

# Does Conservative Religiousness Promote Selection for Intelligence? An Analysis of the Vietnam Experience Study

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#### Abstract

Previous research has indicated that religiousness may moderate the negative effect of intelligence on fertility which is found in modern populations. We studied this question using the Vietnam Experience Study, a public dataset of 4,462 American Vietnam-era veterans. In line with prior research, we found that, net of controls, intelligence predicted lower fertility,  $\beta = -0.06$  (p = .003), and religiousness predicted higher fertility  $\beta = 0.21$  (p < .001). The expected interaction, intelligence \* religiousness, was also found ( $\beta = 0.06$  (p = .002). The results show that above average religiousness is associated with a neutral or positive fertility pattern regarding intelligence, while average or below average religiousness is associated with a negative fertility pattern. The results held when the White subsample was analyzed separately (intelligence  $\cdot$  religiousness  $\beta = 0.09$  p < .001). Finally, the negative relationship between intelligence and fertility seen in the dataset showed a strong Jensen Effect in the expected direction (n = 19 tests, r = -.73).

Keywords: Vietnam Experience Study, Intelligence, Fertility

#### 1 Introduction

There is a large body of evidence indicating that, in modern Western populations, there is negative selection with regard to intelligence (generally defined as the ability to solve cognitive problems plus the speed with which such problems are solved); a trait which meta-analyses indicate is in the region of 0.80 heritable in adults, meaning it is strongly genetic in nature (Bouchard, 2013; Schwabe et al., 2017). Although there is variation between different Western countries, it appears, from literature reviews, that the correlation between intelligence and fertility is in the region of -.14 among females and -.07 among males (Reeve et al., 2018), though many studies give estimates as high as -.2 and -.1 (see Dutton & Woodley of Menie, 2018). However, there is some evidence of a weak positive association between intelligence and fertility among males in Norway (Bratsberg & Rogeberg, 2023), for example. Consistent with the broader intelligence decline, and congruous with the decline occurring due to breeding patterns, there is evidence of a decline in the prevalence of alleles, across recent native European generations, that are indirectly associated with very high intelligence, as has been found in Iceland (Kong et al., 2017), and evidence that carrying such alleles is negatively associated with fertility (Hugh-Jones & Abdellaoui, 2021).

At the same time, there is evidence that the negative Flynn Effect (the reversal of the strongly environmentally-mediated Flynn Effect) is a Jensen Effect at least in part, a positive Jensen Effect meaning that the more *g*-loaded tests show a stronger association with the variable. The Flynn Effect, the secular rise in IQ scores in Western countries across the twentieth century, seemingly betokened a rise in IQ scores due to highly environmentally-sensitive and weakly *g*-loaded subtests being rapidly pushed to their phenotypic maximum (Flynn, 2012). This effect cloaked what was occurring on the other tests. When this maximum was reached, the underlying IQ decline became clear and it was on g (Dutton et al., 2016). Congruous with this, numerous so-called Woodley Effects have been highlighted, consistent with declining IQ. These include lengthening reaction times, worsening backward digit span, worsening color discrimination, declining per capita major innovation, and decreasing use of high-order words in representative bodies of texts (Dutton

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& Woodley of Menie, 2018). The proposed causes of this process include more efficient use of ever more reliable contraception on the part of the more intelligent, feminism causing more intelligent women to delay having children, generous welfare incentivizing the less intelligent to have children (Lynn, 2011), and an evolutionary mismatch, more keenly felt by the more intelligent, which means that they simply do not want children, a possibility to which we will return later (Dutton, 2023). So, we are clearly selecting against intelligence.

Religious belief is weakly negatively associated with intelligence, a relationship which has also been found to be a Jensen Effect (Dutton & Kirkegaard, 2023).<sup>1</sup> We are selecting for traditional religiousness: Those who engage in the collective worship of a moral god, a significantly genetic trait, have more children (Fieder & Huber, 2018; Vaas, 2009) which might, therefore, be seen to contribute to intelligence decline. But, fascinatingly, there is evidence that religiousness limits or even reverses the negative relationship between fertility and intelligence. One recent study, using the GSS, found that among the top quartile of intelligence of white Americans, atheism strongly predicts infertility whereas conservative religiosity strongly predicts fertility. To quote the authors, conservatism and especially conservative religiosity are "the shell, the protective outer coating, by which the essence of civilization — intelligence — is safeguarded and shielded from modern diseases, the symptoms of which most critically include infertility" (Dutton & Rayner-Hilles 2022, p. 120). The study shows that conservative religiosity is heritable and on some measures highly heritable, implying that it limits negative selection on intelligence. Another study has found that, among White Americans, negative selection on intelligence is lower among conservatives than among liberals and, further, among members of the Church of Jesus Christ of Latter-day Saints, there is positive selection for intelligence (Kirkegaard & Dutton, 2023). In this study, we will attempt to replicate and advance these findings.

## 2 Method

We used data from the Vietnam Experience Study (VES). The Vietnam Experience Study is a Vietnam-era dataset of American military veterans. About 60 % of them were deployed in Vietnam, while the remainder were stationed elsewhere, such as West Berlin or South Korea. The dataset has been extensively described by the original authors (Centers for Disease Control Vietnam Experience Study, 1988a,b,c), and utilized in numerous research projects (Batty et al., 2008; Dutton et al., 2022; Kirkegaard & Nyborg, 2020a, 2021; Nyborg & Jensen, 2000, 2001; Phillips et al., 2009). These earlier studies showed that the mean correlation between g-factors extracted by different methods was .98.

The sample contains only men who were enlisted or inducted into the military around the year 1970. Later, around 1985, the men were re-contacted for extensive interviews and testing, following concerns about the effects of Agent Orange in the Vietnam War. The men were roughly 38 years old during the follow-up wave. In terms of race, the sample was 82 % White, 12 % Black, 4 % Hispanic, 1 % Native American, and 0.8 % Asian, roughly in line with the American citizens' adult demographics at the time.

Intelligence was measured using a diverse battery of 19 tests. The descriptions of these are given in the appendix. Intelligence (g factor) was measured as the general factor based on exploratory factor analysis. Factor analysis was done using the psych package for R (Revelle, 2020). Cronbach's standardized alpha for the 19 tests was .92. Figure A1 shows the ability distribution.

Religiousness was measured based on a set of 12 items found in the MMPI-2 (Minnesota Multiphasic Personality Inventory, second edition). The items are given in Table 1.

Overall religiousness was scored as the general factor of these items. This analysis was carried out using the **mirt** package for R (Chalmers et al., 2020). Missing data were handled automatically by the

It is odd in that there is evidence that polygenic scores associated with intelligence are *positively* associated with some measures of religiosity, specifically church attendance (Fieder & Huber, 2022). One possible explanation is that the correlation between church attendance and intelligence is only -.1 and intelligent people tend to be more pro-social, making them more likely to go to church. They are also more socially conformist (Woodley of Menie & Dunkel, 2015) and will, therefore, be more likely to go to church in a context in which this is the social norm. It may also reflect a tension within the nature of intelligence whereby on the one hand intelligence is associated with low instinctiveness but on the other hand it is associated with being pro-social and with social conformity.

Question	ltem	Prevalence	Missing	Loading
53	A minister can cure disease by praying and putting his hand on your head.	0.08	0.01	0.60
58	Everything is turning out just like the prophets of the Bible said it would.	0.50	0.04	0.76
95	I go to church almost every week.	0.25	0.00	0.76
115	I believe in a life hereafter.	0.76	0.01	0.78
206	I am very religious (more than most people).	0.17	0.00	0.79
249	I believe there is a Devil and a Hell in the afterlife.	0.63	0.01	0.83
258	I believe there is a God.	0.92	0.01	0.95
373	I feel sure that there is only one true religion.	0.37	0.01	0.65
476	I am a special agent of God.	0.09	0.00	0.60
483	Christ performed miracles such as changing water into wine.	0.77	0.03	0.81
490	I read the Bible several times a week.	0.13	0.00	0.91
491	I have no patience with people who believe there is only one true religion.	0.27	0.01	-0.36

**Table 1:** Questions measuring religiousness in the MMPI-2. Each item is a true/false question. Missing is the proportion of missing data, Prevalence is the proportion of people who answered "true", excluding the missing data. Loading is the loading on the "general factor of religiosity" from factor analysis of the scale.

scoring algorithm. The reliability of the religiousness score was moderately high,  $r_{xx} = .84$ . The loadings are also shown in Table 1, above. Note that item 491 is expected to have a negative loading because it measures hostility towards religious people. The distribution was fairly normal, as shown in Figure 1, but with an atheist/non-religious cluster on the far left (around -2), as well as a long right tail of very religious people.

Fertility was measured by a telephone question at the same time as the other interviews at age 38. Since men's fertility is not completed at this age, this somewhat underestimates the total fertility of the men, and might bias the results slightly if men who would have had children later, were different from average intelligence. Figure 2 shows the distribution of fertility.

## 3 Results

The main analysis consists of a series of linear regression models predicting fertility. These are shown in Table 2.

It should be noted that the regressions are ordinary least squares (linear regression). The betas are standardized in the sense that the quantitative variables were standardized before being entered into the model (except for g, which was standardized to the White subset for interpretability, i.e., 0 = 100 IQ, 1 = 115 IQ). The interactions were conducted using the standard approach in R, i.e., the main model was:  $fertility \sim religiousness \cdot g + race + age$ . In any case, the count models produced about the same results, and they don't involve standardizing the fertility variable.

First, we replicated the usual fertility pattern, in that intelligence negatively predicted fertility (Model 1,  $\beta = -0.10$ , p < .001). This was also true when race and age were controlled for (Model 2,  $\beta = -0.06$ , p = .005). Religiousness predicted fertility, as research has found numerous times (see Dutton & Rayner-Hilles, 2022), as discussed earlier (Models 1-2,  $\beta$ 's = 0.22, 0.21). Next we tested the interaction



Figure 1: Distribution of religiousness in the dataset.



Figure 2: The distribution of fertility measured at age 38 by interviewer question.

between intelligence and religiousness, finding a positive value (Model 3,  $\beta = 0.06$ , p = .002). To make sure this was not somehow due to race confounding, we fitted the model in the White and Black subsets (Models 4-5). The White subsample showed the same effect, if somewhat stronger ( $\beta = 0.09$ , p < .001). Nothing was seen in the Black subsample, but it was too small for this analysis (n = 525). Finally, we tested for nonlinear effects of religiousness and intelligence, individually or jointly, finding nothing (likelihood ratio tests > .10). This analysis was probably also low power, so should not be taken as strong evidence for strict linearity. Figure 3 shows the predicted interaction effect for the full sample, and Figure 4 shows it for the White subsample.

Because fertility is a count variable, it is arguably more correct to use a count variable regression

Predictor/ Model			Model			
	1	2	3	4	5	
	No controls	Controls	Interaction	White interact	Black interact	
Intercept	1.81 (0.020)	0.85 (0.304)	0.84 (0.304)	1.07 (0.324)	-0.14 (1.031)	
intercept	p <0.001	p = 0.005	p = 0.006	p = 0.001	p = 0.893	
Religiousness	0.22 (0.021)	0.21 (0.021)	0.21 (0.021)	0.19 (0.022)	0.28 (0.129)	
Religiousiless	p <0.001	p <0.001	p <0.001	p <0.001	p = 0.034	
σ	-0.10 (0.019)	-0.06 (0.021)	-0.06 (0.021)	-0.04 (0.021)	-0.12 (0.086)	
8	p <0.001	p = 0.005	p = 0.003	p = 0.036	p = 0.159	
Δσe		0.02 (0.008)	0.02 (0.008)	0.02 (0.008)	0.05 (0.027)	
A60		p = 0.003	p = 0.002	p = 0.03	p = 0.04	
σ · religiousness			0.06 (0.019)	0.09 (0.022)	-0.02 (0.090)	
g rengiousness			p = 0.002	p <0.001	p = 0.855	
race = White		(ref)	(ref)			
race = Black		0.32 (0.067)	0.34 (0.067)			
		p <0.001	p <0.001			
race — Hispanic		0.46 (0.098)	0.46 (0.098)			
		p <0.001	p <0.001			
race = Asian		0.02 (0.229)	0.03 (0.228)			
		p = 0.933	p = 0.905			
race — Native		0.14 (0.193)	0.16 (0.193)			
		p = 0.470	p = 0.421			
$\mathbf{R}^2$ adj.	0.036	0.045	0.047	0.033	0.031	
Ν	4455	4455	4455	3649	525	

**Table 2:** Main regression results. Outcome is fertility at age 38. Standardized betas with standard error in parentheses.

model. Since the data were not distributed exactly like a Poisson distribution but rather had too many 0's, we additionally tried models that can deal with zero-inflation. We fit the same interaction model using glm(family = "poisson"), as well as the functions hurdle() and zeroinfl() from the pscl package (Jackman et al., 2023; Zeileis et al., 2008). All three approaches detected the same interaction between intelligence and religiousness (poisson p = .0001, zero-inflation p = .03, hurdle p = .009). Although varying in their modelling of the data, all of the models generated substantially similar predictions such that average religiousness was associated with weak negative selection for intelligence and above average religiousness was associated with no or a slightly positive pattern. For the zero-inflated models, the interaction was only seen for the number of children, not for childlessness, suggesting that selection against intelligence operates mainly through the number of children people have, not whether they have any at all. On the other hand, the standard errors for these estimates were too large to reliably detect the effect, so not much can be made of these results (i.e., low power). Figures A2 and Table A2 show the model predictions.

Finally, it has been reported in the literature that the relationship between intelligence and fertility shows a Jensen Effect, i.e., that the tests with higher g-loadings also show stronger correlations with fertility (Woodley & Meisenberg, 2013). We replicated this analysis using our large battery of tests, shown in Figure 5. The results were in line with the previous findings.



Figure 3: Prediction of fertility from intelligence and religiousness in the full sample (n = 4,455). Both variables are standardized.



**Figure 4:** Prediction of fertility from intelligence and religiousness in the White subsample (n = 3,649). Both variables are standardized.

## 4 Discussion

Our study has replicated the findings of earlier studies. Traditional religiosity appears to ameliorate and, in the case of our dataset, actually reverse the negative relationship between intelligence and fertility. Furthermore, we found that the negative IQ-fertility nexus is a Jensen Effect, implying that it is substantially genetically-mediated. Our finding that conservative religiosity protects against falling intelligence may seem ironic considering the evidence of a weak negative relationship between IQ and religiosity (see Dutton,



Figure 5: Jensen's method applied to the intelligence-fertility relationship.

2014), though there is evidence that this is no longer the case in younger samples due to the increasing adoption of atheistic, postmodern ideologies further and further towards the left tail of the IQ distribution via the usual sociological 'Trickle Effect' (see Dutton & van der Linden, 2017).

This leaves us asking why conservative religiosity acts in this way. At the environmental level, there is evidence that contemporary extreme liberalism promotes anti-natalism, encouraging people to not have children for the good of the environment (e.g. Extinction Rebellion; Climate Strike). This has been attributed to a process of runaway individualism where a person must signal their liberalism to a greater extent than the last liberal (see Dutton & Rayner-Hilles, 2022). Accordingly, competitive signaling in a liberal society could lead to the choice of infertility. By contrast, traditional religiosity tends to be pro-natalist and also promotes putting the good of the family, and in many cases also the nation, above the self, which is also implicitly pro-natalist as these need to survive (Graham et al., 2009).

'Evolutionary match' means that the organism is evolved to a specific environment. If that environment radically changes, then the organism is in an evolutionary mismatch. There is evidence that when we are placed in our evolutionary match, which until relatively recently has involved high mortality salience, then we become both more religious (Norenzayan & Shariff, 2008) and more pro-natalist, as if our evolutionary match activates what we might call 'adaptive instincts' or adaptive cognitive biases in us (McAllister et al., 2016). This interpretation would be congruous with our being a highly environmentally sensitive species, with a long childhood learning period.

There is indeed evidence that intelligence may be highly germane to this. Congruous with an intelligence-sensitivity nexus, some studies have found that people with high IQ are more environmentally plastic. For example, in a sample of 11,000 twin pairs, "individuals with high IQ show high environmental influence on IQ into adolescence (resembling younger children), whereas individuals with low IQ show high heritability of IQ in adolescence (resembling adults), a pattern consistent with an extended sensitive period for intellectual development in more-intelligent individuals" (Brant et al., 2013). Intelligent people are more sensitive to their environment. Perhaps this sensitivity and reduced use of instinctive response helps them to better solve problems, as has been argued elsewhere (Dutton & van der Linden, 2017), and therefore they are more likely to become maladaptive in an evolutionary mismatch. They are, it might be summarized, less 'hard-wired'. It may even be argued that our 'materialistic' culture promotes a materially wealthy lifestyle above all else, including above fertility. The more intelligent, being more environmentally plastic, are more likely to absorb this.

Insomuch as there is substantial evidence that the collective worship of a moral god is an adaptation, having every component of an adaptation as usually defined (Vaas et al., 2009),<sup>2</sup> we might aver that the collective worship of a moral god is our 'evolutionary match'. Specifically, the collective worship of a moral god is an evolutionary match for those evolved to more complex societies in which people must cooperate with strangers. In this context, belief in a moral god will compel cooperation between strangers (Norenzayan & Shariff, 2008). It can be seen as substitute evolutionary match where much of the social pressure and authority in simple face-to-face societies has been transferred to the deity. As such it is a remedy for the evolutionary mismatch of an anonymous mass society. Indeed, collective worship of a moral god is associated with elevated genetic health.

In general, religion, at least those religions that have survived, appears to take that which is adaptive and make it into the will of God, making such behaviors more likely to be adopted. In addition, traits which are under positive selection tend to become pleiotropically related meaning that traditional religiosity becomes part of an adaptive 'fitness factor' (see Dutton et al., 2018; Sarraf et al., 2019). It will induce adaptive instincts and this will be especially important for the more intelligent, where it will overwhelm any antinatalist ideology which they might have absorbed from the broader society. By contrast, atheism, liberalism (with which atheism is robustly associated) and other deviations from this 'match' are associated with poor mental and physical health (Vaas, 2009), strong negative feelings sometimes leading to Machiavellianism and other Dark Triad traits, a feeling that life has no meaning, and a desire to not have children. The relationship between Machiavellianism and anti-natalism is partly mediated by depression (Schönegger, 2022).

However, it may be that the explanation for our finding is more genetic in nature, as the alternative begs the question of why some people do and others do not get drawn into traditional religiosity in the first place and do or do not become apostates. Accordingly, perhaps a more persuasive model is that conservative religiosity, and the adaptive instincts it promotes including pro-natalism, are all pleiotropically bundled together. These people are strongly pro-natalist for genetic reasons and strongly believe that life has eternal meaning, and wish to go on eternally, somehow, via breeding for the same reasons. Indeed, mortality salience not only increases religiosity but increases the desire to name a child after oneself, the desire for a kind of 'symbolic immortality' (Vicary, 2011). Thus, among the more intelligent of these people, there is an inbuilt protection against anti-natalism.

Indeed, in that normal range high intelligence seems to predict social conformity — the intelligent are better at norm-mapping and persuading themselves of the veracity of the dominant value-system such that they can better compete for status (Woodley of Menie & Dunkel, 2015) — we might expect the more intelligent in a conservative religious community to competitively signal their religiosity via high fertility. High fertility, in this context, can be seen to signal the parents' adherence to Church teachings, their confidence that God will look after them, and simply the fact that God is blessing them with children, perhaps due to the intensity of their faith in Him. This may be why intelligence is associated with fertility among White American members of the Church of Jesus Christ of Latter-day Saints (Kirkegaard & Dutton, 2023).

In essence, then, we find that modern conditions cause intelligent people to fail to pass on their genes but that, specifically among the traditionally religious, this relationship is weakened and, in some instances, reversed. As has been discussed elsewhere (Dutton & Rayner-Hilles, 2022), this has thought-provoking implications with regard to the composition of future elites in Western countries and the kinds of policies which they may pursue.

### 5 Limitations

Unfortunately, there were no later follow-ups to the sample, so we can't know what happened after age 38. We controlled for age in the model as the best way of dealing with this issue, knowing this is not perfect. The results hold whether or not age is controlled (p for interaction = .002).

<sup>&</sup>lt;sup>2</sup> It may also be that religion manifested as a series of adaptive traits, such as over-detecting agency and obeying authority (Boyer, 2001), became pleiotropically bundled placing religiosity under selection as a trait in itself.

#### References

- Batty, G. D., Shipley, M. J., Mortensen, L. H., et al. (2008). Iq in late adolescence/early adulthood, risk factors in middle age and later all-cause mortality in men. *Journal of Epidemiology & Community Health*, 62(6), 522-531. doi: 10.1136/jech.2007.064881
- Bayroff, A. G., & Fuchs, E. F. (1970). The armed services vocational aptitude battery (Tech. Rep.). U.S. Army Behavior and Systems Research Laboratory. Retrieved from https://apps.dtic.mil/docs/ citations/AD0706832
- Bouchard, T. (2013). The wilson effect: The increase in heritability of iq with age. *Twin Research and Human Genetics*, *16*, 923-930.
- Boyer, P. (2001). *Religion explained: The human instincts that fashion gods, spirits and ancestors*. London: William Heinemann.
- Brant, A., Munakata, Y., Boomsma, D., et al. (2013). The nature and nurture of high iq. *Psychological Science*, 24, 1487-1495.
- Bratsberg, B., & Rogeberg, O. (2023). Stability and change in male fertility patterns by cognitive ability across 32 birth cohorts. *Biology Letters*, 20231072.
- Centers for Disease Control Vietnam Experience Study. (1988a). Health status of vietnam veterans: 1. psychosocial characteristics. *JAMA*, *259*(18), 2701-2707. doi: 10.1001/jama.1988.03720180027028
- Centers for Disease Control Vietnam Experience Study. (1988b). Health status of vietnam veterans: 2. physical health. JAMA, 259(18), 2708-2714. doi: 10.1001/jama.1988.03720180034029
- Centers for Disease Control Vietnam Experience Study. (1988c). Health status of vietnam veterans: 3. reproductive outcomes and child health. *JAMA*, 259(18), 2715-2719. doi: 10.1001/jama.1988 .03720180041030
- Chalmers, P., Pritikin, J., Robitzsch, A., et al. (2020). *mirt: Multidimensional item response theory.* Retrieved from https://CRAN.R-project.org/package=mirt
- Dutton, E. (2014). *Religion and intelligence: An evolutionary analysis*. London: Ulster Institute for Social Research.
- Dutton, E. (2023). Breeding the human herd: Eugenics, dysgenics and the future of the species. Imperium Press.
- Dutton, E., & Kirkegaard, E. O. W. (2023). The negative religiousness-iq nexus is a jensen effect on individual-level data. *Journal of Religion and Health*, *61*, 3253-3275.
- Dutton, E., Madison, G., & Dunkel, C. (2018). The mutant says in his heart, "there is no god": The rejection of collective religiosity centred around the worship of moral gods is associated with high mutational load. *Evolutionary Psychological Science*, *4*, 233-244.
- Dutton, E., & Rayner-Hilles, J. O. A. (2022). *The past is a future country: The coming conservative demographic revolution*. Exeter: Imprint Academic.
- Dutton, E., & van der Linden, D. (2017). Why is intelligence negatively associated with religiousness? *Evolutionary Psychological Science*, *3*, 392-403.
- Dutton, E., van der Linden, D., & Lynn, R. (2016). The negative flynn effect: A systematic literature review. *Intelligence*, 59, 163-169. doi: 10.1016/j.intell.2016.10.002

- Dutton, E., & Woodley of Menie, M. A. (2018). At our wits' end: Why we're becoming less intelligent and what it means for the future. Exeter: Imprint Academic.
- Elwood, R. W. (1995). The california verbal learning test: Psychometric characteristics and clinical application. *Neuropsychology Review*, 5(3), 173-201.
- Fieder, M., & Huber, S. (2018). Political attitude and fertility: Is there selection for the political extreme? Frontiers in Psychology. doi: 10.3389/fpsyg.2018.02343
- Fieder, M., & Huber, S. (2022). Contemporary selection pressures in modern societies? which factors best explain variance in human reproduction and mating? *Evolution and Human Behavior*, 43(1), 16-25.
- Flynn, J. R. (2012). Are we getting smarter? rising iq in the twenty-first century. Cambridge University Press.
- Graham, J., Haidt, J., & Nosek, B. (2009). Liberals and conservatives rely on different sets of moral foundations. *Personality Processes and Individual Differences*, *96*, 1029-1046.
- Greve, K. W., Stickle, T. R., Love, J. M., et al. (2005). Latent structure of the wisconsin card sorting test. Archives of Clinical Neuropsychology, 20(3), 355-364. doi: 10.1016/j.acn.2004.09.004
- Jackman, S. (2023). pscl: Political science computational laboratory. Retrieved from https://cran.r -project.org/web/packages/pscl/index.html
- Kirkegaard, E. O. W., & Dutton, E. (2023). Will intelligent latter-day saints and smart conservatives inherit the earth? *Evolutionary Psychological Science*, *9*, 26-37.
- Kirkegaard, E. O. W., & Nyborg, H. (2020). Pupil size and intelligence: A large-scale replication study. Mankind Quarterly, 60(4), 525-538.
- Kirkegaard, E. O. W., & Nyborg, H. (2021). Intelligence and general psychopathology in the vietnam experience study. *Mankind Quarterly*, 61(4), 792-819. doi: 10.46469/mq.2021.61.4.2
- Kirkegaard, E. W., & Nyborg, H. (2020). Is gout related to achievement? testing the uric acid hypothesis in the vietnam experience project. *Mankind Quarterly*, 61(1), 67-78. doi: 10.46469/mq.2020.61.1.7
- Kong, A., Frigge, M., Thorleifsson, G., et al. (2017). Selection against variants in the genome associated with educational attainment. *PNAS*, *114*(5), E727-E732. doi: 10.1073/pnas.1612113114
- Leckliter, I. N., Matarazzo, J. D., & Silverstein, A. B. (1986). A literature review of factor analytic studies of the wais-r. *Journal of Clinical Psychology*, *42*(2), 332-342. doi: 10.1002/1097-4679(198603)42: 2<332::AID-JCLP2270420220>3.0.CD;2-2
- Lynn, R. (2011). *Dysgenics: Genetic deterioration in modern populations*. London: Ulster Institute for Social Research.
- McAllister, L., Pepper, G., Virgo, S., & Coall, D. (2016). The evolved psychological mechanisms of fertility motivation. *Transactions of the Royal Society B*, *371*, 20150151.
- Norenzayan, A., & Shariff, A. (2008). The origin and evolution of religious pro-sociality. *Science*, *322*, 58-62.
- Nyborg, H., & Jensen, A. R. (2000). Black-white differences on various psychometric tests. *Personality* and *Individual Differences*, 28(3), 593-599.
- Nyborg, H., & Jensen, A. R. (2001). Occupation and income related to psychometric g. *Intelligence*, 29(1), 45-55. doi: 10.1016/S0160-2896(00)00042-8

- Phillips, A. C., Batty, G. D., Gale, C. R., et al. (2009). Generalized anxiety disorder, major depressive disorder, and their comorbidity as predictors of all-cause and cardiovascular mortality. *Psychosomatic Medicine*, 71(4), 395-403. doi: 10.1097/PSY.0b013e31819e6706
- Reeve, C., Heeney, D., & Woodley of Menie, M. A. (2018). A systematic review of the state of literature relating parental general cognitive ability and number of offspring. *Personality and Individual Differences*, 134, 107-118.
- Revelle, W. (2020). *psych: Procedures for psychological, psychometric, and personality research*. Retrieved from https://CRAN.R-project.org/package=psych
- Ruff, R. M., & Parker, S. B. (1993). Gender- and age-specific changes in motor speed and eye-hand coordination in adults: Normative values for the finger tapping and grooved pegboard tests. *Perceptual* and Motor Skills, 76(3S), 1219-1230. doi: 10.2466/pms.1993.76.3c.1219
- Sarraf, M., Woodley of Menie, M. A., & Feltham, C. (2019). *Modernity and cultural decline: A biobehavioral perspective*. Basingstoke: Palgrave Macmillan.
- Schwabe, I., Janss, L., & van den Berg, S. (2017). Can we validate the results of twin studies? *Frontiers in Genetics*, *8*, 160. doi: 10.3389/fgene.2017.00160
- Schönegger, P. (2022). What's up with anti-natalists? an observational study on the relationship between dark triad personality traits and anti-natalist views. *Philosophical Psychology*, 35(1), 66-94. doi: 10.1080/09515089.2021.1946026
- Shin, M.-S., Park, S.-Y., Park, S.-R., et al. (2006). Clinical and empirical applications of the rey-osterrieth complex figure test. *Nature Protocols*, 1(2), 892-899. doi: 10.1038/nprot.2006.115
- Tombaugh, T. N. (2006). A comprehensive review of the paced auditory serial addition test (pasat). Archives of Clinical Neuropsychology, 21(1), 53-76. doi: 10.1016/j.acn.2005.07.006
- Vaas, R. (2009). God, gains and genes. In E. Voland & W. Schiefenhövel (Eds.), *The biological evolution of religious mind and behavior.* New York: Springer.
- Vicary, A. (2011). Mortality salience and namesaking: Does thinking about death make people want to name their children after themselves? *Journal of Research in Personality*, 45, 138-141.
- Witt, J. C. (1986). Review of the wide range achievement test-revised. Journal of Psychoeducational Assessment, 4(1), 87-90. doi: 10.1177/073428298600400110
- Woodley, M. A., & Meisenberg, G. (2013). A jensen effect on dysgenic fertility: An analysis involving the national longitudinal survey of youth. *Personality and Individual Differences*, 55(3), 279-282. doi: 10.1016/j.paid.2012.05.024
- Woodley of Menie, M. A., & Dunkel, C. (2015). Beyond the cultural mediation hypothesis: A reply to dutton (2013). *Intelligence*, 49, 186-191.
- Zeileis, A., Kleiber, C., & Jackman, S. (2008). Regression models for count data in r. *Journal of Statistical Software*, 27(8), Article 8. doi: 10.18637/jss.v027.i08

## Appendix

#### A Intelligence battery

This text is copied from (Kirkegaard & Nyborg, 2020b).

- Grooved Pegboard Test (GPT, right hand): A measure of manual dexterity and fine motor speed (Ruff & Parker, 1993). The speed score is the reciprocal of the number of seconds taken to place a set of pegs in a grooved hole as quickly as possible.
- 2. GPT (left hand).
- 3. Paced Auditory Serial Addition Test (PASAT): A measure of mental control, speed, and computational and attentional abilities (Tombaugh, 2006). The subject mentally adds a sequence of numbers in rapid succession. Score is the total number of correct responses.
- 4. Rey-Osterrieth Complex Figure Drawing (CFD): A measure of visuospatial ability and memory (Shin et al., 2006). The direct copy score (CFDD) is given from a subject reproducing a complex spatial figure while the figure is in full view.
- 5. CFD, copy from immediate recall. The immediate recall score (CFDI) is given from a subject reproducing a complex spatial figure immediately after being shown it.
- 6. CFD, copy from delayed recall. The delayed recall score (CFDL) is given from a subject being exposed to a complex spatial figure and, after 20 minutes of other activities, drawing it.
- 7. Wechsler Adult Intelligence Scale-Revised (WAIS-R), general information (Leckliter et al., 1986). A test of general knowledge.
- 8. WAIS-R, block design. A test of spatial ability.
- 9. Word List Generation Test (WLGT). A measure of verbal fluency. The subject generates as many words as possible which begin with the letters F, A, and S for 60 seconds. The score is the total number of words generated.
- 10. Wisconsin Card Sort Test (WCST). A measure of executive function (Greve et al., 2005). The score is the ratio of correct responses to countable responses.
- 11. Wide Range Achievement Test (WRAT). Measures ability to read aloud a list of single words (untimed) (Witt, 1986).
- 12. California Verbal Learning Test (CVLT). A measure of verbal learning and memory (Elwood, 1995). The subject recalls a list of 16 words over 5 repeated learning trials. The score is the total correct over 5 trials.
- 13. Army Classification Battery (ACB). A verbal test administered at induction (ACBVE) (Bayroff & Fuchs, 1970).
- 14. ACB verbal. Administered at the follow-up interview (ACBVL).
- 15. ACB arithmetic reasoning test. An arithmetic test administered at induction (ACBAE).
- 16. ACB arithmetic. Administered at the follow-up interview (ACBAL).
- 17. Pattern Analysis Test (PAT). A measure of pattern recognition administered at induction.
- 18. General Information Test (GIT). A test of general knowledge administered at induction.
- 19. Armed Forces Qualification Test (AFQT). A general aptitude battery. This measure is the total score on four subtests (word knowledge, paragraph comprehension, arithmetic reasoning, mathematics knowledge) administered at induction.

Five of the tests (13, 15, 17-19) were given at induction and the remaining at the follow-up interview. Factor loadings are given below.

Test	g-loading	Test	g-loading
VE time1	0.82	PASAT	0.57
AR time1	0.81	WLGT	0.49
PA	0.70	CFD copy direct	0.47
GIT	0.69	CFD copy immediate	0.55
AFQT	0.85	CFD copy delayed	0.55
VE time2	0.82	CVLT	0.42
AR time2	0.82	WCST	0.46
WAIS BD	0.67	GPT left	0.34
WAIS GI	0.76	GPT right	0.33
WRAT	0.73		

Table A1: Factor (g) loadings of the intelligence tests. Variance explained was 0.42.



Figure A1: The distribution of general intelligence.



Figure A2: Model predictions based on count data models. a = Poisson, b = hurdle, c = zero-inflated Poisson.

	Poisson Zero-inflated poisson			Hurdle					
Predictor	Coeff.	SE	р	Coeff.	SE	р	Coeff.	SE	р
Predict fertility count									
intercept	0.56	0.01	<.001***	0.63	0.02	<.001***	0.63	0.02	<.001***
g	-0.04	0.01	<.001***	-0.02	0.01	.18	-0.02	0.01	.18
religiousness	0.12	0.01	<.001***	0.09	0.01	<.001***	0.09	0.01	<.001***
race=White	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
race=Black	0.16	0.03	<.001***	0.18	0.04	<.001***	0.18	0.04	<.001***
race=Hispanic	0.22	0.05	<.001***	0.25	0.06	<.001***	0.25	0.06	<.001***
race=Asian	0.01	0.13	.93	0.05	0.15	.73	0.05	0.16	.75
race=Native Am.	0.08	0.11	.42	0.06	0.12	.61	0.02	0.13	.86
age	0.03	0.01	.003**	0.04	0.01	.00	0.04	0.01	.003**
$g \cdot religiousness$	0.04	0.01	.0002***	0.03	0.01	.030*	0.03	0.01	.009**
Predict zero									
intercept				-2.86	0.19	<.001***	1.38	0.04	<.001***
g				0.28	0.18	.11	-0.12	0.04	.003**
religiousness				-0.36	0.15	.019*	0.27	0.04	<.001***
race=White	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)	(ref)
race=Black				0.27	0.49	.58	0.22	0.14	.12
race=Hispanic				0.46	0.53	.39	0.25	0.21	.22
race=Asian				0.52	1.00	.61	-0.09	0.41	.83
race=Native Am.				-0.66	1.89	.73	0.41	0.42	.32
age				0.11	0.15	.47	0.03	0.04	.47
$g \cdot religiousness$				-0.10	0.14	.48	0.06	0.04	.11

**Table A2:** Count model results. Coefficients with standard error and two-tailed statistical significance. Fertility is not standardized, but the other numerical variables are. \* p < .05, \*\* p < .01, \*\*\* p < .001.