On Evolutionary Pressure and General Leftism

Joseph Bronski

Abstract

Using the General Leftism scale developed in Bronski 2023 [1], we ask a 333 person sample on Prolific to fill out the scale both for themselves and their spouse. Using a narrow-sense heritability estimate of 0.6, we find a selection pressure of 0.076 SDs per generation in the conservative direction. Then, we examine data from Bronski 2023 [1] that allows us to compute the mutational pressure as 0.22 SDs in the leftist direction. We find that the sum of these two pressures adequately explains the change in general leftism per generation over that last 70 years (0.15 SD per generation in the leftist direction), indicating that Western political change is solely due to evolutionary pressure. Per Bayesian analysis, There is a 95% chance, given this data, that 70% or more of the observed shift in leftism is due solely to evolutionary pressure, namely mutational pressure.

Introduction

In a previous article [1], we showed that there is a paternal age effect on leftism (increasing leftism with increasing age of father when born), using a continuous classification based on three item sums regarding race, LGBT, and feminism [1]. As explained in the introduction of that article, this is indicative of mutational pressure increasing the incidence rate of leftism in the population. Furthermore, we showed, with a binary measurement of leftism, that older fathers and their wives were not more likely to be leftist than younger fathers and their wives [2].

Finding that there is no adequate measurement of the selection pressure on “general leftism” (a coherent concept per [1]) in the literature, we run a brief study to measure it.

Methods

The continuous metric centers around three topics: LGBT, feminism, and race ideology. These dimensions are hypothesized to be common to empire decline, and covary due to being the result of mutational pressure on the same genes. Each question was on a Likert scale with the following answer choices: Strongly disagree, disagree, neutral, agree, and strongly agree.
The questions were as follows:

G1. Is LGBT good?
G2. Homosexual behavior is fine when it is private and chaste.
G3. There is nothing wrong with public depictions of homosexual relationships.
G4. I support gay marriage.
G5. There is nothing wrong with attending a gay orgy.
G6. Children should be taught about gay sex in sex education classes.

F1. Is feminism good?
F2. The country would be better if women couldn't vote. (-1)

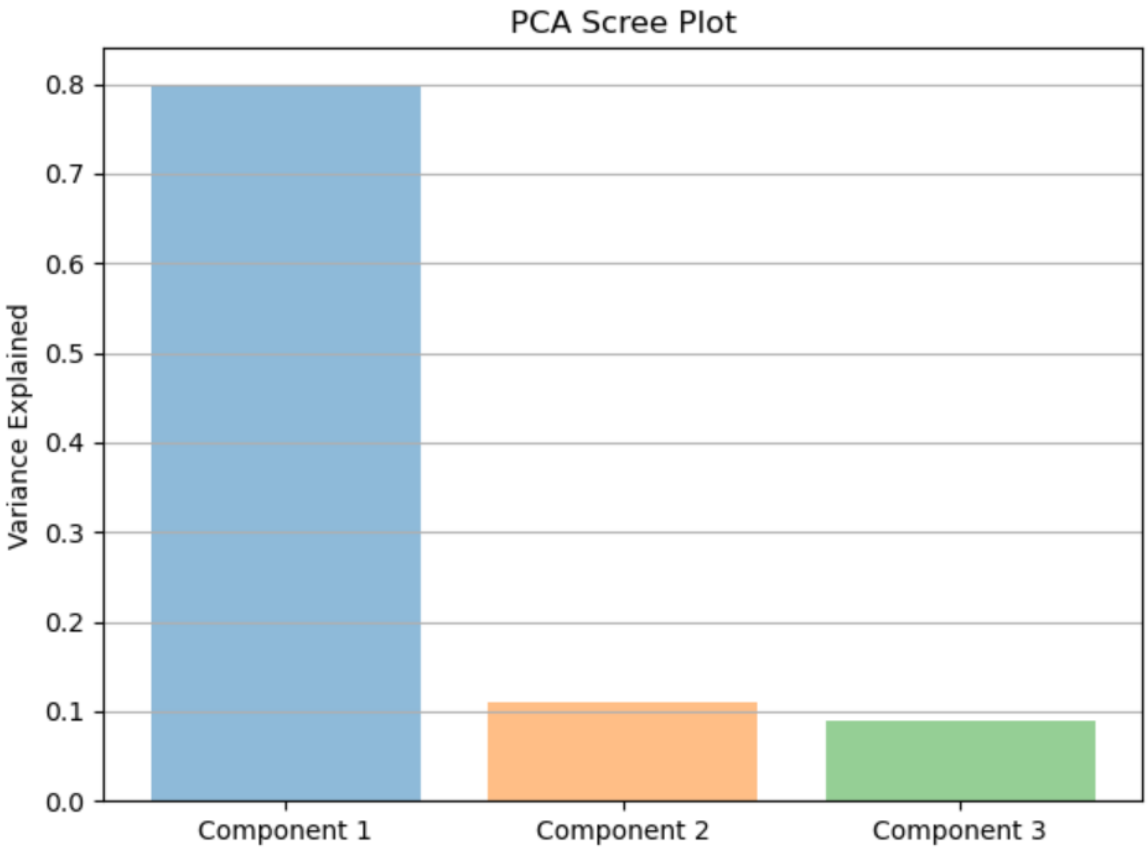
F3. Women should try to be married by the age of 25. (-1)
F4. The government should help ensure sexual equality by making sure women are not discriminated against in private hiring.
F5. Women should hold the majority of the positions of power in society.
F6. Marriage is oppressive for women, and monogamy should be moved away from.

R1. Is Black Lives Matter a good organization?
R2. Europe would be best if it remained all white. (-1)
R3. Immigration policy should be strict and heavily meritorious. (-1)
R4. The government should ensure racial equality by prohibiting racial discrimination in private business dealings such as hiring.
R5. Black people deserve reparations for the legacy of slavery.
R6. I support open borders.

The questions were intended to get “harder” as they progressed in each category, meaning woker people tend to be the only ones to agree to the later questions, while a greater percent of respondents would agree with earlier questions.

Also, items F2, F3, R2, and R3 were reversed.

We summed each of the three scales and performed PCA on the sum, finding one component explains 80% of variation. We use this component to produce general leftism, which has high 0.7 - 0.8 correlations with each item, as before [1].



Scree plot for principal component analysis of Gay sum, Race sum, and Feminism sum.

The test was given to 333 White, married Americans over 45, assuming those over 45 were more or less done with reproduction. We asked how many children they had as our measurement of fertility. Respondents filled out the political scale twice, once for themselves, and once to report on their spouse's politics. We used the component from self-report to produce spousal general leftism, and then averaged that with the self-report factor to produce couple general leftism.

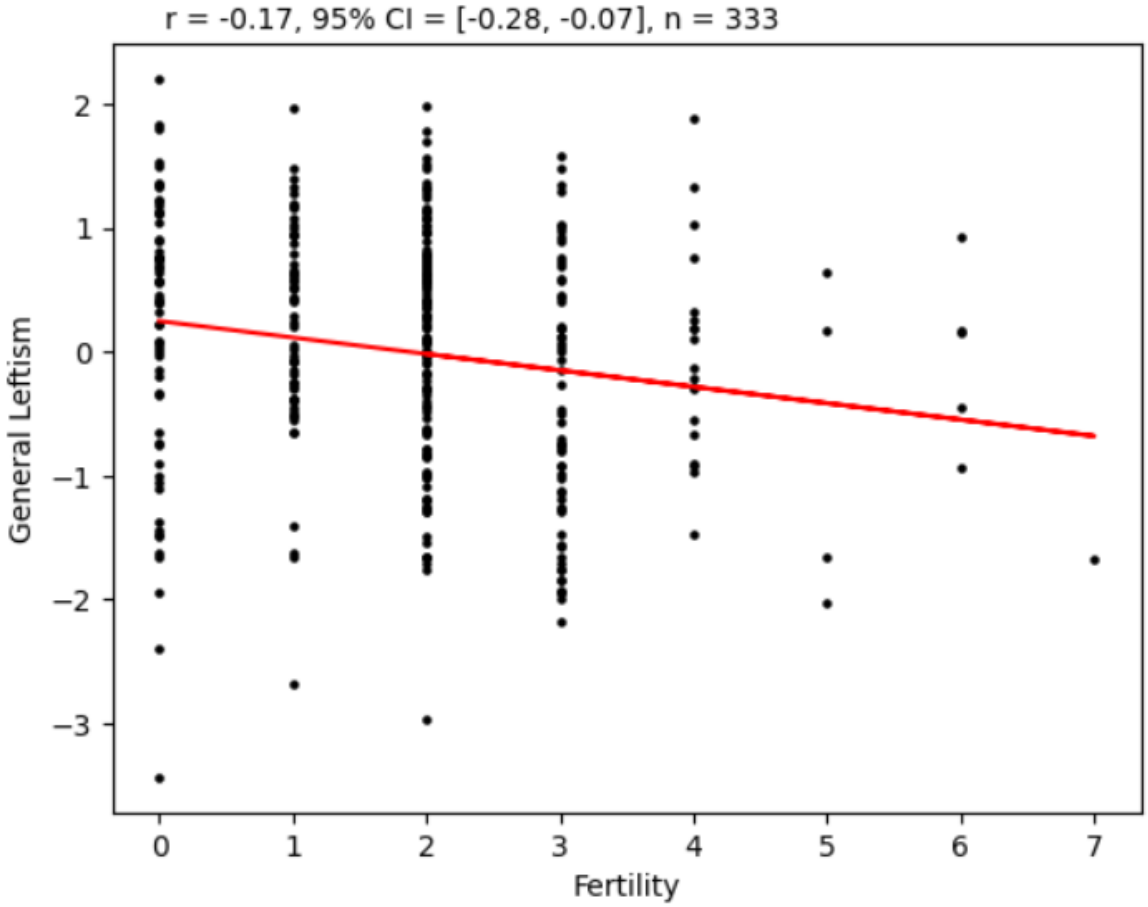
Selection Pressure Results

$$\Delta_s = \frac{\sum_{i=1}^{n} h^2 g_i f_i}{\sum_{i=1}^{n} f_i} = h^2 \frac{\sum_{i=1}^{n} g_i f_i}{\sum_{i=1}^{n} f_i}$$

Equation for computing selection pressure. g is a normalized trait, f is fertility, and h^2 is narrow sense heritability.

We found the average couple weighted by number of offspring had a general leftism of -0.127 SDs. Assuming a narrow-sense heritability (there is no direct estimate of this in the literature,

but partial-broad sense tends to be 0.7, which makes 0.6 a likely figure) we get a selection pressure of -0.127 * 0.6 = -0.076 SDs per generation.



Correlation of Fertility and General Leftism

Mutational pressure

$$\Delta_m = (2(\mu_a - 8))\frac{r_{a,g}}{2\sigma_a}$$

In absence of purifying selection, mutational pressure is computed using the equation above, where a is for paternal age. Mu_a is the mean paternal age of the sample (age of their father at birth), sigma_a is the standard deviation, and the r value is the correlation between paternal age and the trait in question.

These were reported as mu_a = 30, sigma_a = 7 and r_{a,g} = 0.11 in Bronski 2023 [1]. Thus our point-estimate for mutational pressure is 0.34 SDs, lacking purifying selection.

It was also found that the phenotypic trend for general leftism is 0.15 SDs per generation. Our point estimate for the overall evolutionary pressure is 0.34 - 0.07 = 0.27 SDs, well above the measured phenotypic trend. It is possible, therefore, that we are missing purifying selection or there is a changing environment that makes lower general leftism more common than it should be genetically.

It is also possible that our point-estimate is off. The lower end of the 95% CI for r_{a,g} was 0.055. Taking a true value of r_{a,g} of 0.07 yields a mutational pressure of 0.22. Thus our overall evolutionary pressure would be 0.22 - 0.07 = 0.15, perfectly matching observation. Therefore, while these studies could have found evidence ruling out the possibility of the change in general leftism over time being due to evolutionary pressure, we cannot in fact reject that null hypothesis based on this data.

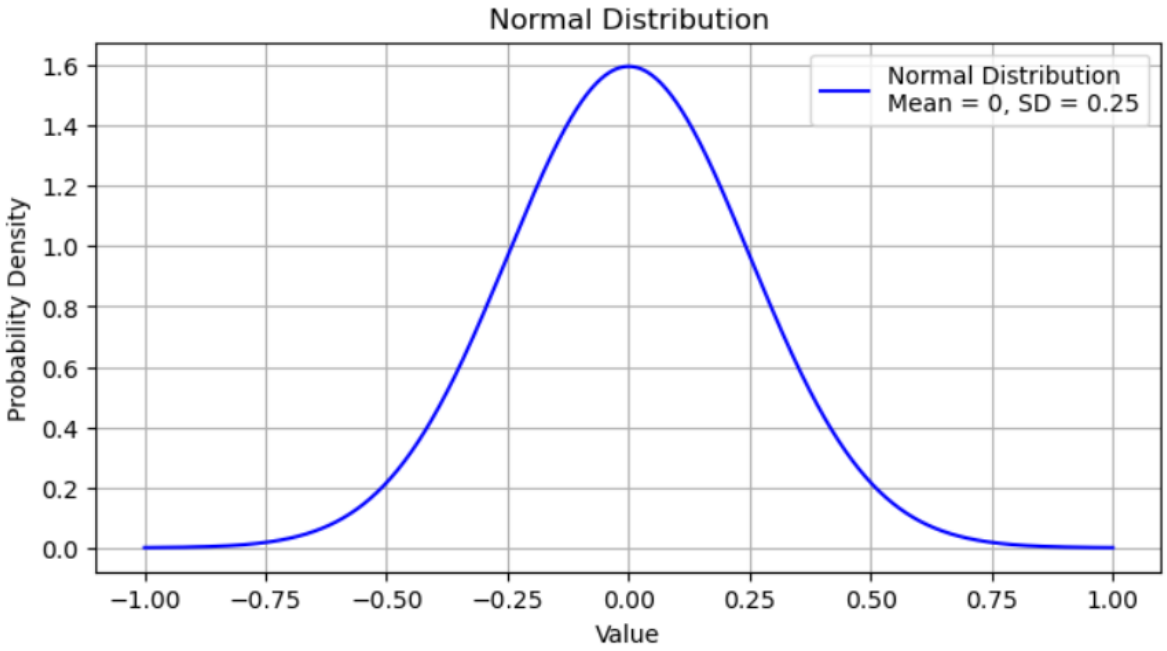
Bayesian analysis of evolutionary pressure

We can go further and compute a posterior distribution for the evolutionary pressure. We will do this by computing posterior distributions for r_{a,g} and r_{f,g}, which we will then map onto posterior distributions for mutational and selection pressure, assuming our point estimates of the mean and SD parameters in the equations for these pressures are certain. The posterior for evolutionary pressure is just the sum of the posterior for mutational and evolutionary pressure.

$$\Delta_s = h^2 \frac{\int_{-\infty}^{\infty} g f(g) p(g) dg}{\int_{-\infty}^{\infty} f(g) p(g) dg} = h^2 \frac{r_{g,f} \sigma_f}{\mu_f}$$

Equation for computing selection pressure from r_{g,f}

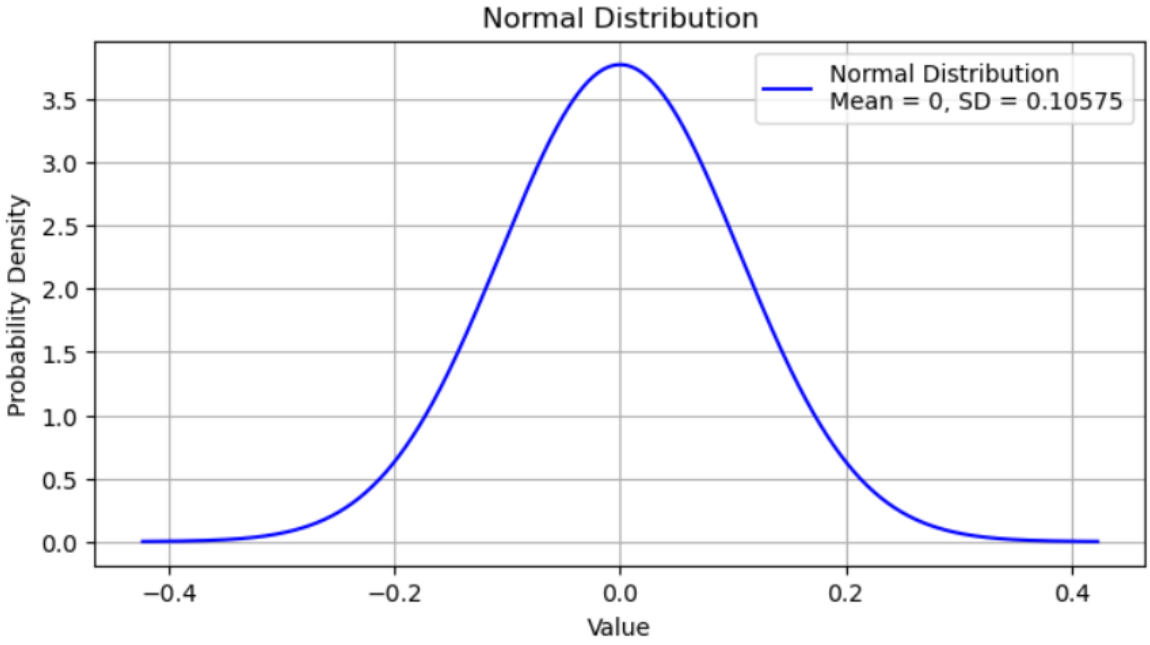
First we must start with priors for r_{a,g} and r_{f.g}. N(0, 0.25) should be a good prior for both. This prior says we weakly believe it to be 0 but it could be any value between -1 and 1, with decreasing probability from 0.



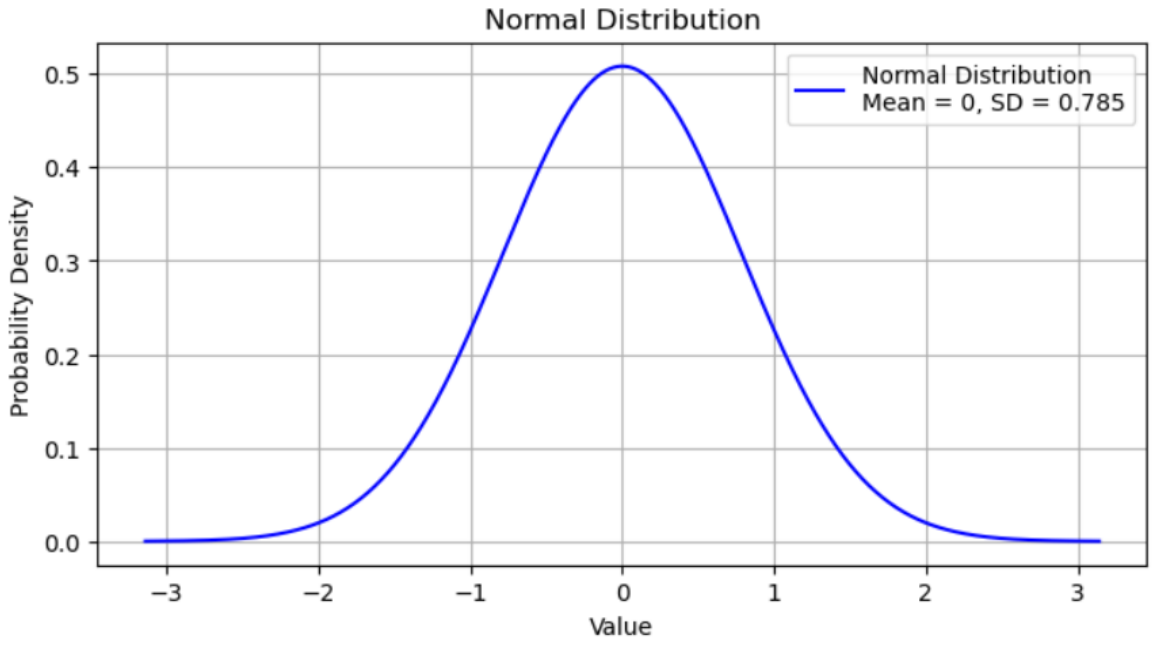
Priors for the r values

For selection pressure, we multiply the r value by 0.423, as this is the narrow sense heritability times the sd/mean ratio. For mutational pressure, we multiply by 44/14 = 3.14.

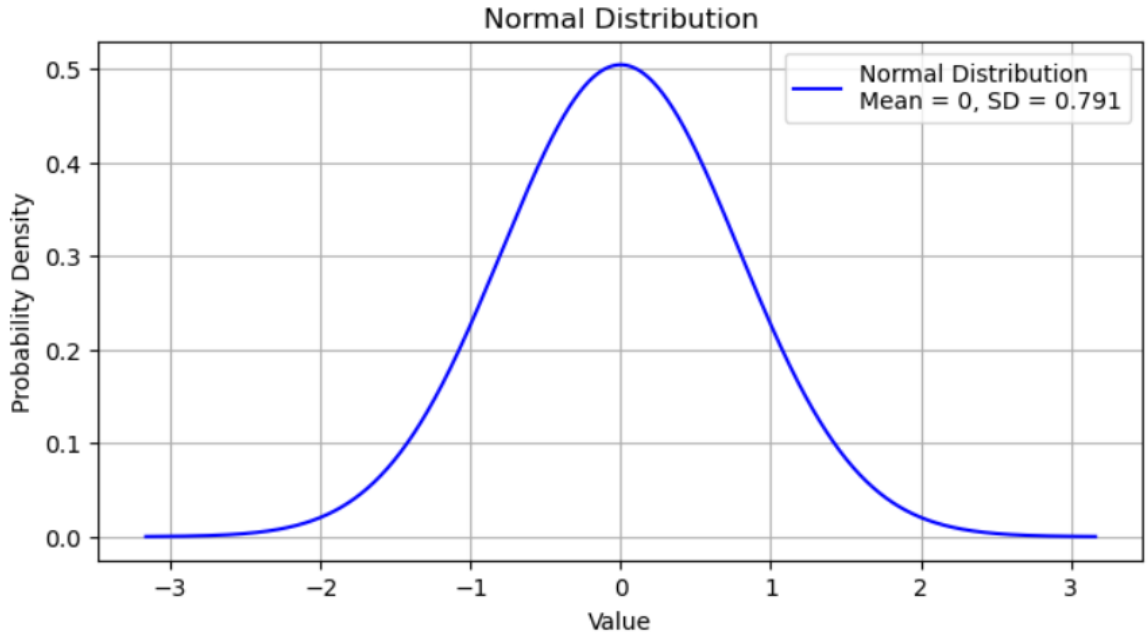
Our prior for selection pressure becomes:



And our prior for mutational pressure becomes:

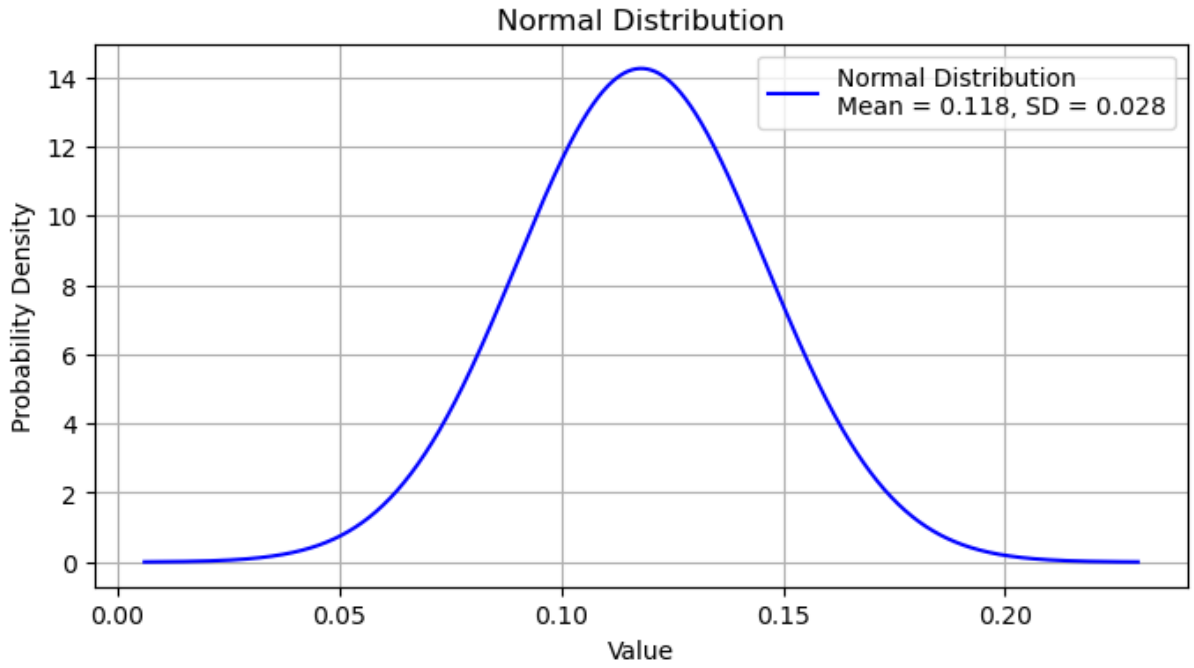


Already we see that, given the lack of purifying selection and the high paternal ages (and therefore expected de novo mutation count), relatively small r values of traits on expected de novo mutational load (paternal age) will produce larger mutational pressures. Meanwhile, because the ratio of fertility SD to the fertility mean is low, coupled with the narrow sense heritability being near 0.5 for traits in general, our we expect much smaller selection pressures. There is not a lot of room for selection with a fertility pattern where 3 is a lot of kids and most people have 1.9! But there is a lot of room for mutational pressure in a world without purifying selection, where nearly all kids make it to adulthood.

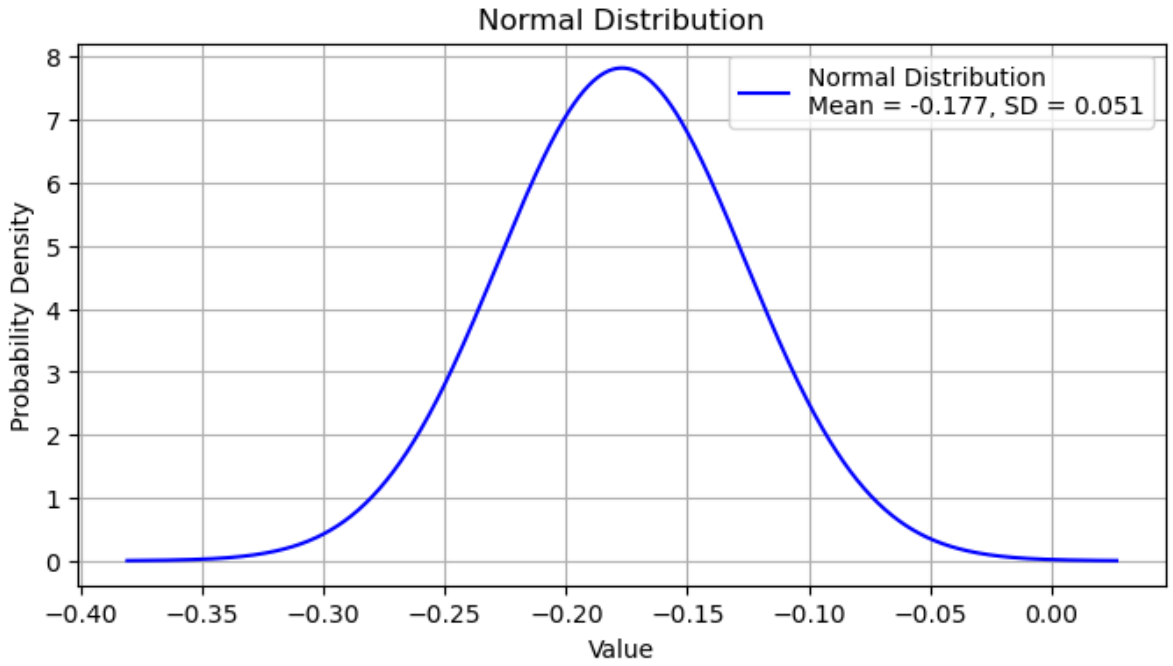


So our prior for evolutionary pressure is above, and mutational pressure explains 77% of the variance in evolutionary pressure.

This is directly contrary to the claim that “Mutation pressure is the change in allele frequencies due to the repeated occurrence of the same mutations. There are not many biologically realistic situations where mutation pressure is the most important evolutionary process” [4]. Large human societies with very egalitarian fertility patterns are a biologically realistic scenario where drift is extremely low due to have an expected value of 0 by definition and there being hundreds of millions of breeding individuals (drift is the standard error on evolutionary pressure essentially). Maybe in a cheetah population of 700 where 2/3 of cubs don’t make it to adulthood and 40% of adults never breed while the rest have between 10 and 50 cubs the claim is true, but it is most certainly not true in advanced human societies.

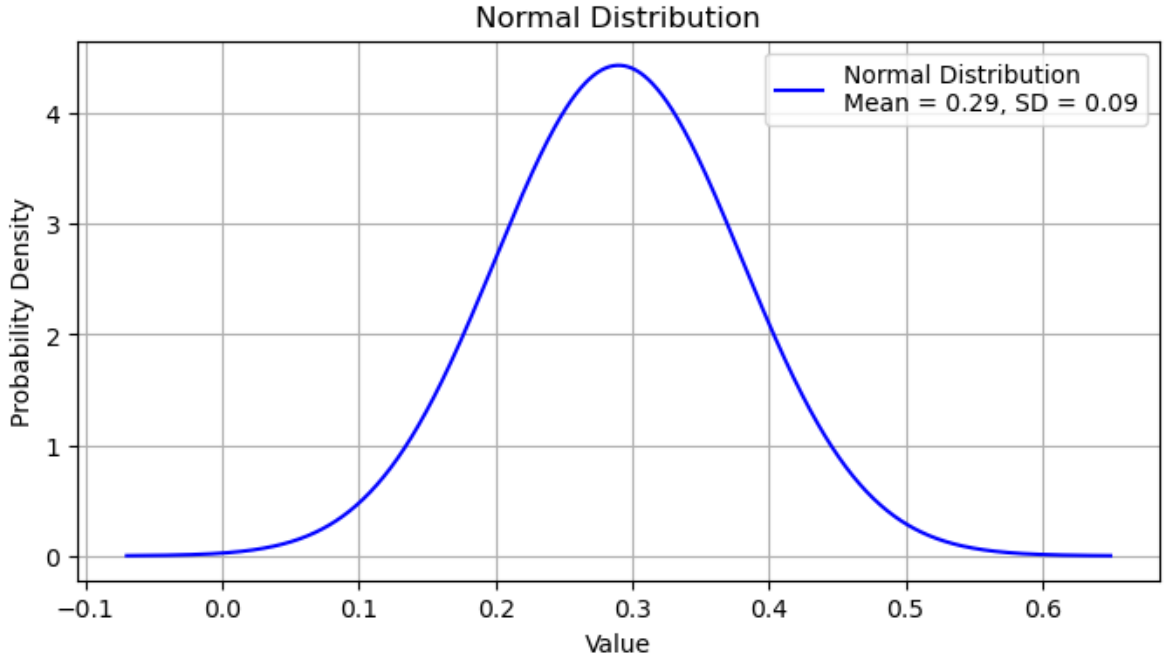


After Bayesian analysis, the posterior distributions for the r values basically go to their point estimates +/- their standard errors. Above is the one for r_{g,a}.

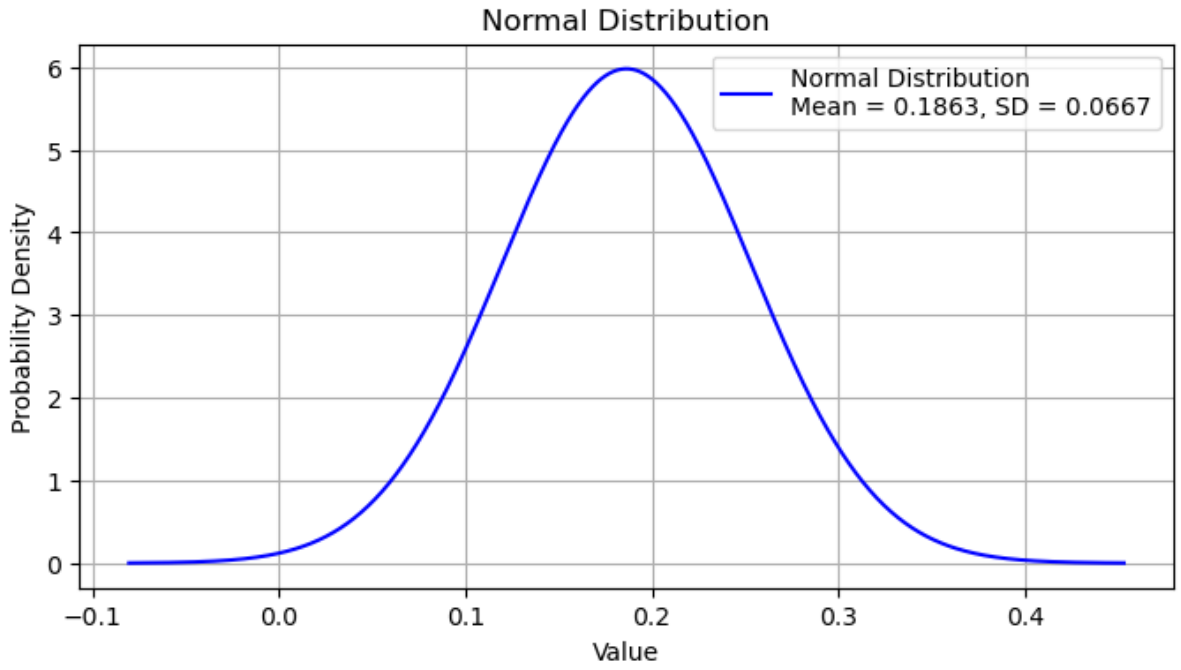


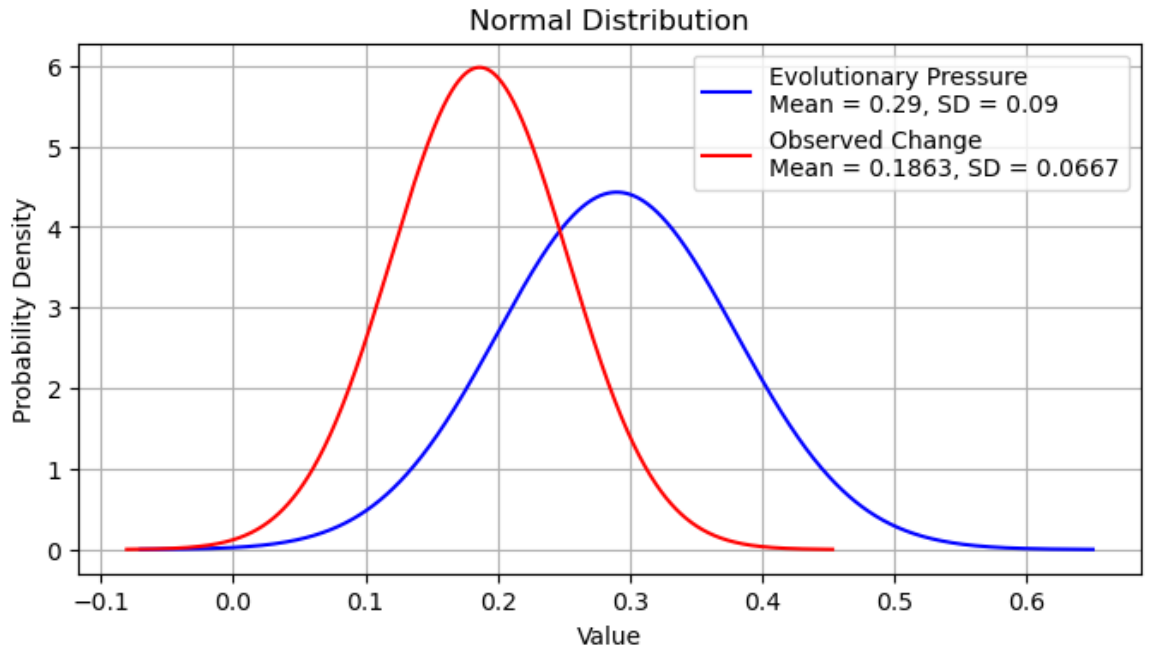
Above is the posterior for r_{f,g}.

Thus the posterior for selection pressure is N(-.177*0.423, 0.051*0.423), and the posterior for mutational pressure is N(0.118*3.14, 0.028*3.14). The posterior for evolutionary pressure is N(-.177*0.423 + 0.118*3.14, ((0.028*3.14)**2 + (0.051*0.423)**2)**.5).



Meanwhile, the posterior for how leftism is changing with each generation is given by multiplying the posterior of the r value of age onto leftism times the mean paternal age (generation time) divided by the standard deviation of age (this transforms r into a per-year effect). This iss 30/13 = 2.3. The posterior of r(age, leftism) is N(0.081, 0.029) so the posterior of the phenotypic change per generation is:



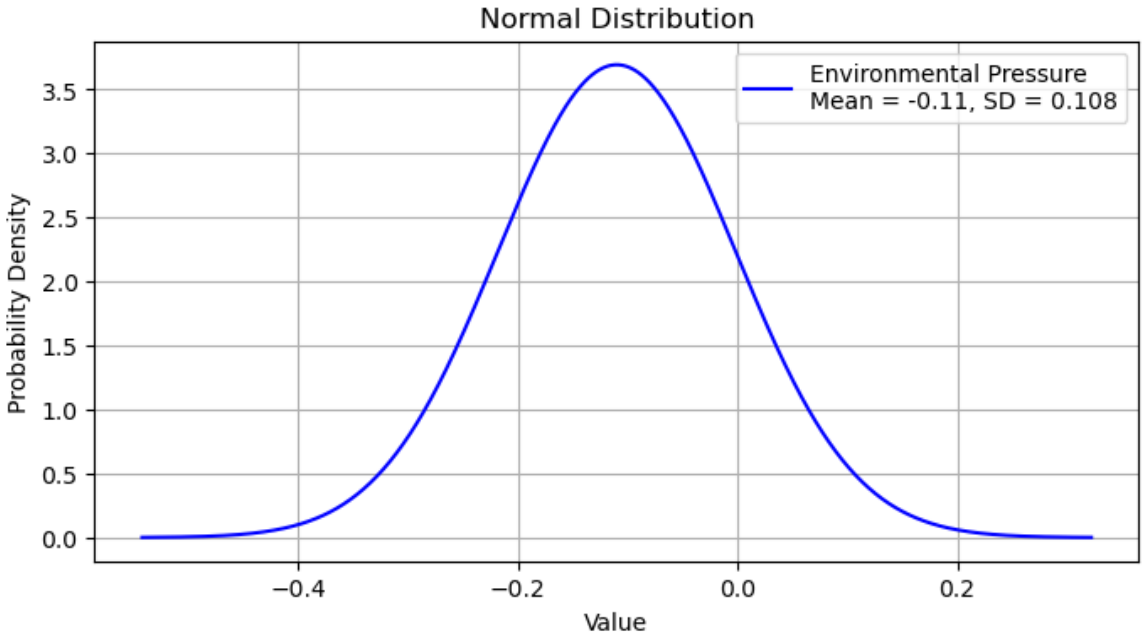


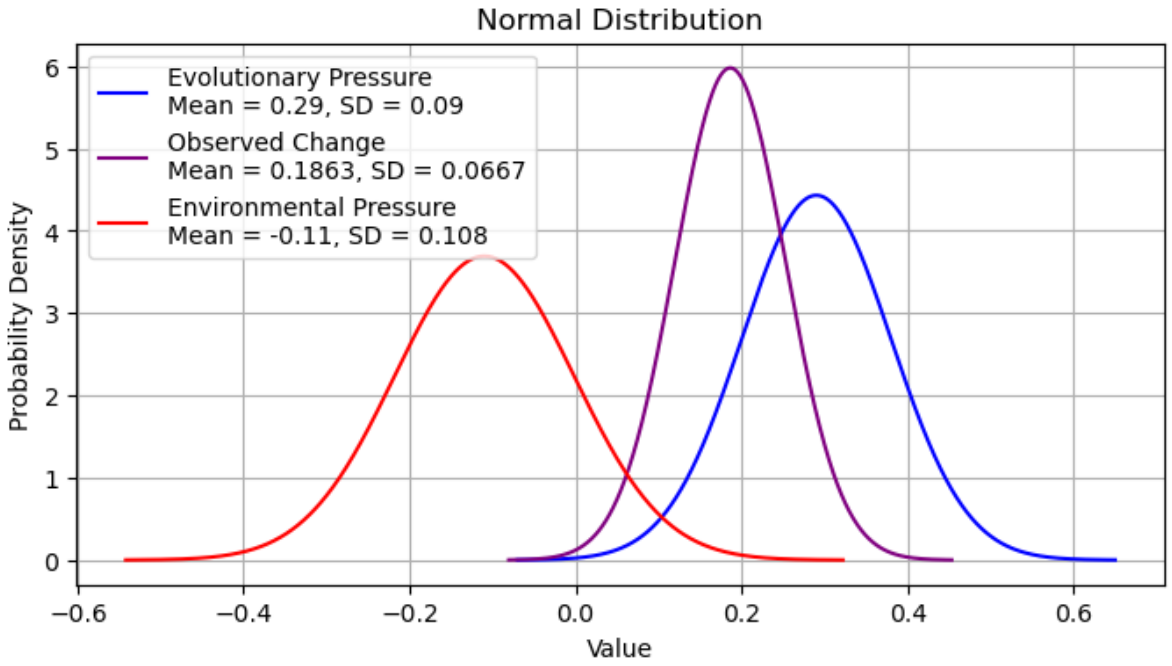
The two distributions have substantial overlap. Imagine you have a multiverse of worlds. The posterior of evolutionary pressure would be the distribution of actual evolutionary pressure among all of the worlds that have the same set of observations as we have accumulated.

We know for every world Observed Change = Evolutionary Pressure + Environmental Pressure.

Thus we have the posterior of environmental pressure as Observed Change - Evolutionary Pressure.

This is given by N(-.11, 0.108).



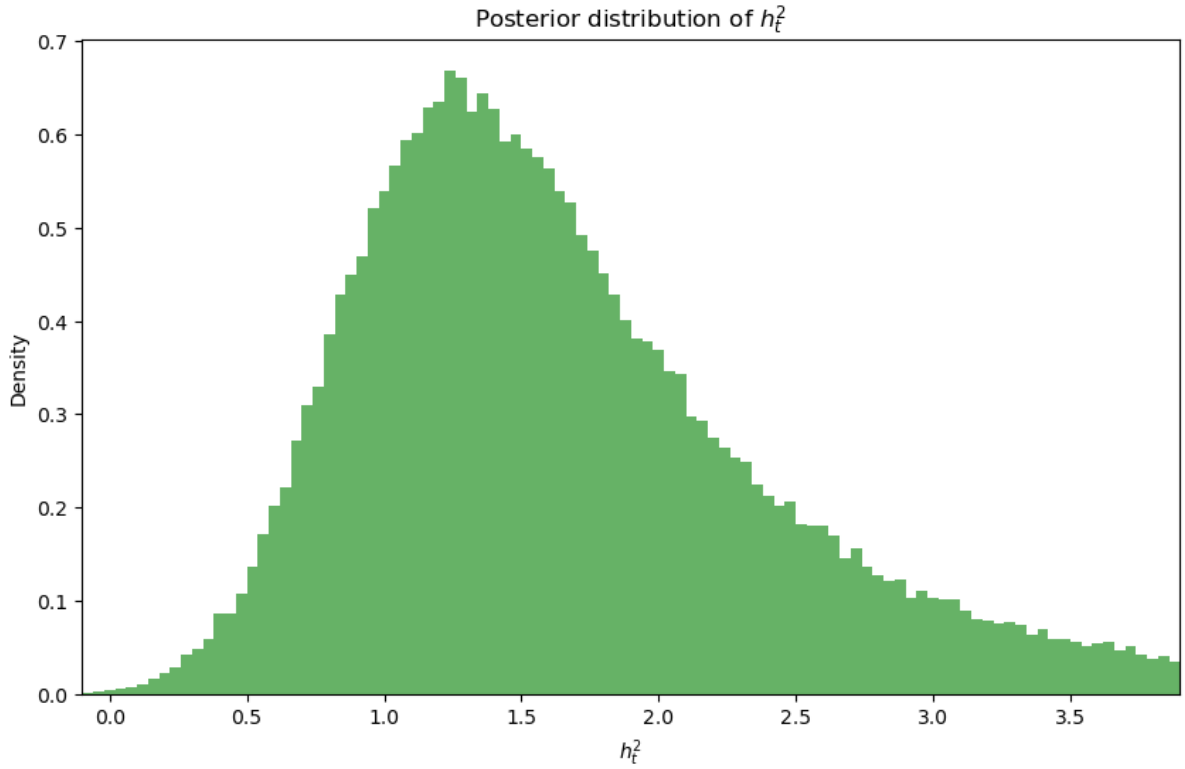


We now have these posteriors.

Note that if we define heretaticity as the between-generations heritability of the phenotypic gap, we get that the most likely estimate is (0.29/0.18) = 1.6. This can be interpreted as saying, if you held environment constant between the generations, you would see 1.6 times the observed change. Likewise, if the heretaticity were 0.1, the change would be overwhelming environmental, meaning we would only see 10% of the observed change if environments were held equal.

Likewise, the most likely environmenticity is -0.6, meaning if we held genes constance would would actually see a conservative shift.

But these are only point estimates. We can define posteriors for these two statistics as Evolutionary Pressure / Observed Change for heretaticity and Environmental Pressure / Observed Change for environmenticity.



We get the following distribution for heretaticity. The distribution for environmenticity is simply multiplied by -1 and added to by 1. The percentiles for heretiacity are as follows:

1st percentile: Approximately 0.386
2.5th percentile: Approximately 0.551
5th percentile: Approximately 0.694
15th percentile: Approximately 0.984

Thus there is an 85% chance that heretaticity is greater than 0.984, meaning that if environment were held constant we would see all or more of the observed shift anyways due to genetic processes.There is a 97.5% chance that 55% or more of the shift was due to genetics and a 99% chance that 38.6% or more of the shift was due to genetics.

For environmenticity we have:

85th percentile: Approximately 0.013
95th percentile: Approximately 0.302
97.5th percentile: Approximately 0.448
99th percentile: Approximately 0.607

Thus there is an 85% chance that the environment effect was less than or approximately 0, a 95% chance that is was less than 30%, and a 99% chance that it was less than 60%

We inescapably must reject the blank-slate hypothesis. The overwhelming odds are, given this data, that all or more of the observed gap is due to evolutionary pressure, mainly mutational pressure.

Conclusion

Our result on selection pressure is in line with previous evidence asserting selection pressure using binary variables [3]. The predominant effect, however, is mutational pressure. Environmental pressure is not likely to be above 0 in the observed direction.

References

1. Bronski, J. (2023). *A Paternal Age Effect on Leftism is Detectable with Continuous Measurements.* Openpsych.
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3. Fieder, M., & Huber, S. (2018). Political attitude and fertility: Is there a selection for the political extreme?. Frontiers in Psychology, 9, 2343.

4. https://udel.edu/~mcdonald/evolmutpress.html