

Intelligence, Irrationality, and Civic Returns: Can Education Improve Democracy?

Stephen C. Miller*

Abstract

Recent empirical studies have shown a strong correlation between years of schooling and various proxies for civic engagement. The correlation is generally interpreted as evidence that education has high civic returns, i.e. that education yields positive externalities in the form of better, more conscientious, and more informed voters and citizens. In this study, I offer evidence that intelligence has a similarly strong relationship with civic engagement, and argue that without controlling for intelligence, the magnitude and significance of education's civic returns will tend to be overstated. I also argue that civic participation itself is only a benefit of education in the absence of systematically biased beliefs, and that education has more potential civic returns when it works against various forms of cognitive bias.

* Mailing address: Department of Economics, MSN 3G4, George Mason University, Fairfax, VA 22030

E-mail: smillerf@gmu.edu (S.C. Miller)

1. Introduction

A common justification for spending on public education is the argument that education has high civic returns in democratic societies. Civic returns can include such things as voter turnout, the average level of voter knowledge, community involvement, and enlightened thinking. Typically, empirical studies in the field of Political Science emphasized only the first two of those components, voter turnout and voter knowledge. Recent studies in economics represent a more thorough attempt to address all four of those components (Dee 2004, Milligan et al 2004). Besides likeliness to vote, Dee uses newspaper readership as a proxy for civic knowledge, group membership as a proxy for civic responsibility, and tolerance of free speech as a proxy for enlightened civic beliefs. Milligan, et al, use other measures, such as individual interest in politics and attitudes about democracy as proxies for civic engagement.

It is important to address more aspects of education's civic returns, because the claims of civic returns in the form of voter turnout and voter knowledge are both problematic. It is not clear how higher voter turnout is itself a positive externality of education. It may be the case that most eligible voters are "right," in that their favored policies will tend to result in the most happiness for the most people; if so, then more voter participation will increase the probability of better outcomes. But a key insight of Public Choice is that voters, numerous or not, will tend to be rationally ignorant. And if more rationally ignorant voters turn out, it makes little sense to consider this a social benefit. The question of rational ignorance, though, would seem to be solved by more investment in education itself, which is where civic knowledge comes into play. The problem with a claim that increased investment will increase civic knowledge is that

while there have been significant increases in both education spending and the average level of education in the U.S., there has been very little improvement in measures of civic knowledge.¹ In a sense, the data presented in this paper merely replace this puzzle with another. If, as the data suggests, the effect of education on civic knowledge and beliefs is limited by the intelligence of students, then a new puzzle emerges: civic knowledge should be increasing as the population becomes more intelligent per the Flynn Effect.²

A larger issue is the question of whether any or all of the various manifestations of civic returns are important. If voters are cognitively biased, higher turnout or newspaper readership may not improve democratic outcomes. But if education can reduce cognitive biases, then it still has potentially high civic returns. But if the effectiveness of education is limited by a student's intelligence, then education is itself a limited instrument.

The paper is divided into six sections. The next section of this study examines the role intelligence, as measured by a short IQ test within the General Social Survey (GSS), plays in these measures of civic engagement that Dee uses, to determine whether controlling for intelligence impacts the estimated effect of education. The third section addresses the possible effect education itself has on IQ scores. The fourth section reviews the concept of rational systematic bias, called *rational irrationality* in recent Public Choice literature, and argues that education only has meaningful civic returns where it tends to reduce systematic bias. The fifth section uses a short science test from the GSS

¹ Delli Carpini and Keeter (1996), for example, conclude that the overall level of political knowledge in the United States had not changed substantially in fifty years.

² The "Flynn Effect" refers to James R. Flynn's (1984, 1987) finding that IQ scores have seen year-to-year increases in the first-world.

to examine how education and intelligence may mitigate cognitive bias. The sixth section concludes.

2. Civic Returns to Intelligence

The notion that education has positive externalities in democracies is not new, but it has received more attention from economists in recent years. A number of studies have attempted to estimate, in various ways, the effect education has on civic outcomes. Common to all of the studies thus far is that they suffer from omitted variable bias; the primary omitted variable is cognitive ability. Arguably, some measure of “culture” is also missing, as peer values also likely exert an independent influence on civic behaviors, knowledge, and beliefs.

The main reason for excluding a measure for cognitive ability, or intelligence, is presumably that most large survey data sets with variables related to civic returns do not contain a “g-factor” variable, although one of the largest U.S. survey data sets, the GSS, includes a measure of cognitive ability *and* many questions on political beliefs, attitudes, and behavior.

This section reviews the relationship between intelligence and a number of proxies for civic engagement, including likeliness to vote, newspaper readership, group membership, and tolerance of free speech by minority groups. A secondary observation is that while intelligence exerts an independent influence on these civic measures, that influence will be credited to education in studies that do not control for cognitive ability.

The results of this study lead to the conclusion that previous studies likely gave too much credit to education as an influence on civic knowledge, beliefs, and behavior.

2.1 The Data

The GSS data set includes a short intelligence test, that for each year of the survey is given randomly to half of the respondents. An empirical psychology literature already exists that examines the validity of this GSS measure of cognitive ability, the verbal test score variable WORDSUM (Alwin 1991, Wolfle 1980).³ The overall finding of these studies is that WORDSUM is overall a good proxy for IQ, as it correlates highly with longer IQ tests, and is itself derived from a popular IQ test, the Wechsler Adult Intelligence Scale (WAIS).⁴ Further, results of demographic studies using WORDSUM and the GSS have typically been very similar to those using other IQ measures (Huang and Houser 1996, Rosenbaum 2000). The WORDSUM is given on a scale of 1-10, with a mean of 5.979, and a standard deviation of 2.173.

The variable EDUC is just the respondent's total years of education, from zero to twenty, with a code of "20" actually indicating twenty-plus years of formal schooling. Some previous studies (typically because of data limitations) look at high-school completion versus non-completion, or college degree holders versus non-degree holders. I do not use any such measure because this study's goal is to examine the effect of additional schooling itself, and not the effect of a credential.

³ Wolfle (p. 110) reported that the correlation between the GSS vocabulary test and the Army General Classification Test (AGCT) was 0.71.

⁴ Wechsler (1958) calculates that the correlation between the vocabulary subtest used in the GSS (the shortened version of the WAIS) and the full-scale version is 0.75, higher than any of the other subtests created.

For the measures of civic engagement, the most recent voting variable available in the GSS asks respondents if they voted in the 1996 U.S. election. The newspaper readership question asked respondents how frequently they read a daily newspaper, scaled from one to five, with a response of “every day” being coded as 1 and “never” coded as 5.

Group membership variables in the GSS include everything from labor union membership to sports group membership to college fraternity/sorority membership. The only measure of group membership that appears directly relevant to civic engagement was political group membership, which is the statistic used in this study.

For free speech tolerance, this study uses the same measures used by Dee (2004). The use of these measures, described in Table 1, is an attempt to capture an aspect of civic enlightenment, of attitudes rather than behaviors. In Section 4, I argue that such proxies for attitudes and beliefs are the most telling measures of civic returns.

2.2 OLS Estimates

Using Dee’s proxies for civic engagement, Table 1 shows OLS regression coefficients for education with and without the WORDSUM IQ control. When using similar controls variables (gender, age, race, religion, and survey year effects) and controlling for intelligence, I still find statistically significant education effects (at the five percent level or less) for all of Dee’s suggested measures of civic engagement. What I do find, though, is that for all but one of Dee’s measures of civic engagement, 1)

intelligence is also significant at the five percent level or less, 2) the coefficient on education falls markedly when controlling for intelligence. The exception to these two observations is group membership, where the coefficient on education does not change and the coefficient on IQ is not significant at the five percent level.

For all of the proxies but group membership, it could be inferred that intelligence has its own civic returns. Those with higher scores on the GSS IQ measure are more likely to have voted in the last election, more likely to read a daily newspaper, and more likely to be tolerant of free speech by various minority groups. Further, the data supports the claim that the effectiveness of education as a policy instrument to increase civic returns may be limited by the intelligence of those to receive civic-oriented education.

3. Direction of Causation

The data in the last section suggests that intelligence has its own civic returns, and that without a control for intelligence, regressions of education on civic return measures will tend to overestimate of education's impact. A possible objection to my claim of overestimation may be to question which way the causation runs, or even to assert that education causatively increases IQ. In which case, the apparent impact of IQ on civic engagement is just a mechanism by which education realizes its civic returns.

This objection is frequently heard from skeptics of intelligence testing in general. In any data set that has measures of both educational attainment and IQ, the two are almost always very highly correlated. In the GSS, for instance, the correlation between education and IQ is 0.5. The nature of the correlation between education and IQ has been

explored in empirical psychology literature, and some possible causative explanations have been tested. There are two competing, but not mutually exclusive, causative hypotheses: 1) Education makes people more intelligent, or at least better able to score highly on IQ tests; 2) People with higher innate intelligence, as measured by IQ tests, will be more likely to obtain more schooling. The first hypothesis has proven to be vulnerable. For example, Dickens and Flynn (2001) predict that the effect of schooling on IQ scores is only temporary and diminishes into adulthood. The Dickens/Flynn model, beyond providing an explanation of the Flynn Effect of steadily increasing population IQ over time, helps explain empirical results like those of Lazar and Darlington (1982), who while finding that early education programs increase the IQ of pre-school aged children, also find that those results decay once the program ends. Since the GSS data is based on an adult IQ test given to adults, it would not seem that the causation runs from education to IQ. If anything, it likely runs the other way, because of the IQ-intensive selection mechanisms used by educational institutions at higher levels – most especially the use of SATs for college admissions and the GRE for graduate school admissions. Both tests are themselves so highly correlated with IQ (and in fact so similar to IQ tests) that Mensa accepts both SAT and GRE results from prospective members as substitutes for taking Mensa's own IQ test.

A previous study by Hauser (2000), also using data from the GSS, makes the following argument regarding both group membership and voting: because education remains statistically significant when controlling for cognitive ability, education still exerts a recognizable and policy-relevant influence on civic behavior. That leaves, however, the important point that where most measures of civic returns are concerned

(excluding group membership), intelligence *also* exerts a recognizable and policy-relevant influence on civic behavior *and* attitudes. Further, controlling for intelligence reduces the coefficient on education most measures of civic returns, including those used by Hauser and Dee from the GSS. It may be argued that the new coefficient for education is still large enough for policy-relevance, but a claim is hollow that says the retention of *statistical* significance (which is really a measure of statistical precision) means that education's effect is policy-relevant. The results in the previous section indicate that controlling for ability clearly impacts the magnitude of education's impact on civic behavior and attitudes. The exception would be group membership, which is a proxy for civic *interest*, and does not address the issue of systematic bias, explored in the next section.

4. Rational Bias

Political market failure, or democratic failure, is often blamed on rational ignorance. Rational ignorance occurs in a democracy because voters have little incentive to become informed about the vast majority of political issues. The claim can be made that subsidized, or publicly provided education would allow and even encourage people to be better-informed. If that claim holds, then a further claim follows: education in a democracy is a public good and therefore needs to be publicly provided to achieve efficient outcomes.

The solution to the problem of rational ignorance, then, is to educate voters – to provide them with the information that they find too costly to seek out individually. Within a public goods framework, the solution makes perfect sense. Education in this

case yields benefits that are fundamentally non-excludable, as more civic knowledge and “better” attitudes likely benefit many voters, whether they are informed or not, and the good is even non-rival in consumption, in the sense that one voter’s consumption of political information does not prevent another from consuming the same information. It might be noted, however, that in a sense *all* goods are rival in consumption so long as there is some cost to providing the good. Information may be non-rival, but all of the resources used in education, such as the labor of teachers, printed textbooks, etc. are scarce and thereby limit the availability of the information they pass along.

4.1 Rational Irrationality

As it turns out, public education as a constraint on democratic failure has another application relevant to Public Choice theorists. Caplan’s model of rational irrationality presents another problem facing democracy: that of systematically biased beliefs. Caplan (2001b) argues that voters in a democracy can be assumed to value their beliefs, in the sense that they identify themselves by their beliefs, and gain utility from holding some beliefs over others. Further, he suggests that voters are *rationaly irrational* where beliefs are concerned; they tend more to hold irrational beliefs when the costs of holding those beliefs are low, and less so when the cost is high. For individuals as voters, Caplan argues, the cost of holding irrational beliefs is very low, as the likelihood of one’s own vote will affect policy outcomes one way or the other is very small.

An example of systematic bias that Caplan (2002) has written on concerns economic beliefs. Using data from the Survey of Americans and Economists on the

Economy (SAEE), Caplan shows a systematic belief difference that exists between professional economists and the general public. The difference itself might be interpreted as bias on the part of economists; but Caplan tests the leading alleged sources of economists' bias, for example the claims that they have a "right-wing" bias on a political spectrum and that economists are biased as a group based on income. In testing these potential sources of bias, Caplan finds no significant correlative effect of those factors on economic beliefs, though he does find positive correlation between "thinking like an economist" and factors such as gender, education, and job security (see Caplan 2001a). Finding little support for specific claims of economist bias, Caplan makes a qualified rejection of those claims, and instead proceeds with the assumption that what separates economists from the general public is their education in their field of expertise.⁵

Note how Caplan's explanation of systematic bias only adds weight to the consideration of education as a solution to democratic failure. One way to articulate Caplan's point is that voters will tend not to hold rational, i.e. nonbiased, beliefs where the cost of changing those beliefs is high. The "progressive education" argument is, in economic terms, that education needs to be less costly to individuals so that they may form rational beliefs. It seems at least superficially that these two ideas are in basic agreement about the cause of democratic failure, i.e. that a public good problem exists for "correct" beliefs in democracies.

⁵ Evidence of systematic bias as evidenced by belief differences between experts and the public has also been researched in the field of toxicology. (Kraus, et al. 1992)

The progressive solution to the problem of rational voter ignorance is not without empirical support. If the solution were effective, one would expect to see a correlation between education levels and "thinking like experts." In both Caplan (2001a) and Kraus, et al. (1992) this correlation is observable and highly significant. The more educated someone is, the more likely that person is to agree with experts in the field. Clearly this gives weight to the call for public education in democracies. It is reasonable to conclude that increasing levels of education for all citizens would reduce both the problems of rational ignorance and rational irrationality.

4.2 Raising the Cost of Ignorance and Irrationality

It will be useful to start off this section with some simplifying assumptions. To evaluate the proposition that more education will solve the problems of rational ignorance and rational irrationality, the assumption will be made that all voters are well-educated. Furthermore, it will be assumed that voters are well-intentioned, and not narrowly self-interested, but only self-interested in a broad sense, where individual voters' utility functions may include arguments beyond material well-being.

With these assumptions in mind, the role of education in democracy can be abstractly evaluated. Even if all voters were well-meaning and well-educated, rational ignorance would persist. Rational ignorance does not rely on an assumption of narrow self-interest. Voters may well wish to be informed and wish to make correct decisions, but the costs of information can be very high, and have eventually diminishing returns, even for the pure altruist. An altruist who seeks so much information that he leaves no time to contribute to positive social outcomes will not meet his ends as an altruist. So at

some point, even the altruist must efficiently abandon the search for information. The constraint of information scarcity is also a problem in that voters who are well-educated will likely concentrate on a particular field of expertise, at the expense of expertise in other areas. One could imagine that all voters have two Ph.D.s, even though only a tiny fraction of the population has done graduate-level work in multiple fields. Even with such a high level of education, ignorance of particulars is quite likely when one considers the multitude of federal, state, and local issues to vote on, as well as the slight differences of platform between candidates. Clearly all individuals, no matter how well-educated, must be rationally ignorant about most specific facts.

Wittman (1995) has argued that rational ignorance is not a likely source of democratic failure, since there is no reason to believe that the error caused by voter ignorance is nonrandom. But is that necessarily true? At some point, voters must still rely on heuristics to make decisions on specific policy referenda and between candidates. Since heuristics are essentially mental shortcuts to aid understanding and decision-making, they are subject to manipulation by subtle changes to the phrasing of a referendum question or how a candidate's policy stance is articulated. For an example of how heuristics can fail in this regard, consider the example where physicians, a highly-educated group, respond that they are more likely to choose an operation that has a 90% rate of survivability than a 10% rate of mortality, even though the two alternatives are statistically identical.⁶ If a well-educated and well-meaning voter's decisions are similarly dependent on how issues and policy questions are phrased, then presumably the political agents who write the referenda and enjoy a bully pulpit can steer rationally

⁶ See McNeill, et al. (1982) for a complete description of the survey mentioned.

ignorant voters toward certain decisions over others. Even assuming that a well-educated and well-intentioned electorate is immune to any problems rooted in rational ignorance, there still exists the problem posed by rational irrationality.

5. Education, Intelligence, and Scientific Belief

It is possible that education raises the cost of holding irrational beliefs. Education may present information that contradicts one's beliefs, and the result is a cognitive cost, where an unresolved contradiction eats away at one's mind until a choice is made -- a choice between the old belief that is unsupported by one's education, and an alternative belief that is supported by the information obtained during education. Logically it would be true that education, to the extent that it creates cognitive costs for those holding irrational beliefs, would tend to reduce the level at rational irrationality is observed. But any claim of the significance of cognitive costs is an empirical one, and it's not clear how Caplan's analysis of the SAE data or surveys such as the one used by Kraus, et al. support a specific story of cognitive costs.

But to reject the significance of cognitive costs, it's necessary to offer an explanation of why they are probably insignificant. Simply acquiring information through education does not prevent an individual from rationalizing the new information with existing beliefs, particularly where the exposure to the information is minimal, such as when the information is outside one's area of expertise. It may be a general observation that more educated people hold beliefs closer to those of experts, but it may not be the case that more education in one field brings one's beliefs closer to those of experts in all or most fields of specialization. An ideal test would examine belief differences in the

same individuals before and after education on a particular subject. The SAEE data compares non-economists to those who've received graduate training in economics, but there may well be some selection bias among economists and other "experts." Caplan found no ideological or income connection between economists and their beliefs about economics, but that does not eliminate the possibility that economists are in some way self-selected. It is likely that current economists, while taking their undergraduate courses in economics, were different from their classmates who chose to go into other fields as a profession. There are two strong candidates for ways in which they were different: 1) they found the emphasis on incentives and market activity more persuasive than other students and 2) they simply had a better capacity to understand the material. These differences would likely apply to experts in other sciences, both physical and social.

There is data in the GSS that can address the issue of systematic bias, in the form of scientific beliefs. In 1993 and 1994 a short five-question science test was included in the GSS questionnaire, and the responses to three of the questions exhibit a bias away from the expected beliefs of experts. Each question had four possible responses, ranging from 1 = "definitely true" to 4 = "definitely false." The first two questions, concerning radioactivity and antibiotics, show an overall bias toward the respective expert views that 1) not all radioactivity is made by humans and 2) that antibiotics are not effective against viruses. The last three questions all exhibit at least some bias away from expert belief.

For the statement "Astrology has some scientific truth," the most popular answer is "probably true." For the statement "humans evolved from animals," the most popular

answer is “definitely false.” For the final statement “All man-made chemicals cause cancer,” the most popular answer was “probably true.”

Table 2 shows the coefficients for education and IQ when regressed on scientific beliefs. For all five questions, the coefficients on both education and IQ are significant at the five percent level or lower. For all questions, the coefficient on education drops substantially when controlling for IQ.

These results support the claim that both education and intelligence will tend to mitigate systematic bias. The data is also supportive of a claim that education’s effectiveness may be limited by intelligence, as the impact of education falls after adding the IQ control.

6. Conclusion

In this study, I presented evidence that intelligence exerts an independent influence on a number of proxies for civic externalities. In fact, the GSS intelligence coefficient was relatively small and not statistically significant for only one aspect of civic engagement: political group membership. For all other dependent variables, the effect of intelligence was statistically significant at the five percent level or less. The economic significance and policy relevance of education and intelligence are harder to describe. Increased raw scores on the GSS intelligence measure predict increases in likeliness to vote, newspaper readership, and tolerance of free speech. But how much? For most of the proxies for civic returns in this study, an increase in one point in the GSS raw score has a larger estimated impact than an additional year of schooling. But without

a common standard of comparison, it cannot be said that intelligence has higher or lower civic returns than education. What can be said is that studies of civic returns that do not control for intelligence will tend to overstate education's impact. It should also be noted that intelligence likely serves as a limit on the effectiveness of education in improving civic outcomes, as education is likely to be most effective for individuals with higher innate cognitive abilities. The evidence on scientific beliefs suggests that both education and intelligence may play a role in mitigating certain kinds of systematic bias. This is important if systematic bias is likely to be a larger problem in democracies than a lack of group membership, voter turnout, or newspaper readership.

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Table 1

Civic Returns with and without IQ control,* 1972-1998 GSS

Civic return measure	EDUC Coefficient w/out intelligence control	t-stat	n	EDUC Coefficient w/intelligence control	t-stat	IQ Coefficient	t-stat	n
Voted in last election	-.044	-20.33	5135	-.029	-8.20	-.034	-6.89	2381
Reads daily newspaper	-.113	-48.51	27,009	-.081	-21.57	-.051	-10.03	15,006
Group membership	-.010	-20.40	19,102	-.010	-11.42	-.002	-1.63	8526
Allow Anti-religionist to speak**	.102	10.41	1174	.075	5.05	.085	4.08	767
Allow Racist to speak	-.029	-27.67	23,185	-.019	-10.84	-.034	-14.35	11,923
Allow Homosexual to speak	-.039	-44.83	25,829	-.022	-15.27	-.043	-22.33	13,197
Allow Militarist to speak	-.038	-37.81	23,164	-.025	-14.64	-.040	-17.49	11,918
Allow Communist to speak	-.046	-49.95	27,545	-.025	-16.35	-.054	-25.51	13,289

*All regressions include controls for gender, age, race, religion, and survey year effects.

**The scale for tolerance of all group speech run counter to the education and IQ scales, with the exception of tolerance for anti-religionist speech.

Table 2

Scientific belief*

	Scientific Beliefs (scaled 1-4; 1=definitely true)	EDUC Coefficient w/out intelligence control	t-stat	n	EDUC Coefficient w/intelligence control	t-stat	IQ Coefficient	t-stat	n
All radioactivity made by humans		.112	18.14	2552	.068	7.85	.124	10.14	1602
Antibiotics kill bacteria, not virus		-.034	-6.63	3592	-.022	-3.39	-.027	-2.91	2630
Astrology has scientific truth		.076	12.12	2589	.044	5.01	.112	8.98	1616
Humans evolved from animals		-.077	-12.51	3667	-.059	-7.21	-.061	-5.30	2657
All man-made chemicals cause cancer		.040	8.30	3674	.028	4.26	.035	3.84	2660

*All regressions include controls for gender, age, race, religion, and survey year effects.

Figure 1 (Source: General Social Survey)

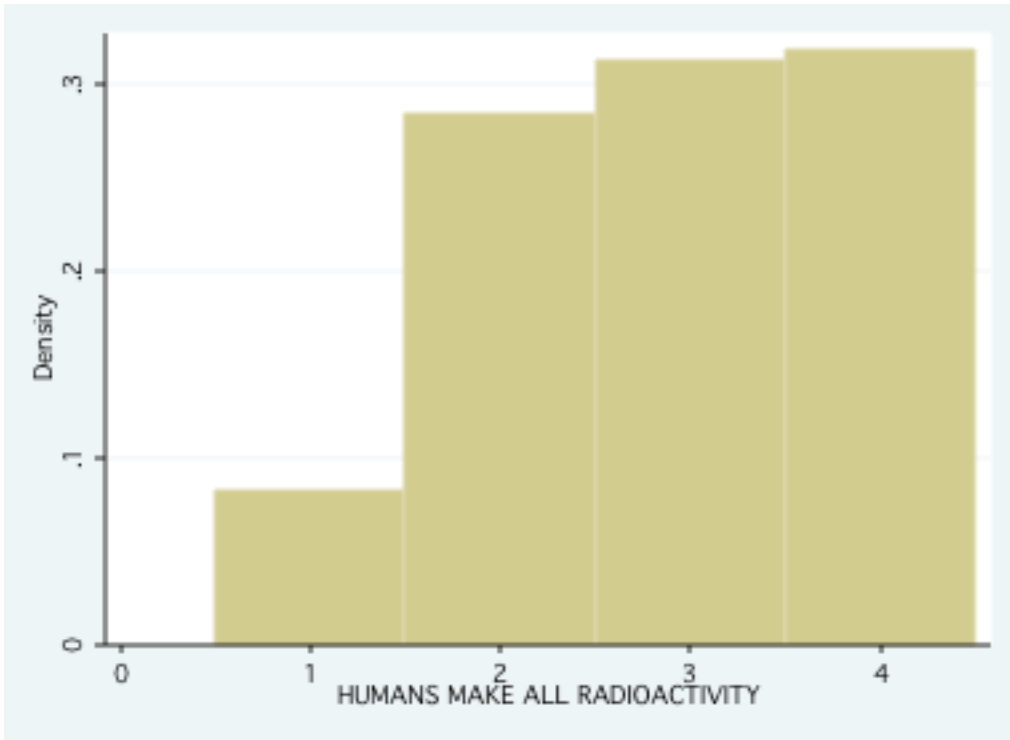


Figure 2 (Source: General Social Survey)

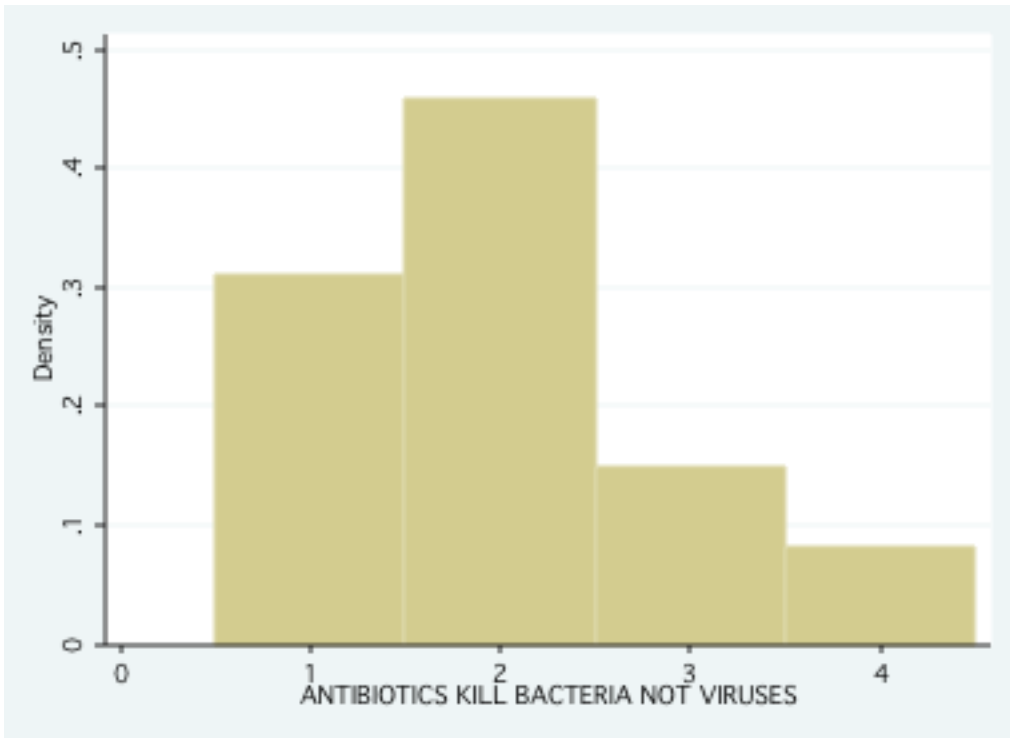


Figure 3 (Source: General Social Survey)

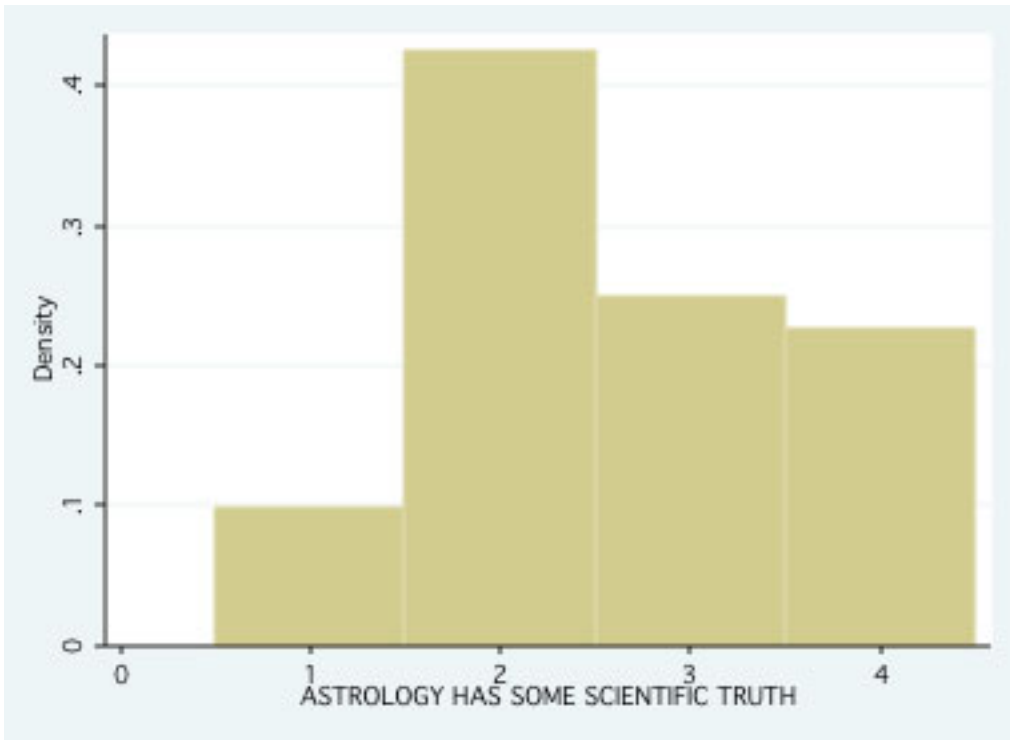


Figure 4 (Source: General Social Survey)

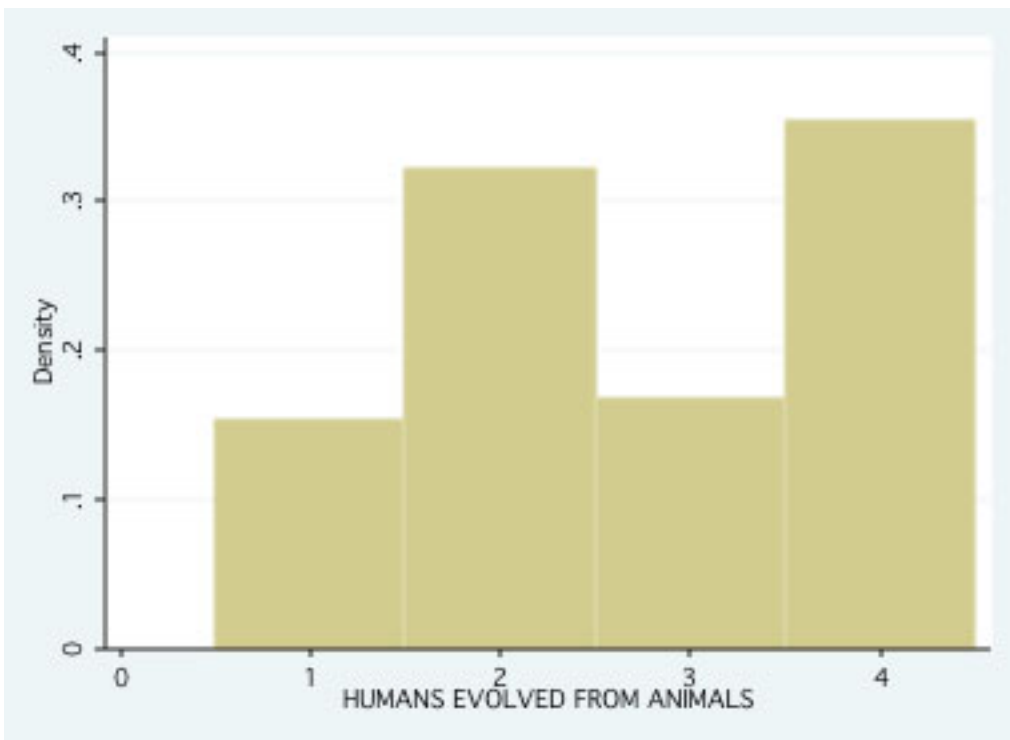


Figure 5 (Source: General Social Survey)

