), "Bright Children Become Enlightened Adults", in *Perspectives on Psychological Science*. 19, 1, p. 1-6. © Association for Psychological Science. The final publication is available at <http://pss.sagepub.com/content/19/1/1>

**General rights**

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

**Take down policy**

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact [openaccess@ed.ac.uk](mailto:openaccess@ed.ac.uk) providing details, and we will remove access to the work immediately and investigate your claim.



**Bright children become enlightened adults**

Ian J. Deary, G. David Batty, Catharine R. Gale

Department of Psychology, University of Edinburgh, UK

Medical Research Council Social and Public Health Sciences Unit, Glasgow, UK

Medical Research Council Epidemiology Resource Centre, University of Southampton,  
Southampton, UK

Correspondence,

Ian J. Deary  
Department of Psychology,  
University of Edinburgh  
7 George Square  
Edinburgh EH8 9JZ  
UK

i.deary@ed.ac.uk  
Tel. +44 131 650 3452  
Fax. +44 131 651 1771

**Abstract**

We examine the prospective association between general intelligence (*g*) at age 10 and more liberal and anti-traditional social attitudes at age 30 in a large ( $N = 7070$ ), representative sample of the British population born in 1970. There was a general latent trait underlying attitudes that are anti-racist, pro-working women, socially liberal, and trusting in the democratic political system. There was a strong association between higher *g* at 10 and more liberal and anti-traditional attitudes at 30, which was not mediated via educational qualifications or occupational social class. Very similar results were obtained in men and women. People in less professional occupations—and whose parents had been so—were less trusting of the democratic political system. The study confirms a major, novel field of adult human activity that is related to childhood intelligence differences.

## **Introduction**

Important differences in people's social attitudes and views are captured under the broad syndrome of the traditional moral values triad (Saucier, 2000; Koenig & Bouchard, 2006). Major, correlated dimensions of this syndrome are conservatism/traditionalism, authoritarianism, and religiousness. Influential work on these concepts emerged in attempts to understand how apparently ordinary individuals became involved in the atrocities of World War II. Adorno's (1950) team developed the Facism (F) scale as part of their now-classic *The authoritarian personality*. Also influential was Altemeyer's (1981, 1988) concept and scale of right wing authoritarianism (RWA). To understand the origins of these attitude differences, psychologists have examined their correlations with mental ability, and examined their developmental origins.

The balance of evidence shows that people with higher cognitive ability tend to hold less authoritarian attitudes as measured by the F and RWA scales, and scales assessing related constructs (overviews appeared in Scarr & Weinberg, 1981, p. 400; McCourt, Bouchard, Lykken, Tellegen, & Keyes, 1999, p. 987). Most studies are cross-sectional. McCourt et al.'s study is typical, with a correlation of  $-.37$  between IQ and RWA. Complementary to these findings, higher mental ability tends to associate positively with more liberal social attitudes and autonomous reasoning about social situations. Intellectually gifted adolescents' higher scores on the Defining Issues Test (based on Kohlberg's moral reasoning) were accounted for by higher intelligence rather than other psychological variables (Sanders, Lubinski, & Benbow, 1995). There is a moderate correlation between intelligence and ego development (Loevinger, 1976, 1993; Cohn & Westenberg, 2004).

The issue of the developmental origins of social attitudes has been examined, but more rarely, using twin, adoption and longitudinal studies. Data from twin (Martin et al., 1986; McCourt et al., 1999) and adoption studies (Scarr & Weinberg, 1981) contradicted the assumption that variance in social

attitudes derives principally from shared environments (Altemeyer, 1988), and found substantial genetic contributions. In a longitudinal study, people with higher non-verbal ability at age 11 were more likely to have non-traditional views of marriage at 33 (Flouri & Buchanan, 2001).

Despite evidence that higher childhood intelligence is related to more liberal and less traditional social attitudes, longitudinal studies are rare, and samples to date have not been large and population-representative. Moreover, it is important formally to model the influences of education and socio-economic position. The British Cohort Study 1970 (Elliot & Shepherd, 2006) provides large, population-representative samples of men and women who took mental tests at age 10 and were followed up 20 years later to assess their social attitudes and views. Here, for the first time, we test the hypothesis that childhood general intelligence at age 10 years is associated with more broad-minded attitudes to social issues at age 30. We examine potential confounding from parental social class and any mediating effects of education and the person's own adult social class.

## **Method**

### **Participants**

The British Cohort Study 1970 is an ongoing longitudinal study of the 17198 live births to parents residing in Great Britain between April 5-11, 1970 (Elliott & Shepherd, 2006). At age 30 years, 11261 participants were interviewed and 11070 (83% of the original cohort who were alive and living in the UK) completed questions on their social attitudes. In total, 8091 had data on mental ability at the age of 10 years. There were 7070 participants (64% of those interviewed) with full data for the analyses presented below.

### **Data collected at age 10 years**

#### *Mental ability*

Mental ability was assessed using a modified version of the British Ability Scales (Elliot, Murray, & Pearson, 1978), adapted to facilitate administration by teachers. Verbal ability was assessed using 2 subscales: word definitions and word similarities. In the word definitions subscale (37 items) the teacher articulated each word in turn and asked the child about its meaning. In the word similarities subscale (42 items) the teacher enunciated 3 words (e.g., orange, banana, and strawberry) and asked the child to name another word consistent with the theme. Nonverbal ability was assessed using 2 subscales. In the recall of digits subscale (34 items) the teacher read out digits at half-second intervals and asked the child to repeat them. In the matrices subscale (28 items) the teacher asked the child to draw in the missing part of an incomplete pattern. Children were tested individually by teachers, who recorded the answers for the first three tests.

#### *Parental occupation*

Parental social class was derived from the father's occupation using 4 categories according to the UK Registrar General's Classification of Occupations 1980 (professional/managerial, skilled non-manual, skilled manual, semi- and unskilled). Mother's occupation was used to derive parental social class if no father was present.

### **Data collected at age 30 years**

#### *Education*

Participants were asked about their highest academic or vocational qualification. These qualifications were subsequently collapsed into 6 categories, reflecting increasing attainment: no qualifications, CSE grades 2 to 5/National Vocational Qualification (NVQ) level 1 and equivalent (national examinations normally taken at the minimum school leaving age of 16), O levels/NVQ level 2 and equivalent (ditto), A levels/NVQ level 3 and equivalent (national examinations normally taken at 18 years old), degree or diploma/NVQ level 4 and equivalent, or higher degree/NVQ level 5.

### *Occupation*

The participants' current social class (professional/managerial, skilled non-manual, skilled manual, semi- or unskilled) was derived from their own occupation.

### *Attitudes*

Participants completed a computer-administered, self-completion, 50-item questionnaire about their attitudes to and views of the following: support for work ethic, support for authority, support for traditional marital values, permissiveness about work and family, opposition to family life, political cynicism, left-right political beliefs, support for sex equality, environmentalism, anti-racism, learning and information technology. Each item had 5 possible responses: strongly agree, agree, neither agree nor disagree, disagree, strongly disagree. More information on this questionnaire appears in the Results section.

## **Results**

### **Principal components analysis of attitudes items**

First we examined the structure of the attitudes items administered at age 30 using principal components analysis. Both the scree slope and eigenvalues greater than 1.0 criteria suggested five components, accounting for 52% of the total variance. The oblimin-rotated components were examined for items that had salient loadings ( $> 0.4$ ). We call the rotated components 'factors'.

Factor 1—'political trust'—consisted of seven items, with high (negative) loadings for statements such as 'there is one law for the rich and one for the poor' ( $-.66$ ), and 'politicians are in politics for their own benefit' ( $-.58$ ). Factor 2—'anti-racism'—consisted of five items, with high loadings for statements such as 'I wouldn't mind if a family of a different race moved next door' ( $.79$ ), and 'I wouldn't mind working with people from other races' ( $.76$ ). Factor 3—'social liberalism'—consisted of 10 items, with high (negative) loadings for statements such as 'give law breakers stiffer

sentences' (-.63), and 'schools should teach children to obey authority' (-.51). Factor 4—'pro-working women'—consisted of six items, with high (negative) loadings for the statements 'pre-school kids suffer if mum works' (-.68), and 'family life suffers if mum is working full-time' (-.70). Cronbach  $\alpha$  coefficients were: .75 for political trust, .82 for anti-racism, .68 for social liberalism, and .65 for pro-working women. There were significant correlations among all 4 factors, with effect sizes ( $r$ ) ranging from .06 to .27. Factor 5 did not have a coherent set of items, and had a low  $\alpha$  (.56). It was not considered further.

## **Structural equation modelling of childhood intelligence and adult attitudes**

### *Model construction*

Next we examined the association between mental ability at age 10 and the social attitudes at age 30. The potentially confounding effect of parental occupational social class, and the potentially mediating effects of education and the person's own occupational social class at age 30 were considered. The correlations and the means and standard deviations of the variables are shown in Table 1. Construction of a structural equation model to test the key hypothesis was as follows. The four British Ability Scales subtests were used as indicators of a latent trait of general mental ability ( $g$ ). The four attitudes scales were used as indicators of a latent trait of general liberal and non-traditional attitudes. Paths in the model were set according to time. Thus, childhood mental ability and parental social class (which were allowed to correlate) were assumed to influence education, which in turn influenced occupational social class at age 30, which in turn was hypothesised to influence social attitudes at age 30. All direct and mediating paths were included in the model. The Wald and Lagrange Multiplier tests were used to indicate paths that could be dropped and added to the model, respectively, to improve the fit. The model was first fitted in men and a replication of the best fit model was attempted in women. The EQS program version 6.1 was used (Bentler, 1995). The models were tested using maximum likelihood.



*Model fit*

The final model that fitted well in men (Figure 1) had only small changes from the model stipulated *a priori* in the previous paragraph. The Lagrange Multiplier test indicated that the associations between parental and the person's own occupational social class and the specific attitude scale 'political trust' should be added to the model. These were added to the model in men and the model had significantly improved fit. The LM test suggested a significant correlated residual between pro-working women and anti-racism attitudes; that was added to the model. The Wald test indicated that the paths between parental and the person's own occupational social class at age 30 and the attitudes trait were not significantly greater than zero in men. Because of its importance, this path was retained and tested again when the model was fitted in women.

The fit of the model in men was as follows (Figure 1). The average of the off-diagonal absolute standardised residuals was .026. The largest standardised residual was .077. The root mean-square error of approximation was .046. The chi square was 274.4 (d.f. = 33;  $p < .001$ ). The Bentler-Bonett normed and non-normed, comparative, and GFI fit indices were .962, .944, .966, and .986, respectively. Therefore, the model fits well. The chi square is highly significant, but this is common with large samples. All paths were significant, except those between parental and the person's own occupational social class at age 30 and the latent attitudes trait.

The women were used as a replication sample (Figure 1). The average of the off-diagonal absolute standardised residuals was .022. The largest standardised residual was .075. The root mean-square error of approximation was .041. The chi square was 238.0 (d.f. = 33;  $p < .001$ ). The Bentler-Bonett normed and non-normed, comparative, and GFI fit indices were .968, .954, .973, and .988, respectively. The same model fits well in women. All paths were significant, except those between parental and the person's own occupational social class at age 30 and the latent attitude trait.

### *Model description*

The model of childhood intelligence and adult social attitudes fits almost identically in men and women, and the path coefficients are almost identical. The measurement models for the two latent traits were clearly supported. All four mental tests loaded strongly on the latent factor of general intelligence ( $g$ ). All four attitude scales loaded moderately and significantly on a latent trait.

Childhood  $g$  and parental occupational social class were moderately correlated.

The key result was a strong association between higher  $g$  at age 10 and generally more liberal, non-traditional social attitudes at age 30, even allowing for potential covariables. The direct path weight was very similar in men (.46) and women (.45). There was an additional, smaller, indirect effect via education. There were no significant associations between  $g$  at age 10 and specific attitude scale scores after the association with general attitudes was taken into account.

Parental social class is significantly associated with education and the person's own social class at age 30.  $g$  at age 10 and education are both significantly associated with the person's own social class at age 30. There were no significant associations between parental and the person's own social class and the latent trait of social attitudes. There were significant associations between parental and the person's own social class and political trust: people in more professional occupations had greater trust.

### **Discussion**

In a large, prospectively-studied, population-representative sample, general mental ability at age 10 is strongly associated with a latent trait underlying four domains of important social attitudes at age 30. People with higher  $g$  scores in childhood are, as adults, less likely to endorse 'traditional' values across a number of domains. The effect is not largely mediated by educational qualifications, and not at all by a person's own occupational social class. There is a specific effect of less political trust

among people in more manual (blue collar) occupations. Results were almost identical for men and women.

The present study not only confirms cross-sectional findings that people with higher intelligence are less likely to have ‘traditional’ moral values (Saucier, 2000; Koenig & Bouchard, 2006), attitudes that are also negatively correlated with the personality trait openness to experience (Saucier, 2000) which is positively correlated with intelligence (Gow, Whiteman, Pattie, & Deary, 2006). It also accords with the findings that some psychological constructs that were thought to be non-cognitive are associated with mental ability (Lykken 1991; Sanders et al., 1995). These include moral reasoning (Kohlberg, 1984; Sanders, Lubinski, & Benbow, 1995), self actualization (Maslow, 1971), and ego development (Loevinger, 1976, 1993; Cohn & Westenberg, 2004). Such de-centring, as required for the attainment of such social/moral-developmental constructs, and the attitudes studied here, might be caused by higher intelligence.

This idea, that social attitudes and views are caused by reasoning processes, was suggested by Scarr and Weinberg (1981). McCourt et al. (1999) summarised their view: “intelligence drives attitude formation. That is, when considering social, moral, and political situations, those with greater cognitive skill *are able* to form more individualistic and open-minded (i.e. antiauthoritarian) attitudes than those of lesser cognitive ability” (p. 987, emphasis added). This might partly arise from any genetic influences that are common to intelligence and attitudes, perhaps via mediating factors such as “mobility and learning” (Martin et al., 1986, p. 4368). Alternative explanations should be considered. First, people with higher ability tend to read more. If print media are more likely to be produced by people who hold anti-traditional views, then there might be a causal path via cultural exposures. If correct, one might have expected greater mediation via education. Also, the print media-producers might tend toward anti-traditional views because of their own higher intelligence. Secondly, people with higher ability might have a more sophisticated view of what

attitudes are considered ‘acceptable’ to researchers, and endorse these. A test of this possibility is whether people with higher mental ability behave in broad-minded ways as well as evincing such attitudes in research settings.

In this large, longitudinal study intelligent children became, on average, broad-minded adults. The state of mind common to the attitude scales used here is one of objective fairness to others; an overturning of past prejudice that militated against fairness. Bright 10-year-olds are, at age 30, more likely to hold to a “philosophy emphasising reason and individualism rather than tradition,” which is how the Concise Oxford Dictionary defines enlightenment.

### **Acknowledgement**

Ian Deary is the recipient of a Royal Society-Wolfson Research Merit Award. David Batty is supported by a Fellowship from the Wellcome Trust.

### **References**

- Adorno, T. W., Frenkel-Brunswick, E., Levinson, D. J., & Sanford, R. N. (1950). *The Authoritarian personality*. New York: John Wiley & Sons.
- Altemeyer, B. (1981). *Right-wing authoritarianism*. Winnipeg, Canada: University of Ottawa.
- Altemeyer, B. (1988). *Enemies of freedom*. San Francisco, CA: Jossey Bass.
- Bentler, P. M. (1995). *EQS structural equations program manual*. Encino, CA: Multivariate Software, Inc.
- Cohn, L. D., & Westenberg, P. M. (2004). Intelligence and maturity: meta-analytic evidence for the incremental validity of Loevinger’s measure of ego development. *Journal of Personality and Social Psychology*, 86, 760-772.
- Elliot, C., Murray, D., & Pearson, L. (1978). *British Ability Scales*. Windsor, UK: National Foundation for Educational Research.

- Elliott, J., & Shepherd, P. (2006). Cohort profile of the 1970 British Birth Cohort (BCS70). *International Journal of Epidemiology*, 35, 836-843.
- Flouri E., & Buchanan A. (2001). What predicts traditional attitudes to marriage? *Children and Society*, 15, 263-271.
- Gow, A. J., Whiteman, M. C., Pattie, A., & Deary, I. J. (2005). The personality-intelligence interface: insights from an ageing cohort. *Personality and Individual Differences*, 39, 751-761.
- Koenig, L. B., & Bouchard, T. J. (2006). Genetic and environmental influences on the traditional moral values triad—Authoritarianism, Conservatism and Religiousness—as assessed by quantitative behaviour genetic methods. In P. McNamarra, (Ed.), *Where God and science meet: how brain and evolutionary studies alter our understanding of religion* (pp. 31-60). (Vol. 1. Evolution, genes, and the religious brain). Westport, CN: Praeger.
- Kohlberg, L. (1984). *The psychology of moral reasoning*. San Francisco, CA: Harper & Row.
- Loevinger, J. (1976). *Ego development: conceptions and theories*. San Francisco, CA: Jossey Bass.
- Loevinger, J. (1993). Ego development: questions of method and theory. *Psychological Inquiry*, 4, 56-63.
- Lykken, D. T. (1991). What's wrong with psychology anyway? In Chiccetti, D., & Grove, W. (Eds.), *Thinking clearly about psychology* (pp. 3-39). Minneapolis, MN: University of Minnesota Press.
- Maslow, A. (1971). *The farther reaches of human nature*. New York: Viking Press.
- Martin, N. G., Eaves, L. J., Heath, A. C., Jardine, R., Feingold, L. M., & Eysenck, H. J. (1986). Transmission of social attitudes. *Proceedings of the National Academy of Sciences of the United States of America*, 83, 4364-4368.
- McCourt, K., Bouchard, T. J., Lykken, D. T., Tellegen, A., & Keyes, M. (1999). Authoritarianism revisited: genetic and environmental influences examined in twins reared apart and together. *Personality and Individual Differences*, 27, 985-1014.

Sanders, C. E., Lubinski, D., Persson Benbow, C. (1995). Does the Defining Issues Test measure psychological phenomena distinct from verbal ability?: an examination of Lykken's query.

*Journal of Personality and Social Psychology*, 69, 498-504.

Scarr, S., & Weinberg, R. A. (1981). The transmission of authoritarianism in families: genetic resemblance in social-political attitudes? In S. Scarr, *Race, social class, and individual differences* (pp. 399-427). Hillsdale, NJ: Erlbaum.

Saucier, G. (2000). Isms and the structure of social attitudes. *Journal of Personality and Social Psychology*, 78, 366-385.

**Table 1**

Pearson correlations among attitudes, education, social class, and intelligence.

	Men	Political trust	Anti- racism	Social liberalism	Pro- working women	Age 30 social class	Age 30 education	BAS Matrices	BAS Digits	BAS Word definitions	BAS Word similarities	Parental social class	Men Mean (SD)
Women													
Political trust		-	.129	.098	.126	.342	.286	.213	.135	.217	.228	.253	33.8 (6.268)
Anti-racism		.059	-	.187	.264	.177	.207	.154	.116	.202	.170	.095	10.0 (3.644)
Social liberalism		.159	.191	-	.245	.117	.211	.206	.125	.237	.229	.113	23.9 (5.275)
Pro-working women		.110	.240	.270	-	-.028	.068	.049	.047	.067	.063	.010	20.4 (3.291)
Age 30 social class		.247	.110	.137	.107	-	.460	.293	.199	.341	.306	.300	2.2 (1.127)

Age 30 education	.232	.225	.229	.112	.434	-	.348	.196	.365	.338	.284	2.7 (1.310)
BAS Matrices	.194	.153	.173	.073	.259	.316	-	.290	.458	.463	.227	15.6 (5.314)
BAS Digits	.112	.125	.133	.063	.162	.192	.286	-	.318	.303	.113	22.4 (4.210)
BAS Word definitions	.185	.251	.261	.097	.296	.390	.455	.325	-	.638	.293	11.1 (5.128)
BAS Word similarities	.205	.217	.213	.083	.281	.379	.457	.322	.650	-	.261	12.5 (2.534)
Parental social class	.197	.096	.134	.025	.252	.330	.231	.135	.301	.272	-	2.4 (1.088)
Women Mean (SD)	35.5 (5.228)	9.2 (3.048)	23.6 (5.043)	21.3 (3.387)	2.1 (1.044)	2.7 (1.259)	16.2 (5.186)	22.7 (4.159)	10.1 (4.762)	12.1 (2.416)	2.4 (1.098)	



*Note.* Men (N = 3412) appear above the diagonal and women (N = 3658) below the diagonal. Means and standard deviations appear in the last column and last row. Standard deviations are given to three decimal places to allow modelling. BAS = British Ability Scales. Variables have been scored such that a higher score indicates: greater agreement with the views inherent in the title of the attitude factor; more professional occupation at age 30; more advanced educational qualifications; higher BAS test scores; and parent in a more professional occupation.

**Figure caption**

**Figure 1**

Structural equation model of general cognitive ability ( $g$ ) at age 10 and a latent trait of social attitudes (liberal, non-traditional social attitudes) at age 30 in the British Cohort Survey 1970. Standardised path coefficients are shown for the same model in men (left;  $N = 3412$ ) and women (right;  $N = 3658$ ). Circles represent latent traits, and rectangles represent manifest (measured) variables. Dashed lines represent non-significant path coefficients. Variables have been scored according to the Note at the foot of Table 1.

**Figure 1**

