

Evidence for a Paternal Age Effect on Leftism

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Abstract

The US has seen a linear decrease in the proportion of conservatives in each generation for at least 90 years. [Sarraf et al. \(2019b\)](#) have suggested that this is related to increases in mutational load due to relaxed selection pressures on humans in industrialized environments. We provide additional evidence for this hypothesis from a Prolific sample: leftists have older fathers than non-leftists ($d = 0.12$, $p = 0.003$, $n = 2380$), and those with older fathers are more likely to be leftist. Since male gametes acquire about 2 mutations per year, while female gametes mutate much more slowly, traits that are changing due to mutational pressure are expected to be more common in offspring from older fathers. Additionally, we show that older fathers themselves are not more leftist than younger fathers, suggesting that the paternal age effect is not due to differences in breeding patterns between leftists and non-leftists. Finally, we discuss limitations of the paper and future research directions. This paper should be replicated with continuous variables.

Keywords: paternal age, leftism, woke, mutational load, sociobiology

1 Introduction

1.1 *Mutational load accumulation*

Mutational pressure refers to the continuous introduction of new genetic variants or mutations into a population's gene pool ([Ohta, 1974](#)). It's an important driver of evolution, but not all mutations are beneficial; in fact, most are either neutral or harmful ([Muller, 1950](#)). It is likely that this happens due to the principle of entropy: on a molecular level, genes are made up of many bases, every three of which code for one amino acid in a protein. Selection can cause high-efficiency proteins to emerge; there are a lot of ways for these proteins to break, potentially as many ways as the number of amino acids in a protein, which is usually in the hundreds or more. Thus, new mutations are almost always fitness-reducing.

Fitness decay, or mutational meltdown ([Lynch et al., 1993](#)), can occur when harmful mutations accumulate faster than they can be eliminated by natural selection. This is especially likely in small populations where genetic drift — random changes in allele frequency — can override the effects of selection. Over time, the accumulation of detrimental mutations can reduce an organism's fitness, or its ability to survive and reproduce. This can lead to a decline in population size, exacerbating the problem as a smaller population is more vulnerable to further harmful effects of genetic drift. Ultimately, if not countered, this process can result in population extinction, in what's known as an error catastrophe or mutational meltdown ([Eigen, 2002](#)).

[Sarraf et al. \(2019b\)](#) have argued that “deleterious mutations—that is, those that tend to impair genetic quality and thus depress fitness and/or wellness—have accumulated in modernized populations, which could have a role in the loss of mental health and the nihilization and broader cultural decline of these groups” ([Sarraf et al., 2019a](#)). This has happened, they argue, because industrialization has relaxed selection pressures. Indeed, it would appear at a glance that the wealthier West is more leftist than other areas of the world which have not experienced the lack of selection pressures for as long.

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1.2 *Multi-level selection theory*

Those who study empire decline have argued that the lack of certain selective pressures contributes to behavioral change in a population over 10-40 generations (Turchin, 2018). This behavioral change is marked by a decline in *asabiyyah*, a term introduced by Ibn Khaldun which roughly translates to “groupishness.” Khaldun theorized that *asabiyyah* declined following an increase in wealth. Peter Turchin theorized that it increases through prolonged exposure to “meta-ethnic frontiers”, areas of ethnic tension, over the course of 10-40 generations. He claimed that high *asabiyyah* predicts empire formation, and rots after a race becomes a successful imperial ethnicity with a lot of wealth. In support of this, he showed that empires form more than 90 % of the time in meta-ethnic frontiers, and that empire decline tends to last about 20-40 generations (Turchin, 2018).

Multi-level selection theory lines up with research on “moral foundations” which attempts to predict political views from deeper sentiments. These sentiments, of course, are highly heritable (49 % - 66 %), meaning there is a lot of potential for genetic change (Zakharin & Bates, 2023). Leftists have been shown to have depressed “binding” sentiments and increased “individualizing” sentiments (Graham et al., 2009) relative to conservatives. Binding sentiments essentially map onto “groupishness”, as they include group loyalty and sexual morality.

1.3 *The increase in Leftism is probably genetic*

Three measures of leftism have been shown to be highly heritable: Wilson-Patterson conservatism (Bouchard Jr et al., 2003), moral foundations (Zakharin & Bates, 2023), and openness (Jang et al., 1996).

Openness in particular has been shown to predict conservatism at values as high as $r = -0.64$ (Van Hiel et al., 2000). Research has shown that changes in openness precede changes in political behavior (Osborne & Sibley, 2020). This makes sense because nothing on the Big 5 openness test asks about politics. Yet the correlation is substantial, as is the heritability. Openness differs by about .2 to .3 SD between generations [14](Donnellan & Lucas, 2008). At least some of this is not due to aging (Brandt et al., 2022) as later born cohorts have higher openness compared to earlier born cohorts at the same ages. It seems unlikely that this could be due to propaganda, new information, or other blank-slatist explanations for the increase in leftism. Yet this change predicts about a 0.5 SD decline in conservatism over the last 60 years. Furthermore, the correlation between openness and conservatism is mostly genetic in nature (de Vries et al., 2022).

Moral foundations have also been getting more leftist. *Asabiyyah* has been operationalized as a factor that loads at -.96 on the individualizing factor, and .96 on the binding factor. It has been shown that based on an analysis of words related to binding and individualizing, *asabiyyah* has been linearly decreasing since at least the 19th century in the West (Hertler et al., 2020). Intuitively, one thinks of moral impulses as fundamental genetic tendencies; one does not read a book and become a totally different moral entity. It is hard to explain the change in moral foundations with changes in the informatic or economic environment, especially when binding and individualizing are highly heritable (Zakharin & Bates, 2023).

1.4 *The increase in Leftism is probably related to mutational pressure*

If leftism is increasing due to genetic change, what is causing that genetic change? There are three main alternatives: selection, mutational pressure, and gene flow. It is possible all three are at play. Immigrants have been shown to be more leftist than the mean of the nations they leave (Giuliano & Tabellini, 2020). This could mean immigration constitutes leftist gene flow into a population. This is expected if leftism is the opposite of groupishness, and leftist immigrants are less loyal to their homelands, thus being more likely to leave for economic reasons.

However, it is likely that mutational pressure is at play as well. Leftism is associated with several probable indicators of mutational load, including mental illness (Goldberg, 2020; de Kluiver et al., 2017; Malaspina et al., 2015) and face asymmetry (Rasmussen et al., 2023; Kosinski, 2021).

It is theoretically plausible that mutational pressure could produce some or all of the leftward shift of the last several generations in the US and other Western nations. Approximately 1 in 500 people are born with autism due to de novo mutation, and 1 in 300 are born retarded due to de novo mutation (Kondrashov, 2017). It is estimated that between 1 in 50 and 1 in 20 face some sort of reduced fitness due to de novo mutation (Kondrashov, 2017). If the mutational pressure on leftism were 1 in 20, and leftism were treated as binary, then mutational pressure would convert 5 % of would-be nonleftists each generation.

Mutational pressure may be higher for traits which have higher polygenicity and which are not as vital for survival as others. ADHD, for example, is associated with mutational load (Min et al., 2021) and has increased 4.1 % in 19 years (Xu et al., 2018).

There is also E. O. Wilson's idea of the "multiplier effect" (Wilson, 2000). "A small evolutionary change in the behavior pattern of individuals can be amplified into a major social effect by the expanding upward distribution of the effect into multiple facets of social life. Consider, for example, the differing social organizations of the related olive baboon (*Papio anubis*) and hamadryas baboon (*P. hamadryas*). These two species are so close genetically that they interbreed extensively where their ranges overlap and could reasonably be classified as no more than subspecies. The hamadryas male is distinguished by its proprietary attitude toward females, which is total and permanent, whereas the olive male attempts to appropriate females only around the time of their estrus. This difference is only one of degree, and would scarcely be noticeable if one's interest were restricted in each species to the activities of a single dominant male and one consort female. Yet this trait alone is enough to account for profound differences in social structure, affecting the size of the troops, the relationship of troops to one another, and the relationship of males within each troop." In other words, there is ethological reason to believe that political behaviors are the most sensitive to changes in the genome. Small changes in behavior can result in large changes to the aggregate social structure. Civil rights, feminism, and gay marriage may seem like radical steps that are hard to explain with small mutational pressures, but the multiplier effect can in theory make small individual changes result in huge aggregate changes to a society.

2 Methods

If leftism is related to mutational pressure, we expect for there to be a paternal age effect for leftism. In other words, leftists should have older fathers on average. The object of this study was to test the hypothesis that leftists have older fathers. We also wanted to see if older fathers are more likely to be leftist, to rule out older fathers simply having more leftist genes, without de novo mutation playing a role.

We tested these two hypotheses in two different rounds of data collection. The first was a general survey of 2380 people on Prolific. We recruited white, non-Hispanic English speaking males from the US, attempting to balance the number of liberals and conservatives by ordering an equal number of liberals and conservatives, using the data participants gave to Prolific when they signed up.

We asked the participants their party identification, whether they lean right, left, or are centrist, and their thoughts on LGBT, Black Lives Matter, and Feminism. We also asked them how old their father was when they were born.

The questions were as follows:

1. What is your party identification?
 - Democratic
 - Republican
 - Green
 - Libertarian
 - Independent
 - Write-in
2. How would you categorize your politics?
 - Left-wing
 - Centrist
 - Right-wing
3. Is LGBT good?
 - Yes
 - No

4. Is Black Lives Matter a good organization?
 - Yes
 - No
5. Is feminism good?
 - Yes
 - No
6. How many years old was your father when you were born (please input a whole number)?
 - Write-in

For the data in the results section, we coded someone as leftist if they answered yes to all three questions regarding BLM, LGBT, and feminism. This was done because it was found that about half the sample answered yes to all three questions, making them the left half of the political spectrum. These questions went together well – a general factor formed from them had loadings of 0.76, 0.78, and 0.79 respectively. Furthermore, there was a 0.69 correlation between this classification scheme and the political variable derived from coding “Left-wing” as 1, “Centrist” as 0, and “Right-wing” as -1, indicating high concept validity. With party coded as “Democratic” as 1, “Independent” as 0, and “Republican” as -1, and dropping the remainders, the correlation was 0.65 with our classification. We also computed coefficient omega (Flora, 2020). It was 0.547, indicating moderate internal consistency for the set of items in the scale or test.

In the second round, we recruited 264 American, non-Hispanic white males aged 48 to 75 who had children. We asked the same political questions, as well as:

- a) how many children their wife gave birth to before they were 35 years old, and
- b) how many children their wife gave birth to after they were 35 years old.

We also asked them to report the political views of their wife, to make sure that older fathers did not tend to mate with more leftist women.

These were not the fathers of the first group, which we do not have access to. Instead, they are meant to be a representative sample of fathers from, approximately, the generation that produced the individuals from the first sample. The main hypothesis for the second sample is that fathers who had children at older ages were not more leftist than fathers who had children at younger ages. Given that the fathers of the first sample come from the same population as the fathers from the second sample, this would show that older fathers of the first sample are not more leftist.

The questions were the same above, minus question 6, plus these questions:

7. How many children did your wife give birth to after you were OVER the age of 35? (Please input a whole number using digits, e.g. 2)
 - Write-in
8. How many children did your wife give birth to when you were UNDER the age of 35? (Please input a whole number using digits, e.g. 2)
 - Write-in
9. Would your wife agree that LGBT is good?
 - Yes
 - Probably
 - Unsure
 - Probably not
 - No

10. Would your wife agree that Black Lives Matter is a good organization?

- Yes
- Probably
- Unsure
- Probably not
- No

11. Would your wife agree that feminism is good?

- Yes
- Probably
- Unsure
- Probably not
- No

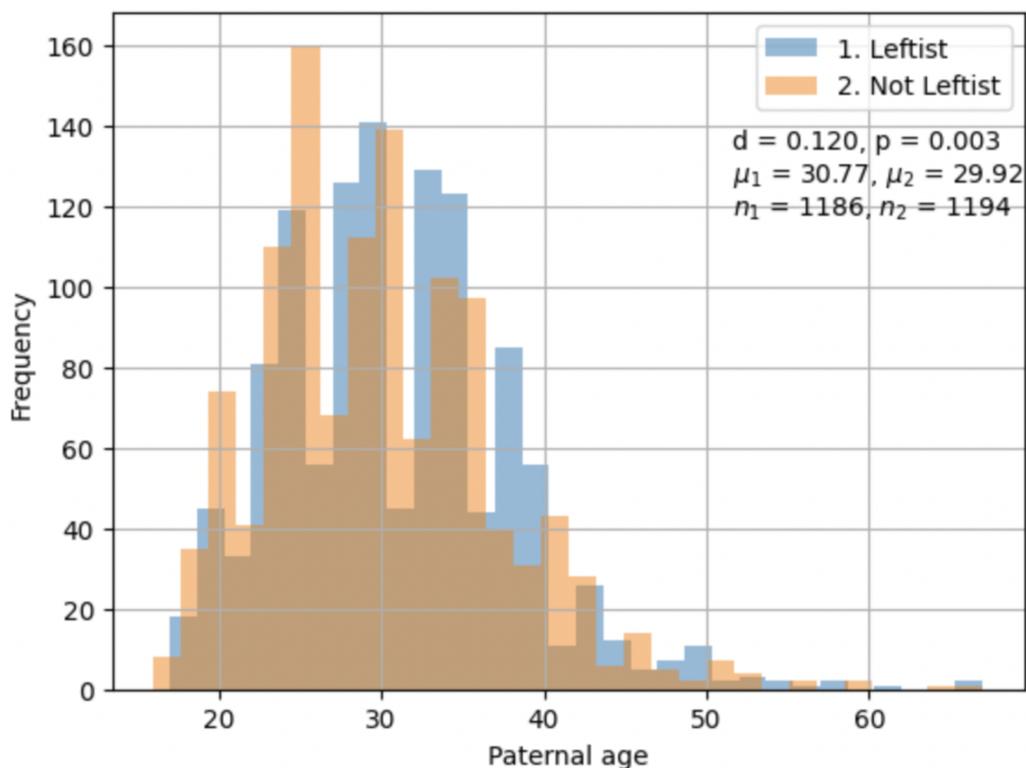


Figure 1: Leftism and Paternal Age (First round).

For Figure 1, we obtained a general factor from the questions about feminism, Black Lives Matter, and LGBT. The loadings were .74, .78, and .79 respectively. Roughly the top half most leftist scorers were categorized as “left.”

The distributions both have long right tails as expected. When these are removed (limiting the distribution to under 45), the results don’t significantly change. In fact, they slightly improved. Thus, keeping the tails provides the most value-neutral dataset.

Figure 2 shows that the paternal age effect is present across father birth years. In this chart and the others in this section, probability refers to the mean of the “leftism” binary variable.

Figure 3 shows that averaged across all paternal birth years, the difference was statistically significant with 95 confidence interval error bars.

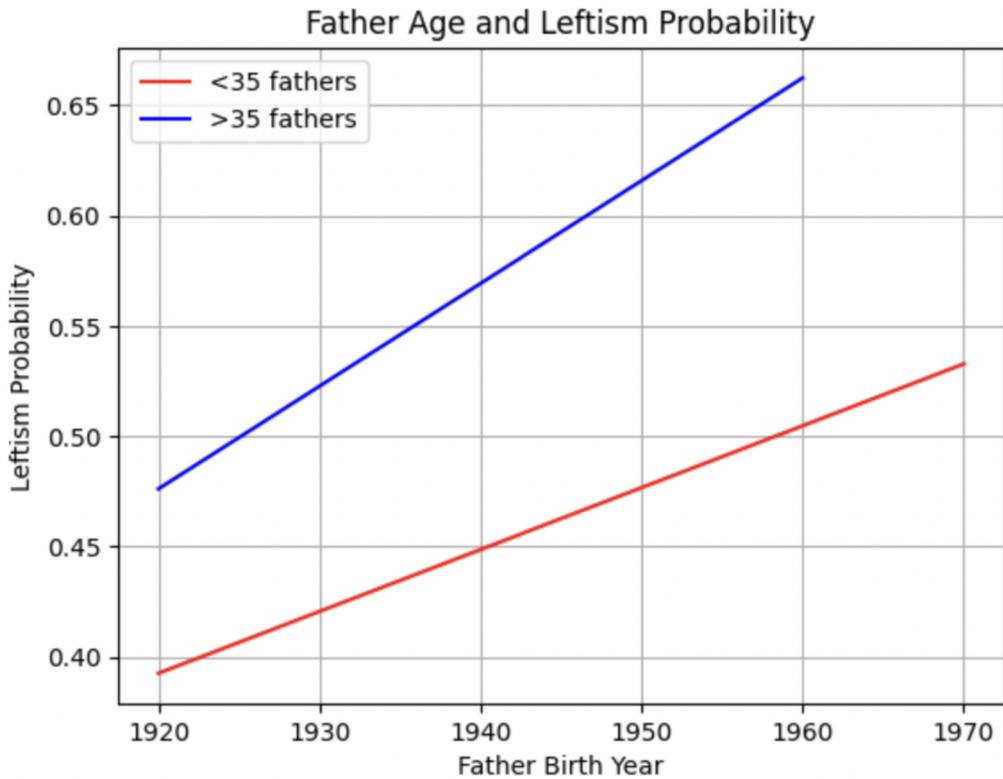


Figure 2: Leftism Probability by Father Age and Birth Year (First round).

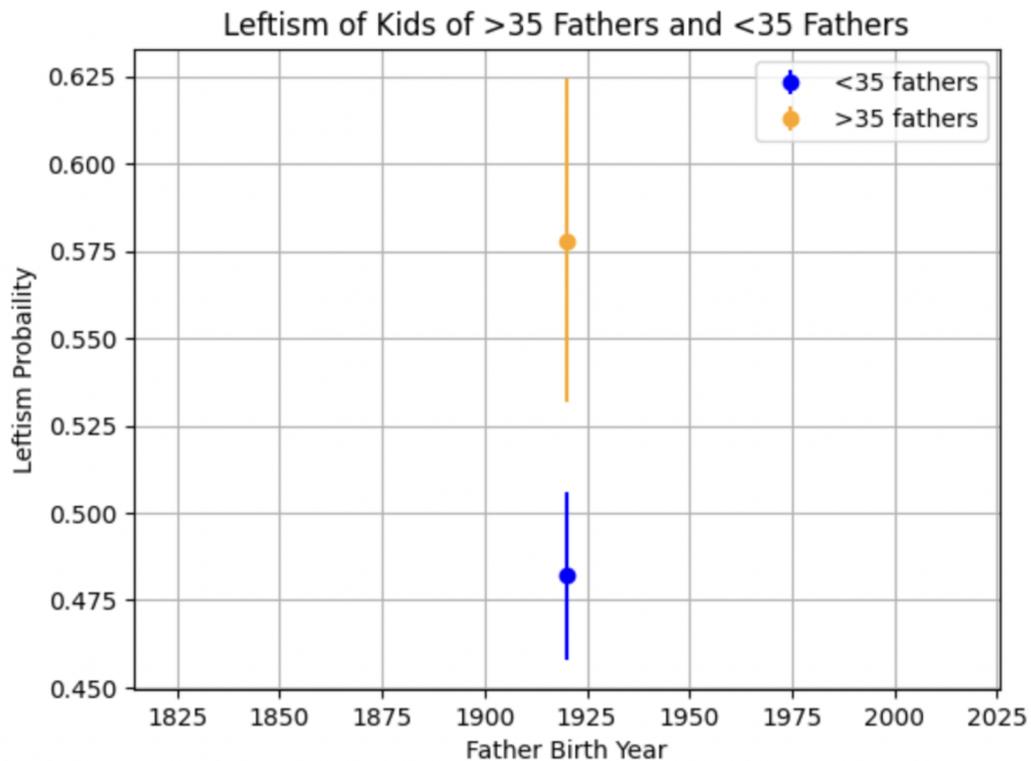


Figure 3: Leftism Probability by Paternal Age (First round).

Next, we show the leftism probabilities from Figure 4 alongside the leftism probabilities of the fathers. It is clear that older fathers are not more likely to be leftist, but sons of older fathers are. The generational overlap here is substantial as well, although not needed. The fathers were 48 to 75 years old as of 2023. Thus the average age of their children would be about 30. The average age of our “sons” sample was approximately 40 with a

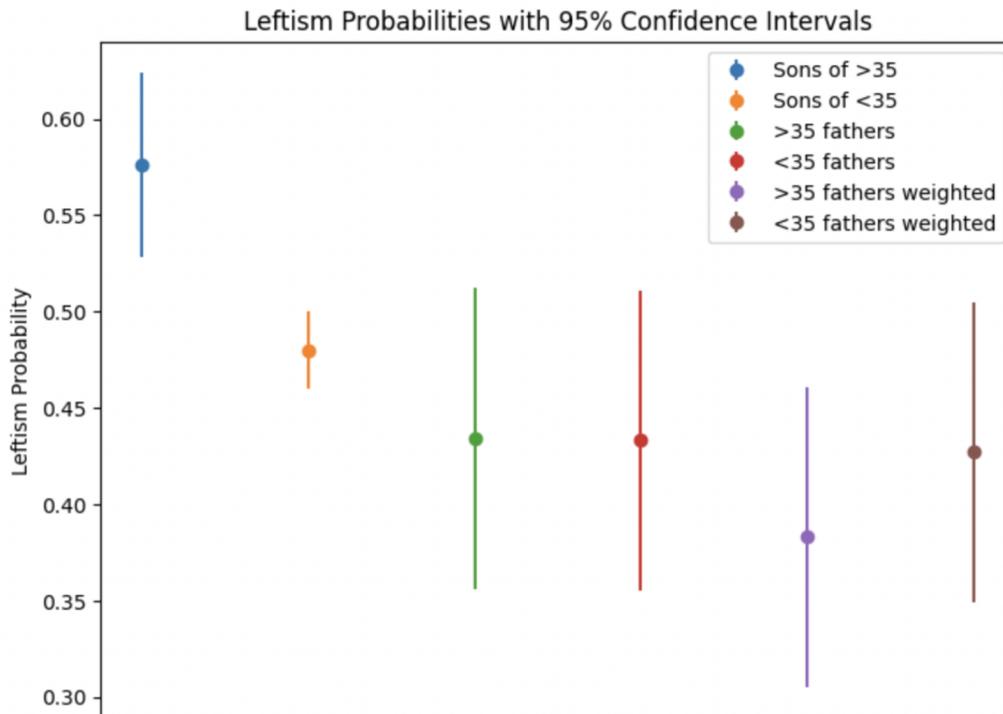


Figure 4: Leftism Probability by Groups (Both rounds).

standard deviation of about 14. The gap between the average is only 10 years, less than a single generation.

Weighted averages were weighted by the number of children. Thus, the weighted leftism mean for >35 fathers was slightly lower, because conservative >35 fathers had more kids after 35 than leftist >35 fathers. There were not statistically significant differences between the weighted averages and the non-weighted averages.

Finally, we show in Figure 5 that the wives of older fathers were not more leftist, according to reports by the fathers (unweighted $p = 0.98$, weighted $p = 0.94$). Thus, children of over 35 fathers cannot be more leftist because their mothers are more leftist than those of under 35 fathers.

Table 1: Logit Regression Predicting Leftism on Paternal Age (under or over 35) and Age (continuous) (First round).

Logit Regression Results						
Dep. Variable:	leftism	No. Observations:	2380			
Model:	Logit	Df Residuals:	2377			
Method:	MLE	Df Model:	2			
Date:	Fri, 11 Aug 2023	Pseudo R-squ.:	0.01723			
Time:	15:51:52	Log-Likelihood:	-1621.3			
converged:	True	LL-Null:	-1649.7			
Covariance Type:	nonrobust	LLR p-value:	4.514e-13			
	coef	std err	z	P> z	[0.025	0.975]
Intercept	0.8112	0.134	6.061	0.000	0.549	1.074
paternalAge	0.2394	0.103	2.317	0.020	0.037	0.442
Age	-0.0208	0.003	-6.944	0.000	-0.027	-0.015

Table 1 shows the results of a logit regression which was run to examine the effect of participant age apart from the effect of paternal age. Paternal age was the much stronger effect. The odds ratio of an effect in a logit regression is $e^{-\text{coef}}$, meaning the odds ratio for paternal age was 1.27 while the odds ratio for participant age was only 0.98.

Finally, Table 2 shows the results of a logistic regression analysis on paternal age (continuous) and age (continuous). Higher paternal age predicts increased leftism with participant age held constant, which is consistent

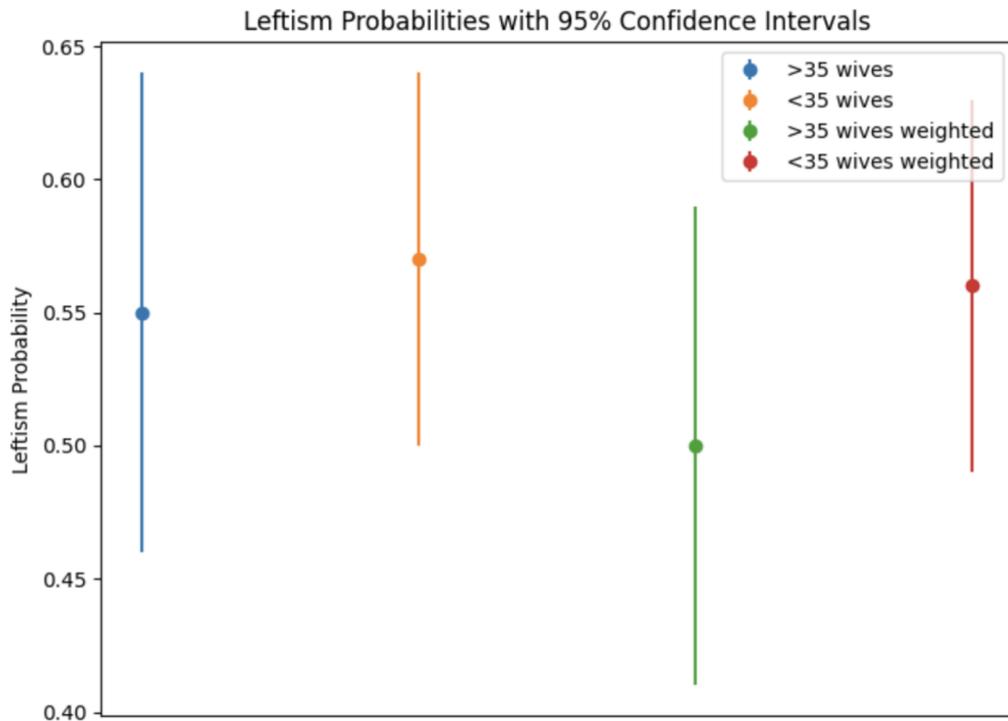


Figure 5: Leftism of Wives by Father’s Age (Second round).

Table 2: Logistic regression predicting leftism with paternal age (continuous) and participant age (continuous) (First round).

Logit Regression Results						
Dep. Variable:	Leftism	No. Observations:	2380			
Model:	Logit	Df Residuals:	2377			
Method:	MLE	Df Model:	2			
Date:	Fri, 18 Aug 2023	Pseudo R-squ.:	0.01701			
Time:	15:22:52	Log-Likelihood:	-1621.6			
converged:	True	LL-Null:	-1649.7			
Covariance Type:	nonrobust	LLR p-value:	6.457e-13			
	coef	std err	z	P> z	[0.025	0.975]
const	0.4595	0.232	1.976	0.048	0.004	0.915
PaternalAge	0.0128	0.006	2.157	0.031	0.001	0.024
Age	-0.0205	0.003	-6.814	0.000	-0.026	-0.015

with mutational load theory, as older fathers should come from less leftist generations, producing less leftist offspring. Instead, they produce more leftist offspring. Participant age increasing, of course, predicts decreased leftism, since older people are less leftist. The odds ratios were 1.012 for each year of paternal age and 0.979 for each year of participant age.

3 Limitations

Key limitations of this study include the treatment of leftism and paternal age as a binary variable, and the lack of data on potential confounders like religiosity and birth order effects.

Binary variables can be problematic for a number of reasons (MacCallum et al., 2002). Dichotomization at the mean can often lead to a reduction in effect sizes, occurrence of spurious significant main effects or interactions, risks of overlooking nonlinear effects, and problems in comparing and aggregating findings across studies.

For birth order effects, there is a literature on homosexuality and birth order effects, broadly indicating that maternal effects differing between first borns and later births influence the development of homosexuality (Miller, 2000). There is also a literature on birth order effects on intelligence, but it is unclear if this is caused by maternal effects, higher mutational load, or something else (Rodgers, 2001). One major hypothesis to rule out is a maternal effect influencing the development of leftism that is more common in later births.

Regarding religiosity, it has been found that less religious people born after 1960, but not before, have older fathers (Woodley of Menie et al., 2020). It is unclear if this is because older fathers are less religious, or if it is due to a paternal age effect. Also, some claim theories of more or less complicated mechanisms of environmental effects of ideas on behavior. The present author does not find this framework generally supported or valid, and therefore is not generally concerned with measuring religious participation as an important variable, but it is relatively common and other researchers (Rutherford, 2020) who seriously believe in it will want to rule out environmental hypotheses.

The reason for these issues was the small budget of the study. In the future, this study should be replicated with more confounding factors ruled out, as well as with a continuous metric for leftism and paternal age for all results.

4 Conclusion

Based on the results, we conclude that there is compelling evidence for a paternal age effect for leftism. The next step is molecular confirmation. Studies which confirm the role of de novo mutation in being more leftist than parents, as well as studies which show increasing polygenic scores for leftism associated traits like openness and individualizing through time can molecularly confirm the role of mutational load and genetics more generally in the rise of leftism.

The decline of asabiyyah seems to be a general feature of empire decline. We propose that the mechanism of asabiyyah decline is in fact mutational load increasing leftism in a population, potentially alongside immigrant gene flow. Further quantitative studies investigating the universality of the rise of features of leftism like feminism (decreased fertility, increased female driven sexual selection), homosexuality, and mass immigration of foreigners can further confirm this view. It may even happen in animals, especially social mammals with similar patriarchal societies to humans like lions, chimpanzees, gorillas, and wolves. An interesting, though expensive and time consuming experiment, could be to take one of these species and give them great wealth in an area over many generations. We might expect them to begin by defending their wealthy territory from outsiders. Over the generations, free from selective pressures, we would expect to see the decline of fertility and increases in female driven sexual selection, with decreases in the ability and drive for males to dominate the females. We might expect to see the ability to defend the territory weaken; gene flow from outsiders increases. And perhaps homosexual behavior would increase as well. This could be done most easily with wolves, because they can reproduce the fastest among the animals listed (2 year generations) and they are found outside of Africa, in Western nations. Just 20 years would be enough to simulate 10 generations, which is 250 years for humans, approximately the time since the American and French Revolutions. An experiment of similar reach, the aim of which is to domesticate foxes, has been run for the last 60 years in Siberia, with good results (Dugatkin, 2018), so this is not unprecedented.

References

- Bouchard Jr, T. J., Segal, N. L., Tellegen, A., McGue, M., Keyes, M., & Krueger, R. (2003). Evidence for the construct validity and heritability of the wilson–patterson conservatism scale: A reared-apart twins study of social attitudes. *Personality and Individual Differences*, 34(6), 959–969.
- Brandt, N. D., Drewelies, J., Willis, S. L., Schaie, K. W., Ram, N., Gerstorf, D., & Wagner, J. (2022). Acting like a baby boomer? birth-cohort differences in adults' personality trajectories during the last half a century. *Psychological Science*, 33(3), 382–396.
- de Kluiver, H., Buizer-Voskamp, J. E., Dolan, C. V., & Boomsma, D. I. (2017). Paternal age and psychiatric disorders: A review. *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, 174(3), 202–213.
- de Vries, R. E., Wesseldijk, L. W., Karinen, A. K., Jern, P., & Tybur, J. M. (2022). Relations between hexaco personality and ideology variables are mostly genetic in nature. *European Journal of Personality*, 36(2), 200–217.
- Donnellan, M. B., & Lucas, R. E. (2008). Age differences in the big five across the life span: Evidence from two national samples. *Psychology and Aging*, 23(3), 558–566. doi: [10.1037/a0012897](https://doi.org/10.1037/a0012897)
- Dugatkin, L. A. (2018). The silver fox domestication experiment. *Evolution: Education and Outreach*, 11(1), 1–5.
- Eigen, M. (2002). Error catastrophe and antiviral strategy. *Proceedings of the National Academy of Sciences*, 99(21), 13374–13376.
- Flora, D. B. (2020). Your coefficient alpha is probably wrong, but which coefficient omega is right? a tutorial on using r to obtain better reliability estimates. *Advances in Methods and Practices in Psychological Science*, 3(4), 484–501.
- Giuliano, P., & Tabellini, M. (2020). *The seeds of ideology: Historical immigration and political preferences in the united states* (Tech. Rep. No. w27238). National Bureau of Economic Research.
- Goldberg, Z. (2020). *Liberals more likely to have a mental health condition*. <https://threadreaderapp.com/thread/1248823584111439872.html>.
- Graham, J., Haidt, J., & Nosek, B. A. (2009). Liberals and conservatives rely on different sets of moral foundations. *Journal of personality and social psychology*, 96(5), 1029.
- Hertler, S. C., Figueredo, A. J., & Peñaherrera-Aguirre, M. (2020). *Multilevel selection: Theoretical foundations, historical examples, and empirical evidence*. New York: Palgrave Macmillan.
- Jang, K. L., Livesley, W. J., & Vernon, P. A. (1996). Heritability of the big five personality dimensions and their facets: A twin study. *Journal of personality*, 64(3), 577–592.
- Kondrashov, A. S. (2017). *Crumbling genome: The impact of deleterious mutations on humans*.
- Kosinski, M. (2021). Facial recognition technology can expose political orientation from naturalistic facial images. *Scientific reports*, 11(1), 100.
- Lynch, M., Bürger, R., Butcher, D., & Gabriel, W. (1993). The mutational meltdown in asexual populations. *Journal of Heredity*, 84(5), 339–344.
- MacCallum, R. C., Zhang, S., Preacher, K. J., & Rucker, D. D. (2002). On the practice of dichotomization of quantitative variables. *Psychological Methods*, 7(1), 19–40. doi: [10.1037/1082-989x.7.1.19](https://doi.org/10.1037/1082-989x.7.1.19)
- Malaspina, D., Gilman, C., & Kranz, T. M. (2015). Paternal age and mental health of offspring. *Fertility and Sterility*, 103(6), 1392–1396.
- Miller, E. M. (2000). Homosexuality, birth order, and evolution: Toward an equilibrium reproductive economics of homosexuality. *Archives of Sexual Behavior*, 29, 1–34.
- Min, X., Li, C., & Yan, Y. (2021). Parental age and the risk of adhd in offspring: a systematic review and meta-analysis. *International Journal of Environmental Research and Public Health*, 18(9), 4939.
- Muller, H. J. (1950). Our load of mutations. *American journal of human genetics*, 2(2), 111.

- Ohta, T. (1974). Mutational pressure as the main cause of molecular evolution and polymorphism. *Nature*, 252(5482), 351–354.
- Osborne, D., & Sibley, C. G. (2020). Does openness to experience predict changes in conservatism? a nine-wave longitudinal investigation into the personality roots to ideology. *Journal of Research in Personality*, 103979. doi: [10.1016/j.jrp.2020.103979](https://doi.org/10.1016/j.jrp.2020.103979)
- Rasmussen, S. H. R., Ludeke, S. G., & Klemmensen, R. (2023). Using deep learning to predict ideology from facial photographs: expressions, beauty, and extra-facial information. *Scientific Reports*, 13(1), 5257.
- Rodgers, J. L. (2001). What causes birth order–intelligence patterns? the admixture hypothesis, revived. *American Psychologist*, 56(6-7), 505.
- Rutherford, A. (2020). *How to argue with a racist: what our genes do (and don't) say about human difference*. Hachette UK.
- Sarraf, M. A., Woodley of Menie, M. A., & Feltham, C. (2019a). Making the case for mutation accumulation. In *Modernity and cultural decline: A biobehavioral perspective* (pp. 197–228). Cham: Palgrave Macmillan.
- Sarraf, M. A., Woodley of Menie, M. A., & Feltham, C. (2019b). *Modernity and cultural decline: A biobehavioral perspective*. Cham: Palgrave Macmillan.
- Turchin, P. (2018). *Historical dynamics: Why states rise and fall* (Vol. 26). Princeton University Press.
- Van Hiel, A., Kossowska, M., & Mervielde, I. (2000). The relationship between openness to experience and political ideology. *Personality and Individual Differences*, 28(4), 741–751. doi: [10.1016/s0191-8869\(99\)00135-x](https://doi.org/10.1016/s0191-8869(99)00135-x)
- Wilson, E. O. (2000). *Sociobiology: The new synthesis*. Harvard University Press.
- Woodley of Menie, M. A., Kanazawa, S., Pallesen, J., & Sarraf, M. A. (2020). Paternal age is negatively associated with religious behavior in a post-60s but not a pre-60s us birth cohort: testing a prediction from the social epistasis amplification model. *Journal of Religion and Health*, 59, 2733–2752.
- Xu, G., Strathearn, L., Liu, B., Yang, B., & Bao, W. (2018). Twenty-year trends in diagnosed attention-deficit/hyperactivity disorder among us children and adolescents, 1997-2016. *JAMA Network Open*, 1(4), e181471.
- Zakharin, M., & Bates, T. C. (2023). Testing heritability of moral foundations: Common pathway models support strong heritability for the five moral foundations. *European Journal of Personality*, 37(4), 485–497.