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The Bell Curve Review: IQ Best Indicates Poverty

Ben Palmer

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Abstract

The Bell Curve (Herrnstein and Murray (1994)) is a very controversial piece of economics literature. *The Bell Curve*, which examines the effect of IQ on various social problems, is broken down into four sections: "The Emergence of the Cognitive Elite", "Cognitive Classes", "Social Behaviors", and "National Context." For survey statistics, Herrnstein and Murray (1994) use the National Longitudinal Survey of Youth (NLSY) data from 1979, which includes 12,686 people from ages 14 to 22, and contains Socioeconomic status (SES), IQ, and other related data. Herrnstein and Murray (1994) generate IQ from the Armed Forces Qualification Test (AFQT), a test all entrants to the Army take as an intelligence or IQ test. *The Bell Curve* concludes that self-isolation of the "cognitive elite," defined in terms of IQ, has led to class stratification. Herrnstein and Murray (1994) believe that IQ is the best and most robust measure that is correlated to many resulting social problems, including poverty. I replicate *The Bell Curve* results that relate SES and IQ to poverty. I then examine the robustness of their results by examining a variety of regression specifications. I find that IQ is more correlated with poverty than SES in every regression, regardless of what is included in the regression, by a factor of 3.

1. Introduction

A. Overview of *The Bell Curve*

The Bell Curve (Herrnstein and Murray (1994)) incite controversy due to its discussion of race and social issues being correlated. Herrnstein and Murray (1994) (henceforth HM) examine the effect of IQ on various social problems and break this down into four distinct sections: "The Emergence of the Cognitive Elite," "Cognitive Classes and Social Behaviors," "National Context," and "Living Together." In "The Emergence of the Cognitive Elite," HM

discuss the effect of the rise of technology and spread of information on people with high IQs. HM believe that people with higher IQs are increasingly being sorted into different cognitive classes, only partially due to nature; HM believe genetics account for $40-80\%$ of IQ results. In "Cognitive Classes and Social Behaviors," HM conclude that low IQ is highly correlated with poverty and crime, among other systemic social problems. While HM find that poverty is, in part, endemic, they also find clear correlation between lower IQ and poverty. In, "National Context," the most controversial section of *The Bell Curve*, HM point out that cognitive stratification has revealed a correlation between certain demographics, such as race, and lower IQ. Finally, in "Living Together," HM discuss how to fix higher education, and how to cope with a society with high variance in innate intelligence. Ultimately these four sections are used to support HM's six main tenets: cognitive ability differs among various types of humans, standardized tests do not test cognitive ability as well as IQ, IQ most accurately measures the meaning of the word "intelligent", IQ scores do not change much over a person's lifetime, IQ tests are blind to various racial, social, economic, or ethnic differences among people, and IQ has 40 to 80 percent heritability.

B. Data Sources

For my data analysis, I include the same data sources that HM use. HM use the National Longitudinal Survey of Youth (NLSY)[1] data from 1979, which includes a comprehensive list of data from high school transcripts of 12,686 people between the ages 14 and 22. The data is considered representative of national averages for students around this age. This data ultimately includes all relevent information, including IQ, socioeconomic status (SES), poverty, age, marriage age, education and more. This data is longitudinal; information is gathered starting in 1979 and is accrued over time. HM also break down IQ into five categories ranging from 5th percentile or below IQ students and below who are "very dull," to 95th percentile and above students who are "very bright." HM also have split up their data into high school level and college level samples so they can test the effect of variables for topics such as affirmative action.

The NLSY includes data on the Armed Forces Qualification Test (AFQT), an

[1]For more information on Will Beasley and Meredith (2018), see the References section.

intelligence or IQ test all entrants to the Army take. The AFQT tests are held in 828 military schools for a total of 472,539 people. The AFQT test ultimately accounts for more variance than most other common IQ tests. This is due to the fact that AFQT is "g-loaded;" it covers what is often called "cognitive ability" very well. Not only is AFQT highly correlated with military school success, but it is also associated with training success for mechanical, clerical, electronic, and general technical skill-type jobs. Ultimately both AFQT and other NLSY survey statistics are used in the analysis of HM for IQ and SES on poverty.

C. Relevant Conclusions of *The Bell Curve*

As mentioned in section A, *The Bell Curve* concludes that self-isolation of the "cognitive elite," defined in terms of IQ, has led to class stratification. HM's entire premise of this class stratification depends on the validity of IQ being a strong indicator of intelligence, or elite cognition. HM believe that this cognitive partitioning begins with education; as colleges increasingly select more students with higher scores, people with higher IQs tend to increasingly be self-isolate in elite schools. This continues into the work force as well. Since college or graduate degrees become increasingly relied upon as a signal of higher intelligence, these cognitively elite become further isolated into higher paying jobs. Ultimately, given that people of high IQs have increasingly been selected for elite colleges and jobs, the gap between high IQ and low IQ pay has significantly increased, and thus the correlation between having a low IQ and being below the poverty line has increased.

HM believe IQ (standardized from AFQT) is the most robust measure of poverty, because it has the lowest variation or μ as compared to other reknowned intelligence tests. This average validity statistic essentially describes the probability that the score account for randomness, meaning the higher the probability, the more accurate the test. Furthermore, when testing for the effect of IQ on poverty, HM find that IQ has a steeper slope (see Figure 1) than SES on poverty, and both are statistically significant at the 1% level. Therefore, they conclude that IQ must be the better indicator of poverty than SES, even though SES contains statistics such as parental education, income, and occupational prestige, which are statistics sometimes used to measure poverty.

D. Overview of Methodology

My approach to analyzing the robustness of IQ versus SES on poverty adapts the basic model of HM's. First, I replicate *The Bell Curve* results that relate SES and IQ to poverty, while restricting the sample to whites only in order to make race no a central factor. I then provide the summary statistics of the cutoff values for "very dull" to "very bright" people (quintiles for IQ) and for "very low" to "very high" people (quintiles for SES), which match HM's findings. I then replicate HM's regression relating age, SES and IQ to poverty with a logistical regression. After calculating these simple regression coefficients, I examine the robustness of their results by examining the results of 12 regressions, with added controls of wages, income, education, and a person's age when married. I then create a graphic showing the coefficient of Age, SES and Race for regressions 4, 8, and 12, showing the estimated association of that variable with poverty as well as two confidence intervals of 1% and 10% significance surrounded those variables. This graphic matches my data from Tables 3 and 4 and provides a visualization showing the IQ's strength and magnitude as a predictor of poverty as compared to SES.

E. Overview of Results and Analysis

Ultimately, my findings affirm HM's assertion that IQ is more correlated with poverty than SES in every regression. In my regressions 3-6, 7, 8, and 10, (see Table 3 and Table 4) where IQ and SES are both z-scored and regressed against poverty, contain significant coefficients at the 1% level for IQ on poverty holding all other regressors constant, whereas only regressions 3-7 have 1% significance for SES holding all other regressors constant. With added controls, coefficients become less statistically significant for both IQ and SES, but IQ usually maintains triple the magnitude in effect on poverty. Thus, we can conclude that IQ is a better measure to estimate poverty than SES.

2. Overview of *The Bell Curve* and its Critiques

Before I explain my results and a more detailed methodology, it is first important to understand *The Bell Curve* in more depth. As previously mentioned, the book is split into

four sections entitled "The Emergence of the Cognitive Elite," "Cognitive Classes and Social Behaviors," "National Context," and "Living Together," which I use as headers below.

A. The Emergence of a Cognitive Elite

HM hypothesize that by the 21st century, intelligence will be a stronger dividing force than social class. During human history, having familial ties as well as a landed aristocracy for thousands of years meant that wealth and power was not allocated by merit until very recently. Furthermore, for many centuries the amount of highly skilled workers vastly exceeded the supply of skilled jobs. However, the rise of technology has meant that many more cognitively elite people occupy these skilled jobs, due to the rise of higher education. Between 1920 and 1960, America experienced a drastic increase in the proportion of high IQ high school students that went to college (HM 34). By 1962, studies showed that SAT formed a right skewed distribution wherein top schools such as Harvard had the highest average SAT scoring students and lower-tier state schools such as Georgia Southern had the lower average SAT scoring students (HM 40). In fact, HM found that the top ten schools in America, which includes only 1 out of 67 college students, accounted for 32% of the students with the Verbal SAT scores above 700 (HM 43).

This cognitive partitioning continued to the next stage of life: occupation. As a college degree became a requirement for many jobs, the percentage of people in high-IQ jobs represented by high IQ people increased from 14% in 1930 to 35% in 1990 (HM 56). HM reason that this change is due to the rise in technology in the 20th century; increasingly higher skilled jobs require people with higher IQs. Also, in general, since higher IQ people are also more productive in the workforce, this separation of higher IQ people and lower IQ people is further exacerbated. It should be understood, however, that there are many exceptions. While there are clear positive correlations between IQ, education, and income, there are many outliers and error. HM assert that it is not enough to render the .4 positive correlation between intelligence and job performance insignificant (HM 68, 82). Thus, jobs requiring the most training, such as lawyers and doctors have the highest wages. Education and work force are two of many places that the isolation of the cognitive elite is evident.

B. Cognitive Classes and Social Behaviors

The isolation of the cognitive elite is also evident in issues such as poverty (I will soon test this) and crime. HM find that poverty is, in part, endemic. They also find clear correlation between lower IQ and poverty. In order to understand this relationship, it is easiest to first focus on whites, as they are the largest race represented in America. HM find that whites who grew up in the bottom 5th percentile of income are 8 times more likely to find themselves below the poverty line (HM 127). This seems to suggest a clear correlation between parent SES and personal income, with no IQ effect. However, white people with average IQs and unemployed parents have almost a 90% chance of escaping poverty by age 30 (HM 127). In fact, personal income has a much steeper downward slope compared to parent income with respect to percentage in poverty as IQ increases (HM 134). This is explained by the fact that once students grow to be a certain young age, their IQs are essentially set, and the impact of parental SES is not as significant.

Also, HM discover an important correlation between low IQ and high crime rates. HM point out that while crime is arbitrarily decided by society, IQ still has a consistent relationship with it. In fact, HM believe that IQ is one of several important factors in determining crime rates, and also believe that it is likely that people with lower IQs did not do as well within the education system and thus wanted to rebel. HM's data backs this up; incarceration rates for "very bright" individuals is 0%, whereas it is 7% for "very dull" individuals (HM 247). HM point out that even though low IQ and increased crime are correlated, the majority of low IQ people are not criminals. However, crime is still a major concern resulting from IQ desparity and the rise of the cognitive elite.

C. National Context

Cognitive elite stratification is also evident in demographics. HM find that east Asians have higher intelligence scores than whites, while African Americans have lower intelligence scores. In recent years, African Americans have narrowed this gap by 3 IQ points, likely due to a shrinking number of very poor scores among African Americans (HM 269). HM believe that despite this difference, and even if IQ were entirely genetic, it should not change how people in society treat each other. Furthermore, just because IQ is lower for African

Americans than whites on an aggregate level does not mean that one should assume any given African American will have a lower IQ than any given white person. The easiest way to quantify the difference between African Americans and whites in IQ is to say that the IQ means are one standard deviations apart, or the equivalent to 16 IQ points (HM 276). With such astonishing results, it is easy to believe that part of the disparity in IQ results from predictive bias. However, HM find that the black and white difference in IQ is usualy found more heavily in culturally neutral questions, rather than culturally biased questions.

Despite the poor results for African Americans on IQ tests, HM find that African Americans have more success in elite education, after controlling for IQ. Controlling for an IQ of 103, 93 percent of blacks, 91 percent of Hispanics, and 89 percent of whites graduated from high school (HM 319). These trends continued into college. Before controlling for IQ, whites had a 27% chance of having a bachelors degree, compared to 11% for blacks. After controlling for an IQ for 113, 50% of whites and 68% of blacks held bachelors degrees (HM 320). The same exact trend applies for occupation. However, all of this is underscored by the fact that, overall, the average African American earns less than the average white person. Knowing that the stratification of the elites has led to social costs and revealed racial disparities, how should America cope?

D. Living Together

Many suggest that in order to fix intelligence stratification, America needs to continue the process of affirmative action. However, HM believe that in order to fix social stratification America needs to revert to more conservative values. Ultimately, though, learning to live with and interact with one another despite differences in opinion, race, social class, religion, etc. is the key to create a cohesive society: one where the cognitive elite do not leave others behind.

HM believe that in order to fix the American education system, the government should grant vouchers to students of all types in order for them to attend the schools that they best fit. This system would not only foster interaction between students of all types, but would allow gifted students to accelerate through schools and the pace they desire. Only then can America fully take advantage of its labor force and technological production potential.

Currently the US government budget toward education includes 92.2% of $8.6 billion dollars to programs for the disadvantaged and only 0.1% for gifted students (HM 434). HM argue that these gifted students may have the biggest impact on society, and thus should be given more funding. Thus, HM believe that IQ should often be favored in education systems.

Fixing higher education is just one piece of the puzzle. In order to counterract negative forces in society, people need to also combat the idea that some people are not as intelligent as others for reasons that are not their fault, and intelligence plays a role in how people do in life. HM point out that unskilled workers are part of a community, just as skilled workers are; the economy is built off of skilled and unskilled labor. Thus, in order to built upon this society, people need to agree on the basics; murder, theft and other crime are morally wrong. Simplifying legal code will help make prosecution quicker, and easier, and will help people know when they are abiding by the law. HM believe that the American government should allow (and not provide) people the opportunity to pursue their goals. Finally, HM argue that public policy should always account for variation among people; America needs to return to individualism. The cognitive elite will continue to separate themselves, but the effect can be mitigated if communities take care of each other.

E. Responses to *The Bell Curve*

The Bell Curve has come under much scrutiny, given the tenuous issues that HM discuss. Two such critics, Goldberger and Manski (1995), assert that IQ cannot explain a causal effect on poverty. In fact, they believe that while it could be a correlate, if one controls for education, an SES index would become more significant, since SES accounts for parental income, as well as various factors such as the size of a family. Ultimately, when education is added as a control, IQ will no longer be statistically significant. In addition, adding an SES index characteristic of socioeconomic environment will make SES a more robust indicator of poverty than IQ.

Other authors have similar viewpoints. Kaye (1996) says that IQ is not a strong indicator of poverty and other social problems; rather social problems are all very correlated among one another (Kaye 83), which can be represented in the form of statistics such as IQ. In fact, he also notes that HM say that cognitive ability "almost always explains less than 20

percent of the variance... usually less than 10 percent and often less than 5 percent" (HM 117). Thus, IQ may have some effect on poverty, but is really one of several variables that explain potential changes in whether or not someone is below the poverty line. Meanwhile, Sternberg (1995) notes that African-Americans are much more likely to experience negative several socioeconomic effects, meaning poverty and race are strong correlates, and not IQ and poverty. Sternberg also mentions that HM must not control for more variables in order to consider their findings robust (Sternberg 260).[2]

Sternberg, Kaye, and Goldberger and Manski all point out interesting flaws in HM's regressions, however do not provide enough empirical results of their own. Ultimately I examine each of their claims against HM's argument and produce regression tables of my own that summarize the effect of more controls and varying SES type effects on IQ and poverty.

3. Empirical Replications and Results

A. Hernstein and Murray's Model

Hernstein and Murray collect IQ from an Armed Forces Qualification Test (AFQT), which tests approximately 18 or 19 year old students looking to enter the Army. This test can be broken down into 10 subtests, including Paragraph Comprehension (PC) and Arithmetic Reasoning (AR), which each have varying correlations with g, which can best be described as "ability," or the IQ index, once standardized. Overall, this test is one of the best aptitude tests widely used, with over 70 percent of variance in scores accounted for by g. Also, the average validity of the AFQT score is .62, whereas some other tests such as the GATB and the Hunter estimate are .25 and .45. To further validate their use of AFQT, HM also use other survey statistics from the National Longitudinal Survey of Youth (NLSY) statistics from high school transcripts from 1979. To measure the correlation between IQ and SES on poverty, along with age added as a control, HM use the following regression model:

$$logit(\phi) = log(\frac{\phi}{1-\phi}) = a + \beta' x$$

[2]For similar reviews, please see Quaye (1995), Reese and Zax (2002), Carles Muntaner and O'Campo (1997), Kohn (1996), and Cabaniss and Fuller (2005) (links are located in the References section).

In this model, a is the intercept, β is the slope of the vector of x independent variables, and ϕ is the predicted probability. IQ as a statistic is also broken into 5 categories ranging from "very bright" to "very dull." Regressions are further broken down into "The High School Sample" and "The College Sample" representing people who reported 12 and 16 years of education on the NLSY survey. HM base their graphics on these models, which represent overall association of IQ and various social factors, including poverty. Ultimately, while these models are not completely devoid of omitted variable bias, HM claim that enough variation is taken into account to make HM's models significant. I take their general logit model and apply it to the case of poverty.

B. Methodology

In my graphic replication based on HM's longitudinal data, I first cleaned up the data. This involved changing column names, setting binary values to certain variables, and shifting over incomes by 1 and logging them in order to avoid log(0) cases. I then filtered the data out for white, non-NA, and zIQYr89 (z-scored IQ from 1989). Then I made the cutoff values for the five categories that HM decided are representative of various SES descriptions (ranging from Very Low to Very High) and IQ descriptions (ranging from Very Low to Very Bright). Tables 1 and 2 confirm our belief that as people's socioeconomic class or cognitive class decrease as people are disproportionally below the poverty line. I then regressed the z scored IQ, age, and an SES index (referred to as Parental SES in the Tables and Figures) on several dummy variables as well as wage, income, education, and (z-scored) age when married for the people involved in the study. I chose these controls, because all will likely reduce omitted variable bias from HM's original regression, since they have an adverse effect on IQ or SES, or age, and poverty. Our regression equation, following the same HM logit general model, is as follows:

$$P = \beta_0 + \beta_1 IQ + \beta_2 SES + \beta_3 Age + \hat{\beta_c} \hat{Controls} + \mu$$

In this regression, $\hat{Controls}$ represents a control vector of we update each regression in order to test robustness. HM conclude that for all cases of IQ and SES, $\beta_1 < \beta_2$, meaning that IQ has a stronger negative effect on being under the poverty line than SES. In my

regression, I look to compare the relative values of β_1 to β_2, given the controls β_c for each individual regression (4 through 12). For regressions 1 - 3, I isolated the effects of IQ and SES, to make sure there is no need for an interaction term. Then, I generate the table with the stargazer package.[3] The breakdown of the percentage of white people in each category is shown in Tables 1 and 2. Figure 1, meanwhile shows the relationship between this SES breakdown and poverty compared to IQ and poverty. Figure 2 shows a good graphical representation of a select few coefficients in Tables 3 and 4.

I then create fourteen regressions, which added controls to the original model as discussed by some critics. For Table 3 and Table 4, I simply display, with stargazer, regressions 1-6 and 7-12, respectively. In these tables, each regression either adds a control variable or replaces one with another from the previous regression. Therefore, regression 1 is the simplest model, and regression 12 is the most complex regression, with 1 and 7 regressors respectively. Finally, from the twelve regressions, I select regression numbers 4 (the original model), 8 (intermediary model), and 12 (final model), and I create a graphic for the coefficient of Age, SES and Race. The black dots and confidence intervals represent regression 4, red represents regression 8, and blue represents regression number 12.

C. Results

Table 1: 1979 White Poverty by Parents' SES

	Parents' Socioeconomic Class	Percentage in Poverty	N	Published
1	Very High	2.9	294	3
2	High	2.8	1,176	3
3	Mid	7.4	3,479	7
4	Low	12.3	1,215	12
5	Very Low	19.7	266	24
6	Sample	10.9	12,686	7

This table indicates the percentage of white people in poverty for each socioeconomic status level. These levels are broken down into 5 categories, ranging from 'very low' to 'very high.' These quintiles of IQ represent the 5th, 25th, 50th, 75th, and 95th percentile individuals, respectively. The figures I found match the data that Herrnstein and Murray found in their analysis of the effect of SES on Poverty. In this case, Poverty is a binary variable that indicates if someone is below or above the 1989 poverty line. Poverty lines can change year to year, so the above statistics above would vary when compared to poverty lines in 1988 and 1990 for example. The 'Published' column marks the actual values that HM report. This table was generated with R.

[3]For more information on Hlavac (2018) and R Core Team (2013) in general see the Reference section.

Table 2: 1979 White Poverty by Cognitive Class

	Cognitive Class	Percentage in Poverty	N	Published
1	Very Bright	2.1	329	2
2	Bright	3.4	1,419	3
3	Normal	6.3	3,477	6
4	Dull	16.1	1,004	16
5	Very Dull	29.3	201	30
6	Sample	7.0	12,686	7

This table indicates the percentage of white people in poverty for each cognitive class level. These levels are broken down into 5 categories, ranging from 'very dull' to 'very bright.' These quintiles of IQ represent the 5th, 25th, 50th, 75th, and 95th percentile individuals, respectively. The figures I found match the data that Herrnstein and Murray found in their analysis of the effect of IQ on Poverty. In this case, poverty is a binary variable that indicates if someone is below or above the 1989 poverty line. Poverty lines can change year to year, so the above statistics above would vary when compared to poverty lines in 1988 and 1990 for example. The 'Published' column marks the actual values that HM report. This table was generated with R.

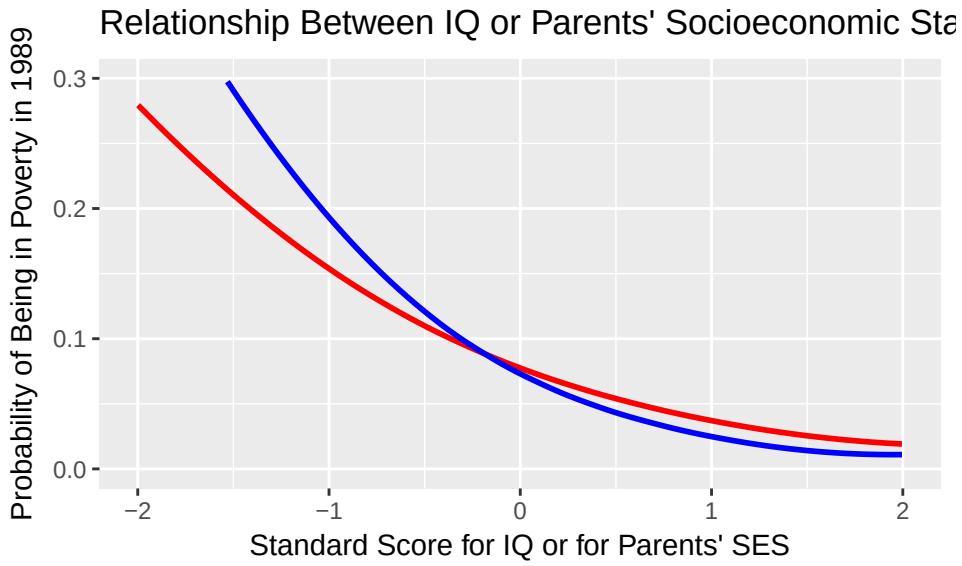

Figure 1: This graphic uses data from the National Longitudinal Survey of Youth (1979), which includes 3,550 individuals in its main cross section, who are white and are not currently in school. Following the proceedures in The Bell Curve, I use a logistic regression previously mentioned in this paper, with poverty status in 1989 regressed against age, IQ and SES. IQ is based on AFQT scores, adjusted for age and skew and z-scored. SES is based on parental income, education and occupation, and z-scored. I plot the predicted probability of being in poverty for IQ (SES) ranges while holding SES (IQ) and age constant at their means. The curve in red represents SES on poverty, whereas the blue curve represents IQ on poverty. This graphic was generated with R.

Table 3: Effects of IQ and other controls on Poverty

	Dependent variable:					
	Poverty					
	HM Regression					
	(1)	(2)	(3)	(4)	(5)	(6)
IQ	-1.105^{***}		-0.916^{***}	-0.916^{***}	-0.753^{***}	-0.743^{***}
	(0.065)		(0.073)	(0.073)	(0.085)	(0.085)
Age				-0.155^{***}	-0.234^{***}	
				(0.056)	(0.064)	
Parent SES		-0.769^{***}	-0.344^{***}	-0.330^{***}	-0.253^{***}	-0.288^{***}
		(0.057)	(0.067)	(0.067)	(0.079)	(0.078)
Wage (in $1000s)					-0.0002^{***}	-0.0002^{***}
					(0.00001)	(0.00001)
Observations	4,552	4,552	4,552	4,552	4,551	4,551
Log Likelihood	−1,212.330	−1,286.138	−1,199.149	−1,195.303	−842.448	−849.309
Akaike Inf. Crit.	2,428.660	2,576.276	2,404.298	2,398.606	1,694.897	1,706.617

Note: *p<0.1; **p<0.05; ***p<0.01

This table reports regression coefficients with standard errors in parentheses. The table uses data from the National Longitudinal Survey of Youth (1979), which includes 3,550 individuals in its main cross section, who are white and are not currently in school. The dependent variable in each regression is a measure of poverty; coefficient correspond to a percentage increase or decrease in probability of being below or above the poverty line in 1989. Column 4 is HM's regression, whereas columns 1-3 show the more basic effects IQ and SES and in 5 and 6, I add a control of wages to the model in a few different forms to see the effect on IQ and SES. This table was generated with R.

Table 4: Effects of IQ and other controls on Poverty

	Dependent variable:					
	Poverty					
	(1)	(2)	(3)	(4)	(5)	(6)
IQ	-0.601^{***}	-0.399^{***}	-0.211	-0.634^{***}	-0.393^{**}	-0.285
	(0.097)	(0.139)	(0.169)	(0.118)	(0.199)	(0.216)
Age		0.112	0.141	-0.045	0.204	0.181
		(0.110)	(0.111)	(0.076)	(0.129)	(0.135)
Parent SES	-0.212^{***}	-0.147	-0.090	-0.194^{*}	-0.218	-0.179
	(0.081)	(0.138)	(0.140)	(0.100)	(0.166)	(0.176)
Wage (in $1000s)	-0.0002^{***}	-0.0002^{***}	-0.0002^{***}	-0.0002^{***}		-0.0002^{***}
	(0.00001)	(0.00003)	(0.00003)	(0.00001)		(0.00003)
Income (in $1000s)	-0.315^{***}		-0.359^{**}	-0.381^{***}	0.022	-0.063
	(0.095)		(0.167)	(0.120)	(0.202)	(0.215)
Education		-0.0005^{***}	-0.0005^{***}		-0.001^{***}	-0.0005^{***}
		(0.00003)	(0.00003)		(0.00004)	(0.00004)
Age when Married				-0.015	-0.116^{***}	-0.106^{**}
				(0.025)	(0.044)	(0.047)
Observations	4,527	4,551	4,527	3,391	3,391	3,391
Log Likelihood	-840.174	-280.369	-277.015	-606.509	-212.397	-188.220
Akaike Inf. Crit.	1,690.349	572.739	568.030	1,227.017	438.794	392.439

Note: *p<0.1; **p<0.05; ***p<0.01

This table reports regression coefficients with standard errors in parentheses. The table uses data from the National Longitudinal Survey of Youth (1979), which includes 3,550 individuals in its main cross section, who are white and are not currently in school. The dependent variable in each regression is a measure of poverty; coefficient correspond to a percentage increase or decrease in probability of being below or above the poverty line in 1989. The table reports regression coefficients with standard errors in parentheses. The dependent variable in each regression is a measure of poverty. In columns 1-6 (henceforth columns 7-12), I add controls such as income, education, and the age when someone gets married in order to see the effect on IQ and Age coefficients. This graphic was generated with R.

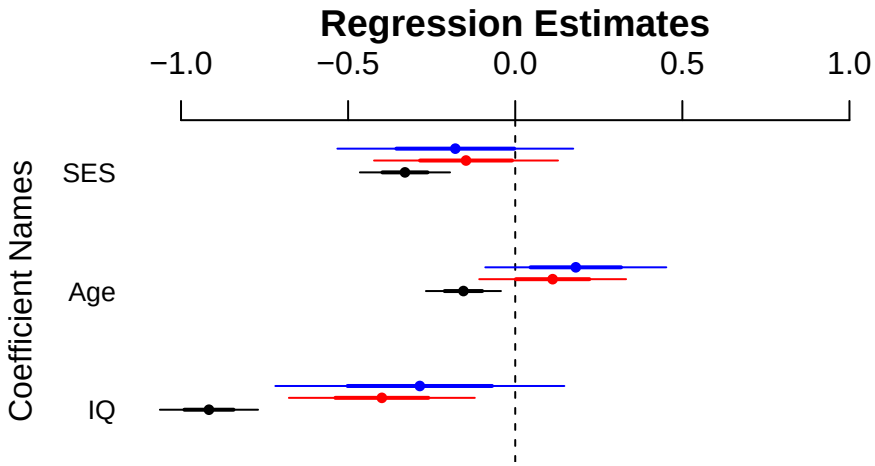

Figure 2: This model uses data from the National Longitudinal Survey of Youth (1979). This model represents the effect of adding more controls to the SES and IQ variables, reporting regression coefficients with standard errors in parentheses. The Age variable is also included in the graphic for reference. The black dots depict the coefficient and confidence interval results of regression 4. The red dots represent regression number 10, and the blue dots represent regression number 14. The thicker lines on the coefficients represents a 10% confidence interval, and the thinner lines represent a 1% confidence interval. This graphic was generated with R.

D. Analysis

Ultimately through my data analysis, I find that the coefficient of IQ on being below the poverty line is negative and robust. First, in Table 2 versus in Table 1, it is clear already that IQ is a stronger indicator of poverty; 29% in poverty are "very dull" but only 19.7% are very low and below the poverty line. However, this doesn't hold the same controls constant that we use for our regression, so this data is more used as an indicator for our later results rather than validation of HM's assertion about IQ. In Table 3, for regressions 1-3, I use simpler models to see the effect of SES and IQ alone and combined. I find that the direct effect of IQ in regression 1, β_1, is -1.105, but when I add SES (regression 3), the β_1 decreases to -0.916 and β_2 decreases from -0.769 to -0.344. These numbers are still very significant at the 1% level, and IQ is approximately 3 times the value of β_2 in regression 3. Regression 5, which includes the variables in HM's model with an added wage control, shows SES on poverty having a β_2 of -0.253, meaning that a standard deviation increase in SES is associated with a 25.3% decreased likelihood in being below the poverty line. This is a 3 times weaker effect than β_1 in regression 5: -.753. Furthermore, SES and IQ only have a standard error of 0.079 and 0.085 respectively for this regression, showing strong statistical

significance for both. However comparing the pair of coefficients and standard errors further illuminates the relative strength of IQ; its standard error is only 0.006 above SES' and yet its coefficient is nearly three times larger in magnitude.

Moving from regression 11 to regression 12 the coefficients suddenly shift from significance at the 5% to no significance even at the 10% level. Regression 12 includes same independent variables as regression 11: IQ, Age, SES, Income, Education, and AgeMarried. However, regression 12 also includes Wages. The β_1 becomes -0.285 with a standard error of 0.216. Therefore, an interaction control term of IQ*SES does not seem necessary; adding Wages to this regression, which has a very weak effect on the Poverty variable, has a stronger nullifying effect on β_1 and β_2 than the introduction of SES to a model with just IQ regressed on poverty. Regressions 10-12 also notably only include 3,391 observations, whereas regressions 1-9 included approximately 4,550 observations. This missing data likely is one reason for the insignificant coefficients for these regressions. Multicollinearity is also an issue here; wages, income, and education are all likely highly correlated, and the Age and AgeWhenMarried are likely highly correlated. Furthermore, there may be a reverse causality bias issue here; poverty may cause one to have poor education, but a poor education may also cause one to be in poverty. However, none of this issues confound the results; there is an overwhelmingly consistent ratio of 3 times more magnitude of IQ on poverty than SES on poverty.

Examining Figure 2 provides a few more insights on why IQ is the strongest indicator on poverty. For Age, IQ, and SES, all three have stronger negative coefficients when having fewer controls (black dots and confidence intervals). Furthermore, at the 10% level, SES seems to lose significance in regression 8, whereas IQ maintains 5% significance for regression 8. Also, as evident in Figure 2, as I add controls, β_1, β_2 and β_3 get wider and wider confidence intervals. Is this due to noise in the data, or are there simply many factors that affect poverty? There is no good way of knowing, but I can at least confirm that other important factors such as Age and SES lose significance when I add controls. Therefore, while IQ is not robust in every regression, I can still reasonably infer that IQ has a stronger negative effect than SES on poverty.

4. Conclusion

My analysis shows that IQ is a better indicator of poverty than SES, but this claim does not come without caveats. Furthermore, I find that with enough controls, both SES and IQ are not robust, but SES is robust for fewer regressions than IQ. In order to draw further conclusions from this information, it is important to review the relevant sections of *The Bell Curve*.

A. Recapitulation of *The Bell Curve*

HM believe that a primary effect of the rise of technology and the spread of information on people with high IQs is isolation. This isolation creates distinct cognitive classes, only partially due to nature, but with $40-80\%$ of it due to genetics. The low IQ cognitive classes are often associated with poverty and crime, among other systemic social problems. HM also point out that cognitive stratification forms along certain demographics, such as race, and lower IQ. HM believe that despite the fact that some people are not as intelligent as others, we need to make sure every individual can learn to cope with an imbalanced society. These beliefs stem from HM's 6 tenets of cognitive ability: cognitive ability differs between various people, standardized tests are not the best measures of cognitive ability, IQ most accurately measures the meaning of the word "intelligence", IQ scores do not change much over a person's lifetime, IQ tests are race-blind as well as socioeconomically-blind, and has 40 to 80 percent heritability.

B. Recapitulation of Data Sources and Methodology

My data analysis uses the same data that HM use. HM use the 1979 NLSY data, which includes 12,686 students from ages 14-22 from across the country. The data is updated over time and forms the SES index and other relavent covariates such as education and age when married. HM also break down IQ into five categories, with the bottom 5% being classified as "very dull," and the top 5% and above students described as "very bright." IQ is calculated through AFQT test score for all entrants to the Army. The AFQT test is ultimately very "g-loaded," meaning that it covers the idea of intelligence more than most other tests. Not only is AFQT highly correlated with military school success, but it is also

correlated with success in mechanical, clerical, electronic, and general technical jobs.

My approach to analyzing the robustness of IQ versus SES on poverty adapts the basic model of HM's. First, I replicate *The Bell Curve* results that relate SES and IQ to poverty. I then provide the summary statistics of the cutoff values for "very dull" to "very bright" people (quintiles for IQ) and for "very low" to "very high" people (quintiles for SES), which match HM's findings. I then replicate HM's regression of age, SES and IQ to poverty with a logit regression. After calculating these simple regression coefficients, I then examine the robustness of their results by examining the results of 12 regressions, with added controls of wages, income, education, and a person's age when married. I then create a graphic showing the coefficient of Age, SES and Race for regressions 4, 8, and 12, which helped show the association of IQ and SES with poverty. This graphic also included a confidence interval of 1% and 10% significance for each point. This graphic matches my data from the table and shows IQ's stronger correlation poverty than SES.

C. Drawing Conclusions from Results and Analyses

Ultimately, my findings affirm HM's assertion that IQ has a stronger association with poverty than SES does in every regression. With added controls, coefficients become less statistically significant for both IQ and SES, but IQ usually maintains triple the magnitude in effect on poverty. Thus, I can conclude that IQ is a better measure to estimate poverty than SES.

I fail to reject the null hypothesis that the coefficient of IQ on Poverty is 0 when I add enough controls, however most other coefficients in this case also have zero correlation. Furthermore, I found that IQ has a significantly stronger relationship with poverty than SES does. However, both have negative correlations with poverty at the 1% level in regression 4, Table 3, which is HM's original model. The model in the book underestimates the effect of an income variable on poverty. When including income in regressions 9 and 11 from Table 4, the coefficient for IQ almost halves with respect to poverty. Ultimately though, GM, Sternberg, and Kaye are correct to assume the robustness of IQ would be affected by adding covariates. GM was incorrect to believe that the coefficient of IQ would become statistically insignificant if I added only an education variable, since it took at least 3 added controls to

render IQ insignificant. In regression 7, this is not the case; the coefficient of IQ is still a very significant -0.601, and 3 times the magnitude of SES, which has a coefficient of -0.212 relating it to poverty. Sternberg and Kaye both argued some variables were too similar and were correlated to race or some other factor, causing IQ to have a minimal effect on poverty. However, when I add the Age and AgeWhenMarried controls in regression 10, the coefficient on IQ is still robust with a coefficient of -.634. Furthermore, despite the correct claims of these critics, IQ is still a more robust indicator of poverty; GM's claim that SES would somehow present better findings is unfounded according to every regression I ran.

D. Suggestions for Policy and Future Debate

IQ has robust findings for not just poverty, but also for several other social categories. As HM suggest, poverty and crime are related. Therefore, it is likely that, using the same IQ, SES, and Age regressors, if I ran the same logit regression, I would find that IQ is a stronger indicator of crime as well. It is likely that this extends to race as well, given that HM were able to relate race and poverty, and I know that an increase in IQ has a negative effect on the probability someone is below the poverty line. Furthermore, this study could give reason to diminish affirmative action; since IQ is a stronger correlate of poverty and not socioeconomic status, this means that people will succeed in education and in the work force regardless of their family income and background. Therefore, finding IQ as a better indicator than SES, helps confirm HM's hypothesis that cognitive elite are self-isolating above the poverty line. With the exception of race, which has increased in IQ relative to white recently, income, education and other indicators have become increasingly stratified, with IQ also fitting into that picture. Having a robust indicator of intelligence like IQ enables one to draw many conclusions about our society today. Should the government no longer pursue education reform programs like Betsy DeVos' voucher program? IQ's robustness seems to suggest it may not be a good idea. While IQ and poverty have a significant negative correlation, if impoverished kids were given the chance to go to better schools, this will not help their future job prospects; if they are low IQ students, they would not be able to escape poverty regardless. IQ's strength as the best indicator poverty gives HM's controversial views on intelligence, social conditions, and cognitive stratification some weight.

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