

## Parental Education Differently Boosts Health and Happiness of American Men and Women

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### Abstract

**Background:** Parental educational attainment is a strong social determinant of health. Parental educational attainment may, however, be differently important for the health and happiness of various demographic groups.

**Aim:** To understand if parental educational attainment is similarly salient for men and women, we tested gender differences in the association between parental educational attainment and health and happiness of American adults.

**Methods:** This cross-sectional study used data of the General Social Survey (1972-2018), a series of nationally representative surveys in the United States. Our analytical sample included 65,814 adults. The main independent variable was parental education attainment. Outcomes were self-rated health and happiness measured using single items. Age, gender, marital status, employment, and year of the study were the covariates. Gender was the moderator.

**Results:** Overall, individuals with more educated parents reported better self-rated health and happiness. We, however, found significant interactions between gender and parental educational attainment on the outcomes, which suggested that the effect of high parental educational attainment on self-rated health and happiness is larger for women than men.

**Conclusion:** In the United States, while parental educational attainment is an important social determinant of health and happiness, this effect may be more pronounced among women than men.

**Keywords:** Socioeconomic position; Socioeconomic status; Education; Self-rated health; Happiness

### Introduction

Educational attainment of self [1] and parents [2] are among the strongest social determinants of health. Parental educational attainment shows some effect beyond the effect of their own education [3]. High education improves health through various mechanisms [4]. Individuals with higher education have better access to resources [4], experience lower stress [4], work in better jobs [4], make better decisions [5], better adjust with stress [6], and lower health risk behaviors [7,8].

The effects of education on health, however, are not invariant across demographic groups [9-11]. One of the well-explored examples is race and ethnic variation in the effects of own [10,12] and parental [13,14] educational attainment. This might be because education does not similarly generate income for various social groups [15]. While race is a major determinant of the economic return of education [16], gender is also another factor that shapes how education generates income. Gender gap in pay is a known phenomenon in the US and beyond [17-19]. Several studies have shown that own and parental educational attainment have larger effects on health, behaviors, and well-being for non-Whites than Whites [20-22]. Although this pattern is well

documented for comparison of racial groups, less is known about the role of gender on the marginal return of education [11].

Very few studies have compared men and women for the health effects of education. For example, Zajacova analyzed data of 12,036 25-74-years-old adults who were interviewed three-four times first in 1971-1975 and then through 1992. Although overall, education had comparable effects on mortality for men and women, for divorced people, education had a stronger gradient for women than men [11]. Among Blacks, multiple studies have shown that education has larger protective health consequences for women than men [23,24]. In fact, for Black men, education may have some unintended effects [25]. Given these complexities, more research is needed on gender differences in parental education – health gradient.

### Aims

To better understand the role of gender, as a social rather than a biological factor, in alerting the relevance of parental educational attainment to the health and happiness of American adults, we compared American men and women for the association between parental educational attainment and SRH and happiness in the United States adults. To generate generalizable results, we used a sample that was nationally representative. We hypothesized that the effect of each additional year of schooling of the parent (parental educational attainment) on SRH and happiness would be larger for women

compared to men. We also hypothesized that this gender difference might be due to marital status. This hypothesis was based on the double disadvantage/jeopardy [26,27] hypothesis that suggests adversity may have a more profound effect on women who are at a relative disadvantage in society compared to men [17-19].

## Methods

### Design and setting

The General Social Survey (GSS; 1972-2018) is a state-of-the-art social survey of American adults. The GSS is conducted annually from 1972 to 2018 by the University of Chicago to monitor the societal change and social trends of American society over time. The GSS is mainly funded by the National Science Foundation (NSF).

### Ethics

The GSS study protocol is approved by the University of Chicago Institutional Review Board (IRB). All GSS participants have provided informed consent. The current study, however, was not human subject research as all the data were public and fully de-identified.

### General Social Survey (GSS)

The GSS gathers extensive data on the social aspects of contemporary American society. This study has continued to monitor the trends of attitudes, behaviors, and beliefs of American adults for over four decades since 1972. The GSS helps us understand how the US society as well as Americans have changed overall, as well as based on demographic groups.

This study provides a unique opportunity to study population variation based on gender, race/ethnicity, and class. The data has also provided a unique opportunity to compare US subgroups over time [28]. Some of the variables cover various aspects of sociology, economics, policy, and demography, among others.

### Analytical sample

The current study included all adults who had participated in the GSS from 1974 to 2018, which included 64814 individuals.

### Study measures

Study variables included parental education attainment, own education, gender, race/ethnicity, age, employment status, marital status, year of the survey, SRH, and happiness.

Study Year. Year of the study was operationalized as an interval variable ranging from 1972 to 2018 (Table 1).

Demographic and SES covariates. Age (years), race/ethnicity, employment status, marital status, year of survey, and own education were the study covariates. Age was an interval variable, measured in years.

Self-identified race and ethnicity were measured as a three-level categorical variable: Whites 0 [the reference group], Blacks 1, and other race/ethnic groups 2. Two SES covariates were included in this study: Employment and marital status.

Employment was measured as an ordinal variable, with categories: "1) Working Full-time, 2) Working Part-time, 3) Temporarily Not

Working, 4) Unemployed, Laid Off, 5) Retired, 6) School, 7) Keeping House, and 8) Other". We recoded this variable as a binary variable with working full-time as 1 and any other statuses as 0.

Own education attainment was measured as years of schooling, varying from 0 to 20. It was treated as an interval measure (a higher score reflecting higher education attainment/ years of schooling).

### Independent variable

Parental education Attainment. Parental education attainment was measured as years of schooling, varying from 0 to 20. It was treated as an interval measure (a higher score reflecting higher education attainment/ years of schooling).

Moderator: Gender. Gender (men 1, women 0) was the moderating factor (effect modifier).

Mediator: Marital Status was also assessed as a binary variable: "1) Married, others including widowed, divorced, separated, and never married. Married was coded as 1 and any other response was the referent category (coded as 0).

### Outcomes

SRH: SRH was measured using a 4-level categorical variable. The exact item was, "Would you say your own health, in general, is excellent, good, fair, or poor?" Items were excellent, good, fair, or poor. We merged excellent and good as healthy and fair or poor as unhealthy people. This variable was operationalized as a categorical (binary) variable with SRH (1 healthy, 0 poor/fair health). As shown by Idler and many others, SRH is a strong predictor of mortality [28].

Happiness: Happiness was measured using a single item. The item measures general happiness and reads as: "Taken all together, how would you say things are these days – would you say that you are very happy, pretty happy, or not too happy?" Responses were 1) very happy, 2) pretty happy, and 3) not too happy. The item was asked from 1972 to 2010. This variable was operationalized as a categorical (binary) variable (1 being very happy / pretty happy, 0 not too happy).

### Statistical analysis

Data were analyzed using SPSS 22.0 We reported frequency (%) and mean (standard deviation; SD) to describe our participants overall as well as by gender. We used Chi-square or independent samples t test to compare men and women for our study variables. Overall, we ran four models for each outcome.

For consistency and ease of interpretation, the positive meaning was the outcome. That is happiness (1 being very happy / pretty happy, 0 not too happy) and SRH (1 healthy, 0 poor/fair health) were the primary outcomes (dependent variable).

All of these models were performed in the pooled sample. Model 1 and Model 2 were performed in the absence of marital status (mediator) in the model. Then we ran Model 3 and Model 4 with marital status as the mediator. Parental educational attainment (years of education) was the primary predictor (independent variable), and age, gender, employment status, marital status, and year of the survey were the covariates. Model 1 only had the main effects.

Model 2, however, also included the gender by parental education attainment interaction term. Odds Ratio (OR), standard error, 95% confidence interval (CI), and p values were reported.

## Results

### Descriptive statistics

This study included 65,814 adults who were sampled from 1972 to 2018 (Table 1). Each year about 2.1 (1990) -7.0% (2006) of the sample was drawn.

Year	All		Men		Women	
	n	%	n	%	N	%
1972	1613	2.5	807	2.8	806	2.2
1973	1504	2.3	701	2.4	803	2.2
1974	1484	2.3	691	2.4	793	2.2
1975	1490	2.3	670	2.3	820	2.3
1976	1499	2.3	669	2.3	830	2.3
1977	1530	2.4	693	2.4	837	2.3
1978	1532	2.4	643	2.2	889	2.5
1980	1468	2.3	641	2.2	827	2.3
1982	1860	2.9	779	2.7	1081	3
1983	1599	2.5	690	2.4	909	2.5
1984	1473	2.3	598	2.1	875	2.4
1985	1534	2.4	688	2.4	846	2.3
1986	1470	2.3	621	2.2	849	2.3
1987	1819	2.8	778	2.7	1041	2.9
1988	1481	2.3	638	2.2	843	2.3
1989	1537	2.4	660	2.3	877	2.4
1990	1372	2.1	604	2.1	768	2.1
1991	1517	2.3	636	2.2	881	2.4
1993	1606	2.5	685	2.4	921	2.5
1994	2992	4.6	1290	4.5	1702	4.7
1996	2904	4.5	1285	4.5	1619	4.5
1998	2832	4.4	1232	4.3	1600	4.4
2000	2817	4.3	1229	4.3	1588	4.4
2002	2765	4.3	1228	4.3	1537	4.2
2004	2812	4.3	1280	4.5	1532	4.2
2006	4510	7	2003	7	2507	6.9
2008	2023	3.1	930	3.3	1093	3
2010	2044	3.2	891	3.1	1153	3.2
2012	1974	3	885	3.1	1089	3
2014	2538	3.9	1141	4	1397	3.9

2016	2867	4.4	1276	4.5	1591	4.4
2018	2348	3.6	1052	3.7	1296	3.6

**Table 1:** Frequency of participants based on the study year in GSS overall and by gender.

The total sample was either men (n=28614; 44.1%) or women (n=36200; 55.9%). Most participants were Whites (80.3%). Men and women differed in employment, marital status, SRH, and happiness (Table 2).

	All		Men		Women	
	N	%	N	%	n	%
<b>Gender</b>						
Men	28614	44.1	28614	100	-	-
Women	36200	55.9	-	-	36200	100
<b>Race</b>						
White	52033	80.3	23408	81.8	28625	79.1
Black	9187	14.2	3528	12.3	5659	15.6
Other Rae/Ethnic Groups	3594	5.5	1678	5.9	1916	5.3
<b>Employed*</b>						
No	32922	50.8	10869	38	22053	60.9
Yes	31892	49.2	17745	62	14147	39.1
<b>Marital Status*</b>						
No	30685	47.3	12378	43.3	18307	50.6
Yes	34129	52.7	16236	56.7	17893	49.4
<b>Self-Rated Health (SRH)* m</b>						
Not Healthy	11845	24.9	4913	23.3	6932	26.2
Healthy	35745	75.1	16185	76.7	19560	73.8
<b>Happiness*</b>						
Not Happy	7668	12.8	3356	12.7	4312	12.9
Happy	52386	87.2	23159	87.3	29227	87.1
	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>
Age (Years)*	45.86	17.28	45.23	16.88	46.35	17.58
Own Educational Attainment (0-20)	7.574	6.09	7.87	6.09	7.34	6.08
Parental Educational Attainment (0-20)	13.16	3.21	13.32	3.34	13.04	3.1
m: 17224 missing cases on SRH *p<0.05 for comparison of men and women						

**Table 2:** Descriptive statistics in the overall sample.

### Multivariable models (Outcome: SRH)

Table 3 presents the summary of the results of our two logistic regression models with parental educational attainment as the independent variable and SRH as the dependent variable. Both models

were estimated in the overall sample. Model 1 only entered the main effect of educational attainment, gender, and covariates. Model 2, however, also added an interaction term between gender and parental educational attainment.

Based on Model 1, high educational attainment of parent was associated with better SRH. Model 2, however, showed a statistically significant interaction between gender and parental educational attainment on SRH, suggesting that high educational attainment has a larger effect on the SRH of women than men (Table 3).

	Model 1						Model 2					
	b	SE	OR	95% CI	p		B	SE	OR	95% CI	p	
Without Marital Status												
Gender (Women)	-0.37	0.09	0.69	0.57	0.83	0	0.07	0.02	1.07	1.02	1.12	0.006
Race/ethnicity (Black)	-0.02	0	0.98	0.98	0.98	0	-0.02	0	0.98	0.98	0.98	0
Race/ethnicity (Other)	-0.35	0.03	0.7	0.66	0.75	0	-0.35	0.03	0.7	0.66	0.75	0
Age (Years)	-0.24	0.05	0.78	0.71	0.87	0	-0.24	0.05	0.78	0.71	0.87	0
Fulltime Employment	0.68	0.03	1.97	1.87	2.07	0	0.68	0.03	1.97	1.87	2.07	0
Own Parental Educational Attainment (0-20)	0.02	0	1.02	1.01	1.02	0	0.02	0	1.02	1.02	1.02	0
Parental Educational Attainment (0-20)	0.13	0.01	1.14	1.12	1.15	0	0.14	0	1.15	1.14	1.16	0
Time (Year)	-0.01	0	0.99	0.99	0.99	0	-0.01	0	0.99	0.99	0.99	0
Gender (Women) × Own Educational Attainment (0-20)	0.01	0	1.01	1	1.02	0.044						
Gender (Women) × Parental Educational Attainment (0-20)	0.03	0.01	1.03	1.02	1.05	0						
Constant	0.1	0.08	1.11			0.206	-0.12	0.07	0.89			0.076
With Marital Status												
Gender (Women)	-0.31	0.1	0.74	0.61	0.89	0.001	0.08	0.02	1.09	1.04	1.14	0
Race/ethnicity (Black)	-0.02	0	0.98	0.98	0.98	0	-0.02	0	0.98	0.98	0.98	0
Race/ethnicity (Other)	-0.3	0.03	0.74	0.7	0.79	0	-0.29	0.03	0.75	0.7	0.79	0
Age (Years)	-0.24	0.05	0.79	0.71	0.87	0	-0.24	0.05	0.79	0.71	0.87	0
Marital Status (Married)	0.29	0.02	1.33	1.27	1.39	0	0.29	0.02	1.34	1.28	1.4	0
Fulltime Employment	0.66	0.03	1.93	1.84	2.03	0	0.66	0.03	1.94	1.84	2.03	0
Own Parental Educational Attainment (0-20)	0.02	0	1.02	1.01	1.02	0	0.02	0	1.02	1.02	1.02	0
Parental Educational Attainment (0-20)	0.13	0.01	1.14	1.12	1.15	0	0.14	0	1.15	1.14	1.16	0
Time (Year)	-0.01	0	0.99	0.99	1	0	-0.01	0	0.99	0.99	1	0
Gender (Women) × Own Educational Attainment (0-20)	0.01	0	1.01	1	1.02	0.128						
Gender (Women) × Parental Educational Attainment (0-20)	0.03	0.01	1.03	1.01	1.04	0						
Constant	-0.09	0.08	0.91			0.284	-0.3	0.07	0.74			0
CI: Confidence Interval; SE: Standard Error												

**Table 3:** Summary of logistic regressions on SRH in the pooled sample.

### Multivariable models (Outcome: Happiness)

Table 4 presents the summary of the results of our two logistic regression models with parental educational attainment as the independent variable and happiness as the dependent variable. Both models were estimated in the overall sample. Model 1 only entered the main effect of educational attainment, gender, and covariates. Model 2,

however, also added an interaction term between gender and parental educational attainment.

Based on Model 1, a high educational attainment of parent was associated with higher odds of happiness. Model 2, however, showed a statistically significant interaction between gender and parental educational attainment on happiness, suggesting that high educational

attainment has larger effect on the happiness of women than men (Table 4).

Model 1							Model 2					
	b	SE	OR	95% CI		p	B	SE	OR	95% CI		p
Without Marital Status												
Gender (Women)	-0.15	0.1	0.86	0.71	1.04	0.119	0.13	0.03	1.14	1.08	1.2	0
Race/ethnicity (Black)	0.01	0	1.01	1	1.01	0	0.01	0	1.01	1	1.01	0
Race/ethnicity (Other)	-0.6	0.03	0.55	0.52	0.59	0	-0.6	0.03	0.55	0.52	0.59	0
Age (Years)	-0.21	0.05	0.81	0.73	0.9	0	-0.21	0.05	0.81	0.73	0.9	0
Fulltime Employment	0.47	0.03	1.6	1.51	1.69	0	0.47	0.03	1.6	1.51	1.69	0
Own Parental Educational Attainment (0-20)	0.02	0	1.02	1.02	1.03	0	0.02	0	1.02	1.02	1.03	0
Parental Educational Attainment (0-20)	0.06	0.01	1.06	1.05	1.07	0	0.07	0	1.07	1.06	1.08	0
Time (Year)	-0.01	0	0.99	0.99	0.99	0	-0.01	0	0.99	0.99	0.99	0
Gender (Women) × Own Educational Attainment (0-20)	0	0	1	0.99	1.01	0.577						
Gender (Women) × Parental Educational Attainment (0-20)	0.02	0.01	1.02	1.01	1.04	0.01						
Constant	0.81	0.09	2.24			0	0.66	0.07	1.94			0
With Marital Status												
Gender (Women)	0.05	0.1	1.05	0.86	1.28	0.612	0.18	0.03	1.19	1.13	1.26	0
Race/ethnicity (Black)	0	0	1	1	1	0	0	0	1	1	1	0
Race/ethnicity (Other)	-0.44	0.03	0.65	0.61	0.69	0	-0.44	0.03	0.65	0.61	0.69	0
Age (Years)	-0.19	0.05	0.82	0.74	0.92	0	-0.2	0.05	0.82	0.74	0.92	0
Marital Status (Married)	0.93	0.03	2.53	2.39	2.66	0	0.93	0.03	2.53	2.4	2.67	0
Fulltime Employment	0.41	0.03	1.5	1.42	1.59	0	0.41	0.03	1.5	1.42	1.59	0
Own Parental Educational Attainment (0-20)	0.02	0	1.02	1.02	1.03	0	0.02	0	1.02	1.02	1.03	0
Parental Educational Attainment (0-20)	0.06	0.01	1.06	1.05	1.08	0	0.07	0	1.07	1.06	1.08	0
Time (Year)	0	0	1	0.99	1	0.001	0	0	1	0.99	1	0.001
Gender (Women) × Own Educational Attainment (0-20)	0	0	1	0.99	1	0.331						
Gender (Women) × Parental Educational Attainment (0-20)	0.01	0.01	1.01	1	1.03	0.142						
Constant	0.29	0.09	1.33			0.002	0.22	0.07	1.25			0.003
CI: Confidence Interval; SE: Standard Error												

**Table 4:** Summary of logistic regressions on happiness in the pooled sample.

## Discussion

In the United States, high parental educational attainment is associated with better SRH and happiness. However, the boosting effects of high parental education are more pronounced for American women than American men. For happiness but not SRH, this gender difference seems to be due to marital status.

In line with other work that shows high educational attainment has smaller health effects on the health and wellbeing of racial and ethnic minority individuals than the general population [13,14,29,30], we

showed poor SRH in highly educated LGBT individuals. Similar patterns are shown for a wide range of associations between SES indicators and health outcomes [31,32]. However, this literature has defined minority status based on race/ethnicity. The effects of education [15] on self-rated health [15] and happiness [33] differ for demographic groups based on race [33], ethnicity [34], and sexual orientation [29].

In our study, the reason men and women differed in the effect of parental education on SRH was not marital status. However, marital

status fully explained why parental education had larger effects on happiness for women than men. This finding is similar to the results shown by Zajacova in which marital status explained why there was a steeper educational gradient for white men compared to white women [35]. Our study extends those results by suggesting the same pattern may be relevant to the effects of parental education on the happiness of American women and men.

For mortality as the outcome, a study showed that for Whites in the US, there is a steeper educational gradient at high schooling levels for white men compared to white women. No systematic gender differences in the relationship between education and adult mortality were observed among black adults in any birth cohorts. The findings suggest that men do not benefit from educational attainment uniformly more than women [35]. In Europe, a study by Mackenbach suggested that education gradients in mortality is larger for men than for women [36].

We call our variable gender not sex. This is because we believe that differential effects of parental educational attainment on health and happiness of Americans is social rather than biological. This finding is in line with the double disadvantage/jeopardy hypothesis [37-39]. Discrimination in the labor market may be one mechanism why a resource generates differential effects for men and women. Still more research is needed on this topic.

There is a need to understand social, economic, and structural as well as behavioral mechanisms that explain why parental educational attainment loses some of its effects for men compared to women. One underlying mechanism may be the differential effect of parental resources due to differential investment on boys and girls [40,41]. Another explanation may be a larger effect of own resources for men than women [42].

Elimination of health disparities is a strategic priority for the U.S. government and local states. The results of the current study may suggest some new insight to that differential marginal return of parental education may be one reason some groups remain at high risk of poor health despite their access to resources. We argue that solution to health disparities across groups needs interventions that not just those which reduce SES gaps but also those who equalize marginal returns of parental education for the members of marginalized groups.

Very few studies have tested gender differences in the health effects of parental education. There are some studies on gender differences of own education on health outcomes in the United States [35] and Europe [36]. For example, American men's and women's mortality is differently shaped by education. For Whites in the US, there is a steeper educational gradient at high schooling levels for white men compared to white women, a gender difference completely due to marital status [35]. Among adults in Europe, the education gradient in mortality was larger for men than for women [36].

There is a need for research that decompose differential access to education from differential effects of education on health outcomes. This is particularly important because the policy response differs to inequalities due to each cause. When the cause is differential access, the solution is to reduce the educational gap across social and demographic groups. If the cause is differential effect (return) of education, however, the suitable solution is to make social changes that equalize the returns of education across groups.

This study had some methodological limitations. Similar to other studies with a cross-sectional design, our data also do not allow causal

inferences between gender, parental education, and health and well-being. We did not test variation of our findings based on race, ethnicity, or nativity status. We only tested differential effects of parental education and other SES indicators such as income, employment, marital status should be studied. Future research may also include area level SES. Despite these limitations, the results of the current study extend what is already known about the non-linear effects of various social determinants on population health across subgroups. GSS was a state-of-the-art study with a methodology, sampling, and very large sample size that increase our confidence in our results [43,44].

## Conclusion

In the United States, while high parental educational attainment boosts SRH and happiness of Americans, these effects are larger for women than men. For happiness, this gender difference seems to be due to marital status. The difference in SRH and happiness of women with high and low parental education seems to be larger than the difference between men with high and low parental education. Health equity is not achievable in a society in which the same economic resource differently impacts well-being and health of the members of various social groups.

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## Authors' Contributions

S.A. conceptualized the study, analyzed the data, and prepared the first draft of the paper. M.B. and S.C. contributed to the conceptualization of the paper and revised the paper. All authors approved the final draft.

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