

ONLINE SUPPLEMENT
to article in

AMERICAN SOCIOLOGICAL REVIEW, 2019, VOL. 84

Genes, Gender Inequality, and Educational Attainment

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This supplement provides tables and figures referenced, but not presented, in the main text. Figures A.1 through A.3 provide the main estimates for the relationship between the education polygenic score and educational attainment in the WLS, HRS, and Add Health, respectively. Tables A.1 to A.4 are full model estimates that form the basis of Figures 3 through 5 in the main text focused on the WLS. For Figure 4 (Table A.2), the difference in coefficients for women between 1964 and 1992 is statistically significant ($p < .00001$) and the differences between men and women are significant at every year (1964 to 2005) ($p < .01$).

Table A.5 presents the education distribution of the HRS sample by gender and five-year rolling cohorts. This distribution generally reflects the same pattern in the Census data (DiPrete and Buchmann 2013). Table A.6a provides the model estimates used to generate Figure 7 in the main paper, the relationship between the education polygenic score and years of education, five-year rolling cohorts, in the Health and Retirement Study. Table A.6b provides the unweighted results. We include these to show the sensitivity of the results for the youngest cohort, particularly the men, as a function of the inclusion and exclusion of weights. Note that the weighted results, given HRS's complex sampling strategy, as well as differential response rates, are more valid. Regardless, only the youngest cohort had significant differences as a function of the inclusion and exclusion of weights. Table A.7 provides the coefficients and 95 percent confident intervals for the estimated relationships between the education polygenic score and years of education in the HRS, based on five-year rolling cohort windows for Figure 7.

Table A.8 provides the estimates used to generate Figure 8 in the main paper, which show gender differences (or the lack thereof) in the relationship between the education polygenic risk score and years of schooling in Add Health.

Finally, an alternative way to test for within- and cross-cohort differences regarding genetic influence would be to use GCTA/GREML (Yang et al. 2011). Using genome-wide data, this statistical approach can generate “SNP heritability” estimates, for the part of a trait’s heritability that is attributable to additive influence of common variants.

There are several problems with using this approach for our purposes here, however. The most prominent is that we lack statistical power. WLS and Add Health had similar sized samples, and the individual HRS cohorts were substantially smaller. Even in WLS and Add Health, however, we had only ~20 percent power to detect differences in heritability of .2. Although we did still run sensitivity analyses on Add Health and WLS, the standard errors for the gender stratified analyses are large, with overlapping confidence intervals and no statistically significant differences between groups. Even so, we do note that the direction of the GCTA results in Add Health support Hypothesis 3b, and the direction of results in WLS is not consistent with Hypothesis 1a (full sample: $b = .175$, $SE = .066$; men: $b = .248$, $SE = .134$; women: $b = .386$, $SE = .123$). But, given the large uncertainty estimates, we have little reason to treat these results as having much evidentiary value.

Our disinclination to interpret this result substantively is also consistent with some general concerns regarding this approach to measuring heritability, including the risk for overfitting (Evans et al. 2018; Kumar et al. 2016). Similar to estimates produced in different data by Kumar and colleagues (2016), we found that the full sample heritability in WLS was substantially (if non-significantly) smaller than either the heritability estimate for men or for women, a mechanically implausible result that held even when we centered the education measure within sexes to remove any mean difference in the outcome between men and women.

In addition, a GCTA/GREML analysis may be conceptually inconsistent with the effort to understand whether genetic influences vary by social conditions. Our use of a polygenic score means that a consistent procedure of weighting specific genetic variants is across genders and across cohorts. GCTA/GREML, on the other hand, attempts to provide an aggregate estimate of genetic influence that is by design indifferent to whether specific influences are similar or different across groups. Polygenic scores are more sensitive than GCTA/GREML to differences in the influence of specific genetic variants in this respect.

References

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Figure A.1. The Relationship between the EPGS and Educational Attainment in the WLS

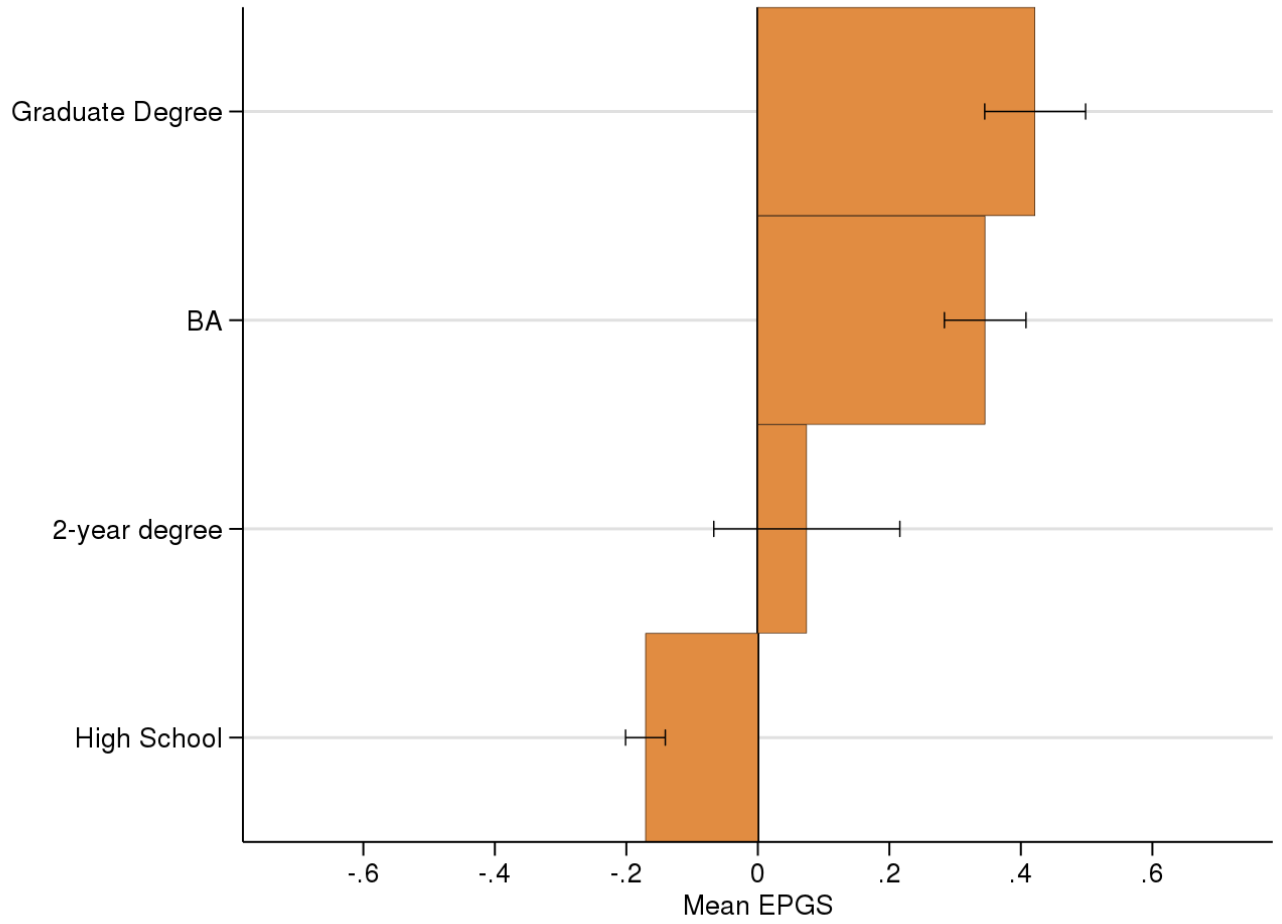


Figure A.2. The Relationship between the EPGS and Educational Attainment in the Health and Retirement Study

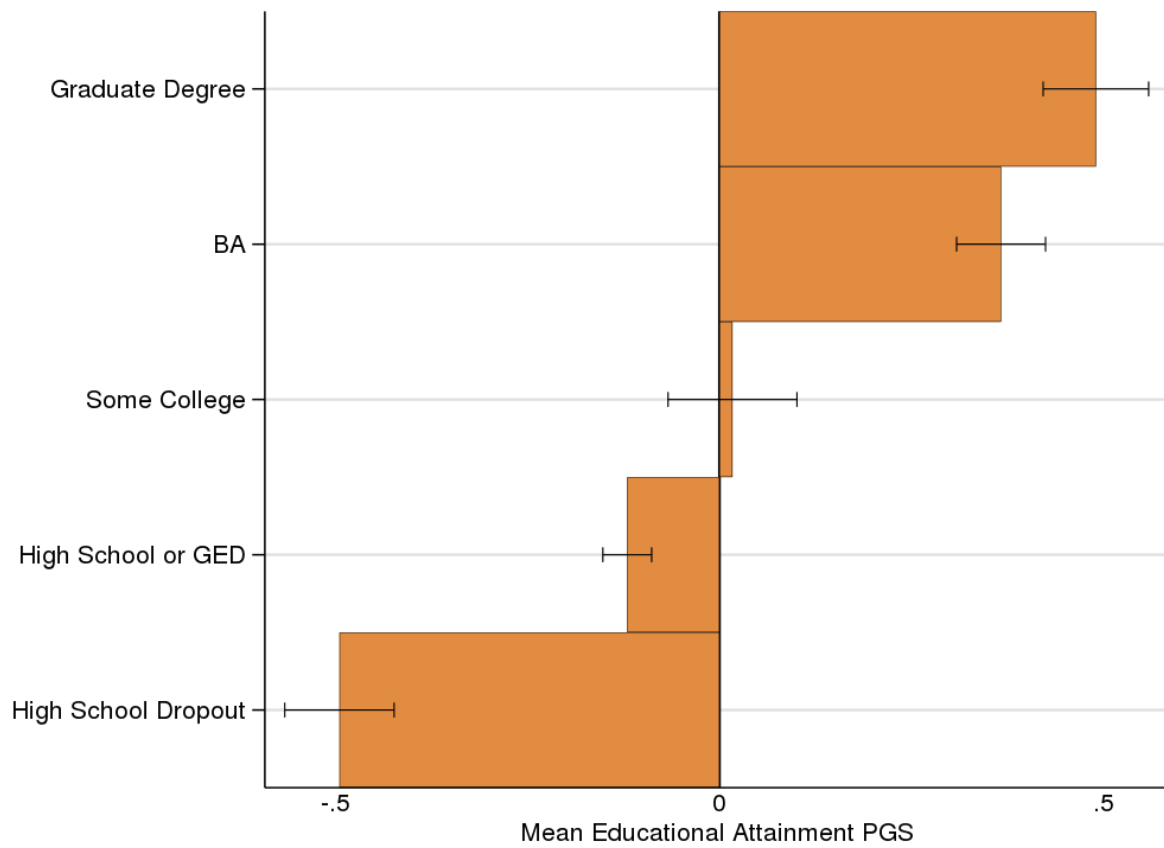


Figure A.3. The Relationship between the EPGS and Educational Attainment in Add Health

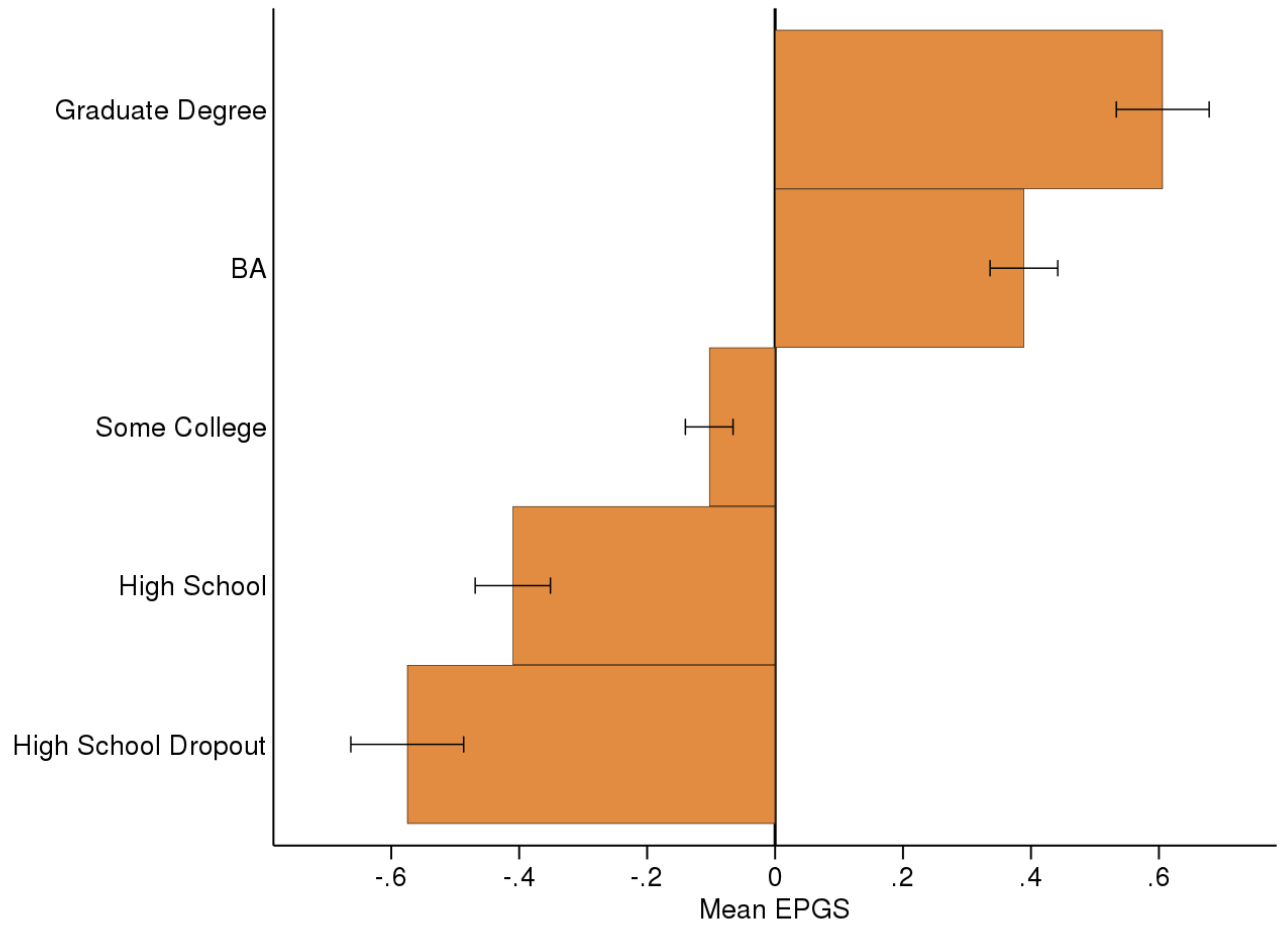


Figure A.4. Principal Component Analysis of Parental Ancestry in the WLS

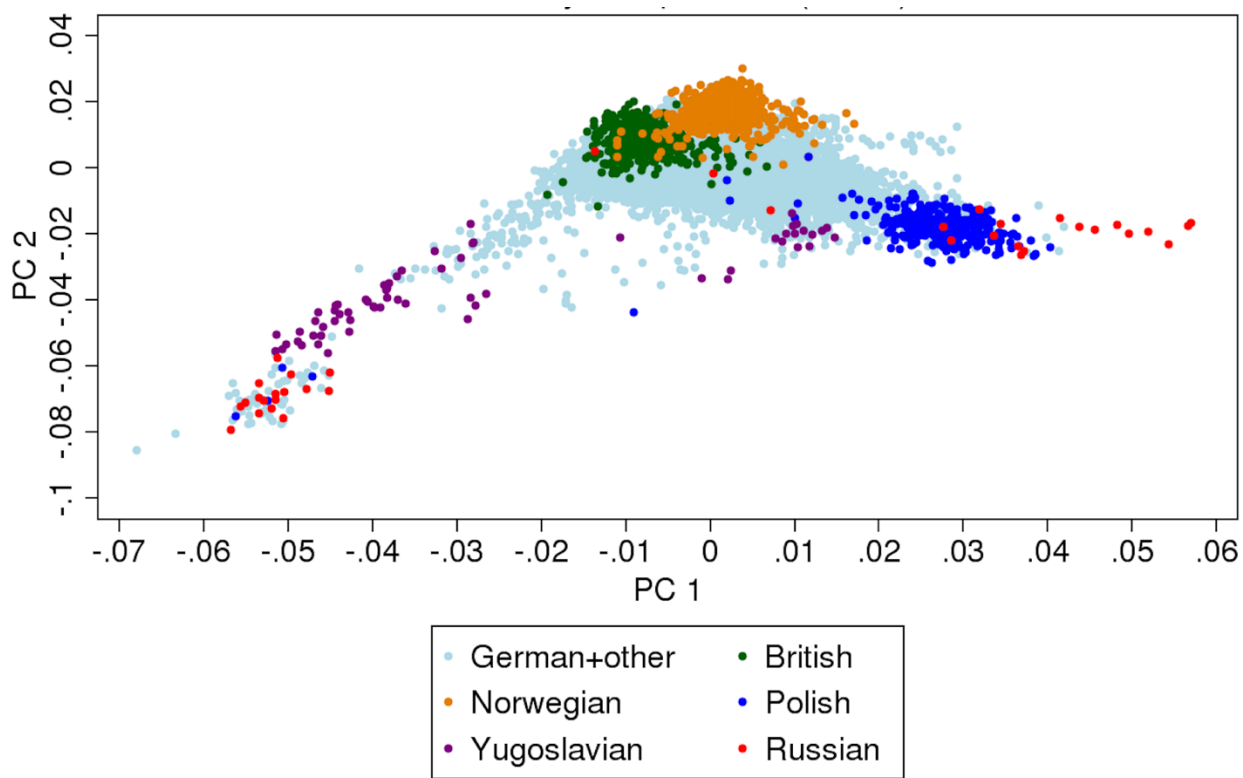


Table A. 1 The Education Polygenic Score Regressed on High School Rank and Adolescent IQ in the WLS. (Figure 3)

	<i>High School Rank</i>		<i>IQ</i>	
	<i>Men</i>	<i>Women</i>	<i>Men</i>	<i>Women</i>
Edu PGS	0.246*** (0.020)	0.278*** (0.017)	0.268*** (0.020)	0.254*** (0.017)
PC 1	5.024** (1.689)	3.793** (1.327)	1.799 (1.511)	-0.219 (1.312)
PC 2	-1.051 (1.738)	2.557* (1.292)	-3.224* (1.536)	5.383*** (1.350)
PC 3	0.717 (1.631)	2.103 (1.318)	-2.888 (1.516)	1.487 (1.401)
PC 4	-3.456* (1.536)	2.032 (1.393)	-7.728*** (1.550)	-3.118* (1.309)
PC 5	-2.030 (1.599)	-1.166 (1.396)	0.328 (1.543)	-1.564 (1.304)
PC 6	-2.086 (1.543)	-1.426 (1.351)	-1.510 (1.466)	-1.420 (1.318)
PC 7	0.961 (1.540)	0.680 (1.408)	-0.530 (1.502)	0.291 (1.340)
PC 8	0.138 (1.498)	-0.312 (1.376)	-0.623 (1.448)	-0.005 (1.377)
PC 9	-1.426 (1.532)	1.076 (1.398)	-1.494 (1.483)	0.523 (1.361)
PC 10	-2.571 (1.548)	-0.735 (1.346)	0.459 (1.545)	0.468 (1.374)
Age	-0.196*** (0.030)	-0.155*** (0.032)	-0.296*** (0.030)	-0.212*** (0.031)
_cons	3.283*** (0.526)	3.036*** (0.557)	5.260*** (0.525)	3.756*** (0.537)
R ²	0.091	0.112	0.125	0.114
N	2404	2684	2580	2850

Notes: Robust standard errors in parentheses. Sample is limited to individuals of European ancestry.

* p<0.05, ** p<0.01, *** p<0.001

Table A.2 Gender differences in the Relationship between the Education Polygenic Score and Years of Schooling over the Life Course in the WLS.
(Figure 4)

	Age 25		Age 35		Age 54		Age 65	
	Men	Women	Men	Women	Men	Women	Men	Women
Edu PGS	0.518*** (0.037)	0.386*** (0.029)	0.695*** (0.047)	0.437*** (0.034)	0.672*** (0.048)	0.490*** (0.036)	0.691*** (0.049)	0.497*** (0.038)
PC 1	-6.513* (3.044)	-11.268*** (2.284)	-11.487** (3.712)	-11.731*** (2.653)	-11.774** (3.734)	-15.241*** (2.928)	-12.625*** (3.804)	-14.364*** (3.072)
PC 2	-9.554** (3.236)	4.122 (2.318)	-10.687** (3.768)	1.331 (2.653)	-11.717** (3.786)	-0.969 (2.865)	-11.264** (3.816)	-0.111 (2.985)
PC 3	2.237 (3.090)	6.869** (2.527)	4.996 (3.690)	11.812*** (2.848)	5.630 (3.703)	11.512*** (3.068)	6.577 (3.769)	11.416*** (3.139)
PC 4	-14.101*** (3.066)	-10.701*** (2.462)	-20.868*** (3.877)	-12.407*** (2.710)	-21.740*** (3.876)	-15.367*** (2.915)	-20.472*** (3.992)	-14.627*** (3.037)
PC 5	1.628 (3.066)	-0.024 (2.447)	1.947 (3.840)	0.068 (2.738)	1.890 (3.877)	-0.649 (2.960)	2.078 (3.900)	0.680 (3.080)
PC 6	-4.464 (2.916)	1.327 (2.518)	-8.708* (3.714)	-0.242 (2.839)	-8.250* (3.737)	-1.260 (3.089)	-7.020 (3.786)	-0.745 (3.211)
PC 7	0.696 (2.944)	-2.072 (2.372)	0.551 (3.925)	-1.157 (2.739)	1.806 (3.960)	0.823 (2.997)	0.979 (4.047)	1.531 (3.169)
PC 8	0.508 (2.818)	3.230 (2.363)	2.201 (3.658)	4.202 (2.684)	3.620 (3.706)	3.196 (2.939)	2.055 (3.768)	3.050 (3.049)
PC 9	1.449 (3.058)	1.158 (2.395)	2.985 (3.829)	0.492 (2.790)	3.082 (3.928)	-1.625 (3.054)	1.392 (4.049)	-1.674 (3.162)
PC 10	-2.870 (3.055)	2.063 (2.337)	-5.837 (3.783)	2.067 (2.656)	-6.152 (3.806)	4.821 (2.955)	-5.463 (3.902)	5.222 (3.116)
Age	-0.450*** (0.055)	-0.125* (0.051)	-0.486*** (0.070)	-0.148** (0.054)	-0.467*** (0.067)	-0.199*** (0.053)	-0.475*** (0.063)	-0.184*** (0.051)
_cons	24.593*** (1.353)	16.058*** (1.250)	31.281*** (2.483)	18.359*** (1.913)	38.996*** (3.597)	24.014*** (2.843)	44.730*** (4.032)	25.287*** (3.309)
R ²	0.114	0.096	0.125	0.096	0.119	0.104	0.122	0.098
N	2572	2838	2567	2858	2597	2896	2511	2799

Notes: Robust standard errors in parentheses. Sample is limited to individuals of European ancestry.

* p<0.05, ** p<0.01, *** p<0.001

Table A.3. Predictive Value of the Education Polygenic Score over the Life Course - Returning for any post-secondary schooling in the WLS (Figure 5a)

	1957-1964		1964-1975		1975-1992		1992-2004	
	Men	Women	Men	Women	Men	Women	Men	Women
Edu PGS	0.542*** (0.046)	0.503*** (0.044)	0.457*** (0.055)	0.378*** (0.071)	0.196*** (0.052)	0.385*** (0.044)	0.105 (0.080)	0.200*** (0.057)
PC 1	-5.446 (3.512)	-16.823*** (3.672)	-7.302 (4.499)	-3.202 (6.160)	0.481 (4.120)	-8.643* (3.606)	-1.361 (6.112)	0.588 (4.740)
PC 2	-12.341*** (3.680)	3.898 (3.497)	-2.256 (4.314)	-2.052 (5.207)	3.253 (4.204)	-3.290 (3.362)	-3.435 (5.981)	2.231 (4.479)
PC 3	0.392 (3.526)	10.343** (3.405)	-1.977 (3.971)	17.008*** (4.856)	-5.963 (3.988)	5.994 (3.341)	3.546 (6.096)	8.677* (4.189)
PC 4	-18.420*** (3.586)	-14.910*** (3.368)	-11.767** (4.152)	-6.783 (5.177)	-8.305* (4.109)	-8.113* (3.450)	3.903 (6.261)	-1.953 (4.497)
PC 5	2.131 (3.605)	1.273 (3.517)	0.231 (4.321)	2.409 (5.387)	7.246 (4.318)	1.451 (3.411)	7.800 (6.782)	-0.297 (4.767)
PC 6	-6.743* (3.397)	3.341 (3.498)	-7.936 (4.091)	-3.540 (5.226)	2.572 (3.964)	0.417 (3.410)	5.075 (5.978)	-2.048 (4.532)
PC 7	0.574 (3.399)	-0.489 (3.463)	-1.375 (4.347)	-0.589 (6.170)	4.176 (4.132)	6.270 (3.490)	-2.439 (6.273)	7.229 (4.832)
PC 8	1.863 (3.298)	5.139 (3.460)	2.951 (4.247)	2.782 (6.125)	2.658 (4.313)	-4.145 (3.501)	-2.657 (5.849)	5.479 (4.462)
PC 9	1.148 (3.439)	0.848 (3.486)	-0.473 (4.300)	1.696 (6.126)	-7.664 (4.244)	-4.936 (3.642)	-7.014 (6.159)	-13.555** (4.620)
PC 10	-1.362 (3.472)	2.563 (3.381)	-4.875 (4.126)	2.874 (5.923)	-1.821 (3.957)	3.929 (3.440)	-8.259 (6.357)	10.650* (4.730)
Age	-0.491*** (0.069)	-0.161* (0.077)	-0.317*** (0.087)	-0.178 (0.151)	-0.050 (0.075)	-0.195** (0.070)	-0.199 (0.108)	-0.008 (0.093)
_cons	11.869*** (1.684)	3.134 (1.874)	9.695** (3.085)	3.663 (5.348)	1.217 (3.972)	9.369* (3.734)	10.313 (6.938)	-1.454 (5.946)
Pseudo R ²	0.074	0.069	0.049	0.040	0.013	0.040	0.012	0.019
N	2572	2838	2567	2858	2592	2891	2508	2784

Notes: Coefficients are expressed as log odds. Robust standard errors in parentheses. Sample is limited to individuals of European ancestry. Principal components have a range of -0.09 to 0.09, leading to extreme coefficient values.

* p<0.05, ** p<0.01, *** p<0.001

Table A.4. Predictive Value of the Education Polygenic Score over the Life Course - Obtaining an additional degree in the WLS (Figure 5b)

	1957-1964		1964-1975		1975-1992		1992-2004	
	Men	Women	Men	Women	Men	Women	Men	Women
Edu PGS	0.437*** (0.057)	0.545*** (0.053)	0.444*** (0.056)	0.426*** (0.080)	0.182* (0.082)	0.391*** (0.066)	0.216 (0.241)	0.405*** (0.116)
PC 1	6.940 (4.310)	-17.247*** (4.829)	-13.238** (4.667)	-8.411 (6.642)	1.062 (5.886)	-12.546* (5.234)	-7.634 (18.882)	6.863 (10.067)
PC 2	-5.830 (4.439)	13.433** (4.120)	2.896 (4.391)	1.218 (5.736)	-6.810 (6.594)	-5.901 (4.551)	-2.331 (16.763)	-0.956 (9.859)
PC 3	-5.103 (4.416)	9.004* (3.838)	1.061 (4.041)	13.757* (5.356)	1.840 (6.213)	0.650 (4.756)	16.659 (19.987)	-3.115 (9.928)
PC 4	-6.209 (4.222)	-11.082** (4.032)	-12.225** (4.278)	-4.291 (5.647)	-7.466 (6.917)	-9.505* (4.729)	15.767 (20.563)	0.198 (9.199)
PC 5	3.605 (4.348)	1.863 (4.447)	-0.355 (4.343)	5.129 (5.661)	3.606 (6.605)	-0.133 (4.668)	12.326 (20.413)	-14.415 (11.076)
PC 6	0.706 (4.402)	4.305 (4.411)	-10.643* (4.186)	-8.154 (5.733)	-10.705 (5.981)	-2.625 (5.103)	9.546 (16.180)	-10.021 (10.651)
PC 7	-0.242 (4.156)	-3.462 (4.407)	-0.197 (4.424)	6.374 (6.780)	-0.239 (7.226)	4.624 (5.213)	-8.145 (17.468)	9.480 (12.531)
PC 8	-4.582 (4.190)	0.861 (4.407)	3.887 (4.314)	5.046 (6.595)	12.827 (7.076)	-5.521 (5.063)	14.208 (17.620)	15.308 (9.188)
PC 9	3.519 (4.638)	1.754 (4.398)	0.452 (4.452)	-1.991 (6.806)	-3.761 (7.407)	-3.482 (5.377)	2.108 (17.430)	10.646 (10.419)
PC 10	-5.925 (4.563)	1.680 (4.256)	-2.847 (4.257)	3.924 (6.161)	-10.649 (6.191)	11.511* (5.370)	-14.766 (17.081)	18.764 (10.397)
Age	-0.278** (0.084)	-0.174 (0.098)	-0.389*** (0.091)	-0.160 (0.171)	0.131 (0.131)	-0.139 (0.100)	-0.665* (0.283)	-0.057 (0.206)
_cons	5.156* (2.071)	2.453 (2.392)	12.159*** (3.215)	2.782 (6.058)	-9.818 (6.984)	5.067 (5.336)	37.663* (18.106)	-0.400 (13.231)
Pseudo R ²	0.037	0.072	0.055	0.043	0.016	0.043	0.040	0.034
N	2575	2844	2567	2858	2579	2874	2507	2784

Notes: Coefficients are expressed as log odds. Robust standard errors in parentheses. Sample is limited to individuals of European ancestry. Principal components have a range of -0.09 to 0.09, leading to extreme coefficient values.

* p<0.05, ** p<0.01, *** p<0.001

Table A.5 Bachelor's Degree Completion Rate by Gender : Rolling 5-Year HRS Cohorts (weighted)

5-year cohort	Men			Women		
	Coef	95% CI lower	95% CI upper	Coef	95% CI lower	95% CI upper
1930-1935	0.14	0.11	0.16	0.11	0.09	0.14
1931-1936	0.14	0.12	0.17	0.12	0.09	0.14
1932-1937	0.15	0.13	0.18	0.11	0.09	0.13
1933-1938	0.16	0.13	0.18	0.11	0.09	0.13
1934-1939	0.15	0.13	0.18	0.11	0.09	0.13
1935-1940	0.16	0.13	0.18	0.11	0.09	0.13
1936-1941	0.16	0.13	0.18	0.11	0.09	0.13
1937-1942	0.17	0.14	0.20	0.11	0.09	0.13
1938-1943	0.16	0.13	0.19	0.12	0.09	0.14
1939-1944	0.16	0.13	0.19	0.12	0.10	0.15
1940-1945	0.17	0.14	0.21	0.12	0.09	0.14
1941-1946	0.17	0.14	0.20	0.13	0.10	0.15
1942-1947	0.19	0.16	0.22	0.13	0.10	0.15
1943-1948	0.19	0.16	0.22	0.15	0.12	0.17
1944-1949	0.20	0.17	0.23	0.16	0.13	0.18
1945-1950	0.21	0.18	0.24	0.16	0.14	0.19
1946-1951	0.21	0.18	0.25	0.17	0.15	0.20
1947-1952	0.23	0.20	0.26	0.19	0.16	0.21
1948-1953	0.22	0.19	0.25	0.19	0.16	0.22
1949-1954	0.22	0.19	0.26	0.19	0.17	0.22
1950-1955	0.23	0.20	0.26	0.20	0.17	0.23
1951-1956	0.23	0.19	0.26	0.22	0.19	0.25
1952-1957	0.23	0.19	0.26	0.24	0.21	0.28
1953-1958	0.23	0.19	0.26	0.23	0.20	0.27
1954-1959	0.23	0.20	0.27	0.24	0.21	0.28

Note: The coefficients reflect five-year rolling cohorts. For example, 1930 is an average of 1930 through 1935, and 1931 is an average of 1931 through 1936.

Table A. 6a Relationship between Education Polygenic Score and Years of Schooling by Gender : Standard HRS Cohorts (weighted)

	HRS (1931-1941)		HRS (1931-1935)		HRS (1936-1941)		War Babies (1942-1947)		Early Boomers (1948-1953)		Mid Boomers (1954-1959)	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Education PGS	0.883*** (0.080)	0.688*** (0.059)	0.840*** (0.128)	0.666*** (0.090)	0.900*** (0.102)	0.709*** (0.079)	0.896*** (0.126)	0.792*** (0.112)	0.915*** (0.098)	0.748*** (0.083)	0.577*** (0.107)	0.799*** (0.095)
Birth year	0.088*** (0.026)	0.049** (0.019)	0.208* (0.088)	-0.053 (0.062)	0.039 (0.060)	0.083 (0.043)	0.085 (0.072)	0.131** (0.050)	-0.016 (0.060)	-0.010 (0.048)	-0.054 (0.060)	-0.066 (0.061)
PC 1	25.790* (10.364)	24.825** (8.263)	28.344 (19.127)	26.460* (11.983)	24.571* (12.365)	23.796* (11.255)	23.662 (14.186)	5.184 (10.502)	10.062 (12.339)	28.913** (8.946)	17.545 (9.601)	16.061 (11.007)
PC 2	-19.718* (8.568)	-4.421 (5.447)	-5.952 (12.395)	5.907 (7.908)	-31.579** (11.277)	-11.893 (7.503)	6.752 (11.194)	-17.569 (9.965)	-11.819 (10.839)	-18.190* (8.199)	-13.639 (10.956)	-14.359 (11.823)
PC 3	-11.760 (9.084)	-15.264* (6.192)	-6.170 (14.739)	-15.653 (9.409)	-15.210 (11.472)	-14.989 (8.192)	-26.879 (14.551)	2.024 (9.677)	2.866 (11.725)	-13.836 (8.972)	-7.286 (11.175)	16.930 (10.870)
PC 4	-16.671* (8.419)	7.736 (5.290)	0.790 (13.366)	8.218 (7.450)	-30.155** (11.026)	9.219 (7.493)	-11.780 (13.508)	0.089 (9.857)	22.211 (12.898)	-10.661 (8.655)	-14.831 (10.842)	-11.279 (10.716)
PC 5	-14.883 (9.876)	-21.441* (8.480)	-13.356 (19.431)	-19.529 (12.398)	-14.881 (11.318)	-22.147 (11.428)	-29.590* (13.656)	-7.018 (10.977)	-18.894 (12.236)	-20.316* (8.468)	-20.306* (9.698)	5.843 (11.202)
PC 6	5.542 (8.493)	-0.160 (5.955)	-6.530 (14.683)	-6.611 (9.995)	12.412 (10.409)	2.757 (7.428)	8.123 (13.726)	17.887 (10.277)	0.801 (11.794)	-8.611 (9.487)	2.512 (12.217)	4.408 (11.660)
PC 7	0.015 (8.762)	10.010 (6.166)	11.644 (14.598)	14.811 (9.379)	-8.452 (10.948)	6.677 (8.181)	-13.295 (14.882)	4.973 (10.312)	13.783 (12.205)	-0.003 (8.906)	-3.325 (12.501)	0.168 (11.170)
PC 8	-4.078 (9.250)	2.139 (5.827)	-2.900 (15.341)	3.146 (8.821)	-4.644 (11.558)	2.099 (7.839)	-15.663 (14.822)	0.618 (9.560)	-0.783 (10.913)	0.422 (8.560)	-14.284 (11.135)	-9.543 (11.083)
PC 9	-3.854 (8.386)	-1.383 (6.046)	-2.952 (13.494)	1.443 (9.301)	-2.657 (10.666)	-3.580 (8.007)	18.875 (14.455)	8.481 (9.318)	0.143 (12.144)	-15.766 (8.615)	-4.674 (10.789)	-14.995 (11.885)
PC 10	-12.913 (8.562)	0.985 (5.743)	-10.424 (13.914)	-8.453 (8.831)	-14.130 (10.920)	6.096 (7.602)	26.311* (12.794)	-0.711 (10.139)	6.787 (10.115)	9.957 (9.288)	-2.366 (11.019)	20.628 (11.867)
_cons	-156.763** (49.985)	-81.588* (35.826)	-389.652* (169.966)	114.193 (120.700)	-62.502 (115.804)	-148.285 (82.760)	-151.137 (139.646)	-242.260* (96.643)	45.393 (116.833)	32.579 (94.438)	119.761 (117.827)	143.350 (119.999)
R ²	0.104	0.095	0.089	0.093	0.119	0.101	0.121	0.104	0.117	0.140	0.093	0.136
N	1764	2117	723	874	1041	1243	650	976	794	971	665	696

Notes: Robust standard errors in parentheses. Sample is limited to individuals of European ancestry.

* p<0.05, ** p<0.01, *** p<0.001

Table A.6b Relationship between Education Polygenic Score and Years of Schooling by Gender : Standard HRS Cohorts (unweighted)

	HRS (1931-1941)		HRS (1931-1935)		HRS (1936-1941)		War Babies (1942-1947)		Early Boomers (1948-1953)		Mid Boomers (1954-1959)	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Education PGS	0.884*** (0.073)	0.676*** (0.055)	0.886*** (0.115)	0.628*** (0.084)	0.881*** (0.094)	0.713*** (0.073)	0.886*** (0.118)	0.795*** (0.083)	0.900*** (0.095)	0.762*** (0.080)	0.691*** (0.091)	0.713*** (0.073)
Birth year	0.063** (0.023)	0.046** (0.017)	0.177* (0.078)	-0.062 (0.059)	0.014 (0.055)	0.083* (0.038)	0.089 (0.067)	0.153*** (0.042)	-0.027 (0.056)	-0.027 (0.045)	-0.016 (0.053)	-0.037 (0.044)
PC 1	30.356** (9.224)	21.347** (7.058)	41.958** (16.024)	20.994* (10.467)	24.045* (11.534)	22.169* (9.504)	17.565 (13.337)	6.062 (9.399)	6.294 (12.191)	25.994** (8.625)	0.038 (8.595)	7.601 (9.152)
PC 2	-14.795 (7.774)	-3.399 (5.120)	-3.136 (11.237)	6.467 (7.908)	-24.735* (10.654)	-10.792 (6.758)	5.029 (10.345)	-23.440** (8.257)	-15.075 (10.648)	-16.633* (7.962)	-20.168* (9.857)	-12.149 (9.125)
PC 3	-13.045 (8.183)	-12.980* (5.693)	-3.706 (12.760)	-11.071 (8.871)	-18.768 (10.695)	-14.993* (7.387)	-29.672* (13.204)	-9.438 (8.236)	6.738 (10.659)	-12.506 (8.432)	-8.601 (9.627)	0.590 (8.190)
PC 4	-18.274* (8.032)	6.269 (4.910)	-7.376 (12.663)	2.772 (7.038)	-27.342** (10.519)	10.620 (6.885)	-15.044 (12.706)	5.798 (9.041)	23.211 (11.906)	-13.720 (8.099)	-7.445 (9.539)	2.268 (8.706)
PC 5	-21.903* (8.804)	-19.585** (7.166)	-29.126 (16.199)	-20.721 (10.921)	-18.278 (10.587)	-18.237 (9.356)	-30.432* (13.092)	-16.773 (9.916)	-21.699 (12.098)	-15.075 (8.560)	-25.019** (8.821)	0.062 (9.367)
PC 6	7.092 (7.731)	-4.126 (5.553)	-4.785 (12.802)	-8.448 (9.526)	14.936 (9.719)	-1.606 (6.896)	7.326 (12.840)	12.925 (8.516)	1.011 (10.698)	-7.115 (8.825)	7.440 (10.329)	6.803 (8.407)
PC 7	-1.166 (7.894)	7.331 (5.636)	12.316 (12.645)	13.556 (9.243)	-10.329 (9.991)	3.038 (7.157)	-13.172 (13.939)	4.836 (8.763)	12.376 (11.034)	0.310 (8.522)	-4.123 (10.495)	3.205 (8.458)
PC 8	-4.037 (8.263)	-0.238 (5.455)	-2.219 (13.479)	-1.084 (8.234)	-5.216 (10.468)	0.413 (7.346)	-13.006 (13.266)	3.367 (8.301)	4.080 (10.062)	-1.162 (8.075)	-19.420* (9.686)	-15.345 (8.486)
PC 9	-6.263 (7.747)	-2.381 (5.534)	-3.275 (12.765)	3.113 (8.870)	-5.905 (9.731)	-6.366 (7.165)	16.216 (13.374)	9.614 (7.901)	2.438 (10.939)	-17.918* (8.043)	4.226 (9.356)	-4.111 (8.781)
PC 10	-7.882 (7.767)	1.031 (5.187)	1.217 (12.666)	-2.372 (7.961)	-13.587 (9.817)	1.873 (6.908)	20.772 (11.981)	6.541 (8.250)	4.555 (9.444)	5.762 (8.957)	-7.156 (8.957)	5.554 (8.857)
_cons	-108.595* (45.218)	-76.689* (32.787)	-328.752* (151.005)	132.931 (113.480)	-14.662 (106.320)	-147.363* (73.142)	-160.026 (130.884)	-284.329*** (82.356)	67.172 (109.965)	66.857 (87.707)	44.194 (103.440)	86.795 (85.691)
R ²	0.108	.086	0.108	0.081	0.115	0.103	0.115	0.113	0.119	0.128	0.104	0.094
N	1788	2146	728	883	1060	1263	663	999	808	981	727	961

Notes: Robust standard errors in parentheses. Sample is limited to individuals of European ancestry.

* p<0.05, ** p<0.01, *** p<0.001

Table A. 7 Relationship between Education Polygenic Score and Years of Schooling by Gender : Rolling 5-Year HRS Cohorts (weighted)

5-year cohort	Men			Women		
	Coef	95% CI lower	95% CI upper	Coef	95% CI lower	95% CI upper
1930-1935	0.84	0.59	1.09	0.67	0.49	0.84
1931-1936	0.87	0.65	1.09	0.60	0.44	0.77
1932-1937	0.79	0.57	1.00	0.61	0.45	0.77
1933-1938	0.81	0.61	1.01	0.58	0.43	0.73
1934-1939	0.82	0.62	1.02	0.60	0.46	0.74
1935-1940	0.87	0.67	1.06	0.69	0.54	0.85
1936-1941	0.90	0.70	1.10	0.71	0.55	0.86
1937-1942	0.91	0.71	1.11	0.73	0.58	0.89
1938-1943	1.00	0.78	1.21	0.68	0.53	0.83
1939-1944	0.97	0.74	1.19	0.78	0.61	0.94
1940-1945	0.93	0.69	1.16	0.87	0.69	1.05
1941-1946	0.89	0.65	1.12	0.83	0.60	1.06
1942-1947	0.90	0.65	1.14	0.79	0.57	1.01
1943-1948	0.96	0.70	1.21	0.83	0.62	1.05
1944-1949	0.92	0.68	1.16	0.86	0.65	1.06
1945-1950	1.02	0.79	1.25	0.78	0.59	0.97
1946-1951	0.92	0.71	1.14	0.74	0.55	0.93
1947-1952	0.95	0.75	1.15	0.74	0.58	0.90
1948-1953	0.91	0.72	1.11	0.75	0.59	0.91
1949-1954	0.81	0.62	1.01	0.77	0.61	0.94
1950-1955	0.73	0.52	0.93	0.79	0.61	0.97
1951-1956	0.58	0.38	0.78	0.89	0.70	1.09
1952-1957	0.61	0.41	0.81	0.84	0.64	1.04
1953-1958	0.61	0.41	0.81	0.81	0.62	1.01
1954-1959	0.58	0.37	0.79	0.80	0.61	0.99

Note: The coefficients reflect five-year rolling cohorts. For example, 1930 is an average of 1930 through 1935, and 1931 is an average of 1931 through 1936.

Table A.8 Gender Differences in the Relationship between the Education Polygenic Score and Years of Schooling in Add Health

	Full Sample		High School Graduates	
	Men	Women	Men	Women
Polygenic Score	0.771*** (0.039)	0.812*** (0.037)	0.613*** (0.035)	0.684*** (0.034)
Birthyear	-0.015 (0.023)	-0.009 (0.021)	0.020 (0.020)	0.008 (0.019)
PC1	10.241*** (3.042)	14.711*** (3.035)	10.025*** (2.650)	13.654*** (2.712)
PC2	6.124 (3.694)	8.083* (3.476)	6.430* (3.159)	9.260** (3.106)
PC3	0.550 (2.313)	-12.369 (8.873)	1.372 (1.974)	-15.280 (8.033)
PC4	7.079* (2.962)	11.968*** (3.576)	5.847* (2.538)	10.979*** (3.171)
PC5	-4.517 (3.793)	0.600 (2.716)	-3.947 (3.246)	0.138 (2.397)
PC6	-5.871* (2.826)	-4.447 (3.870)	-4.288 (2.410)	-3.154 (3.431)
PC7	0.287 (3.674)	2.870 (2.950)	0.064 (3.139)	1.238 (2.615)
PC8	0.543 (2.393)	3.643 (4.069)	0.601 (2.039)	5.263 (3.609)
PC9	5.920 (3.044)	7.677* (3.223)	2.374 (2.690)	5.560 (2.872)
PC10	-3.215 (4.972)	6.186** (2.294)	1.790 (4.496)	4.261* (2.032)
_cons	43.138 (45.128)	31.554 (41.667)	-25.120 (39.958)	-0.299 (37.583)

Notes: Robust standard errors in parentheses. Sample is limited to individuals of individuals of European Ancestry

* p<0.05, ** p<0.01, *** p<0.001