

CIVIC RETURNS TO HIGHER EDUCATION:
A NOTE ON HETEROGENEOUS EFFECTS*

JENNIE E. BRAND
University of California – Los Angeles

Version: February 2010
Running head: education and civic participation
Word count (including footnotes and references): 5,610

* Direct all correspondence to Jennie E. Brand, Department of Sociology, University of California – Los Angeles, 264 Haines Hall, Los Angeles, CA 90095-1551, USA; email: brand@soc.ucla.edu; phone: 310.206.1049; FAX: 310.206.9838. I thank John Wilson and several anonymous reviewers from *Social Forces* for helpful comments and suggestions. Versions of this paper were presented at the Department of Sociology and Institute for Policy Research at Northwestern University and the Population Association of America 2010 Annual Meeting. Financial support for this research was provided by the National Institutes of Health, Grant 1 R21 NR010856-01 and by the California Center for Population Research at UCLA, which receives core support from the National Institute of Child Health and Human Development, Grant R24 5R24HD041022. The ideas expressed herein are those of the author.

AUTHOR BIOGRAPHY PAGE

JENNIE E. BRAND

Jennie E. Brand is Assistant Professor of Sociology at the University of California – Los Angeles and a faculty affiliate at the California Center for Population Research. Her research focuses on the relationship between socioeconomic background, educational attainment, job conditions, and socioeconomic attainment and well-being over the life course. This substantive focus accompanies a methodological focus on causal inference and the application and innovation of statistical models for panel data. Current research projects include evaluation of heterogeneity in the effects of education on socioeconomic outcomes and the social consequences of job displacement.

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ABSTRACT

American educational leaders and philosophers have long valued schooling for its role in preparing the nation's youth to be civically engaged citizens. Numerous studies have found a positive relationship between education and subsequent civic participation. However, little is known about possible variation in effects by selection into higher education, a critical omission considering education's expressed role as a key mechanism for integrating disadvantaged individuals into civic life. With data from the National Longitudinal Survey of Youth 1979, I disaggregate effects and examine whether civic returns to higher education are largest for disadvantaged low likelihood or advantaged high likelihood college goers. I find evidence for significant heterogeneity in effects: civic returns to college are greatest among individuals who have a low likelihood for college completion. Returns decrease as the propensity for college increases.

Keywords: college education; civic participation; volunteering; causality; heterogeneity;

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The questions of how and to what extent education can and should influence civic participation have preoccupied philosophers, theorists, and social scientists for hundreds of years. From Plato and Aristotle to America's prominent educational leaders – Thomas Jefferson, John Dewey, Horace Mann, W. E. B. Dubois – education has been recognized for its role in preparing youth to be socially engaged citizens (Giroux 2009). The original missions of colleges and universities expressed this essential public purpose, and civic returns to education, particularly among disadvantaged members of the population, continue to offer a central justification for public policy promoting equal access to schooling.¹ Civic participation is defined as unpaid work or involvement with voluntary associations, groups, or activities, such as the United Way, Meals on Wheels, neighborhood improvement groups, little league sports, or sometimes more broadly, involvement with political activities like campaigning. Civic participation confers societal rewards by way of a vibrant democracy and well-functioning neighborhoods; it is linked to individual rewards by way of job networks, occupational advancement, and physical and mental well-being (Durkheim 1933; Putnam 2000; Wilson 2000).

A prominent tradition of social and political research seeks to identify factors that influence civic participation (Wilson 2000). This work has taken on renewed interest at a time when many forms of civic involvement appear to be declining (Putnam 2000). Numerous studies identify education as a key correlate if not determinant of civic participation, with the more educated more participatory than the less educated (Almond and Verba 1963; Brehm and Rahn 1997; Dee 2004; Freeman 1997; Gesthuizen, van der Meer, and Scheepers 2008; Hauser 2000; Huang, van den Brink, and Groot 2008; McPherson and Rotolo 1996; Nie, Junn, and Stehlik-Barry 1996; Putnam 1995, 2000; Verba and Nie 1972; Verba, Schlozman, and Brady 1995). Putnam (1995) asserts that "education is by far the strongest correlate that I have discovered of civic engagement in all its forms" (p. 672).

Some studies recognize the endogeneity or selection bias problem associated with assessing the causal effect of education on civic participation (Dee 2004; Gibson 2001; Hauser 2000), that is, that

factors such as motivation or conscientiousness might cause both college attainment and civic participation. However, studies have not addressed a related form of selection bias: heterogeneous effects by factors influencing selection into college education. Individuals differ not only in background attributes but also in how they respond to life events. Given the substantial literature on the relationship between education and civic participation, surprisingly little attention has been paid to variation in civic returns to education. Moreover, given education's potentially key role in integrating disadvantaged youth into civic life, we should assess whether schooling succeeds in promoting civic participation among underprivileged groups. The studies I note above estimate averages of varying effects of education on civic participation across groups of individuals classed by their pre-college social backgrounds and levels of early achievement. In this study, I disaggregate the effects of college on civic participation and examine whether civic returns to schooling are largest for disadvantaged low likelihood or advantaged high likelihood college goers.

CIVIC RETURNS TO HIGHER EDUCATION

Given evidence for a significant average effect of education on civic participation, various explanations have been advanced as to why education should increase such involvement. First, individuals learn civic norms and responsibilities governing democratic society, such as recognition of and adherence to collective interests that override individual preferences, via socialization in schools (Brady, Verba, and Schlozman 1995; Cogan and Morris 2001; Dee 2004; Durkheim 1925; Gesthuizen, van der Meer, and Scheepers 2008; Nie, Junn, and Stehlik-Barry 1996). As Durkheim (1925) contends, education teaches students "how one should act on behalf of the collective interest" (p. 59). Despite certain claims that universities have lost their sense of civic purpose (Giroux 2009; Huang, van den Brink, and Groot 2009), many if not most colleges and universities actively encourage undergraduate students to participate in some form of volunteer service, and participation during college has been found to

positively affect students' long-term civic commitment (Astin, Sax, and Avalos 1999; Checkoway 2001; Johnson 2004).

Second, scholars contend that education increases skills and resources that facilitate civic involvement, such as cognitive, communicative, and bureaucratic proficiency and position in social networks. These acquired skills reduce the costs and complexity associated with participation (Hauser 2000; Nie, Junn, and Stehlik-Barry 1996; Verba, Schlozman, and Brady 1995). Third, strategic mobilization of organizations and groups encourages and discourages, to varying degrees, the participation of different demographic groups: the highly educated with their higher resources are more likely to be asked to participate (Brady, Schlozman, and Verba 1999; Gesthuizen, van der Meer, and Scheepers 2008; Hauser 2000; McPherson and Rotolo 1996; Musick and Wilson 2008; Rosenstone and Hansen 1993; Wilson and Musick 1997a), and individuals tend to participate when asked (Freeman 1997). Fourth, higher education is associated with higher income and occupational status, which are associated with higher levels of civic participation. Nevertheless, when education, income, and occupational status are used together to predict participation, education remains the primary influence (Putnam 1995).

A final explanation for the observed association between education and civic participation is selection bias (also called “pre-treatment heterogeneity bias” or “endogeneity”), that unobserved factors are correlated both with selection into college education and civic participation producing a spurious association (Dee 2004; Gibson 2001; Hauser 2000). For example, highly educated parents are likely to be civically active and to have children who obtain high levels of education, such that an intergenerational transmission of civic participation appears as a causal effect of education (Janoski and Wilson 1995). Or ability and personality may positively affect both educational attainment of youth and civic participation (Hauser 2000).² Or individuals with cohesive social relations with parents, teachers, neighbors, and peers in childhood may obtain more education and be more socially and civically active (Nie, Junn, and Stehlik-Barry 1996). Researchers who use various methods in an attempt to rule out selection bias find smaller, although still significant, effects of college on civic participation (Huang, van den Brink, and Groot

2009). The robustness of the correlation between education and civic participation in the face of various technical assumptions and model specifications incites most researchers to conclude that education exerts some causal effect on participation.

An issue overlooked in the literature on education and civic participation is that social scientists increasingly recognize two kinds of selection bias (Morgan and Winship 2007). The first kind, *pre-treatment heterogeneity*, is due to heterogeneity in preexisting attributes associated with both educational attainment and civic participation, as I discuss above. The second kind is *treatment effect heterogeneity*, or systematic variation in the effect of education on civic participation. An estimate of the effect of education on civic participation is a weighted average of heterogeneous effects, a quantity that depends upon composition of the college-educated population (Angrist and Kruger 1999; Card 1999; Heckman, Urzua, and Vytlačil 2006; Morgan and Winship 2007). While homogeneous college effects are assumed in the prior literature on education and participation, it is reasonable and important to understand that responses to college may differ (Brand and Xie 2010). One approach to studying variation in effects of education is to estimate interactions between educational attainment and observed covariates, such as race or gender. However, examining interactions with individual covariates quickly exhausts degrees of freedom as more covariates are considered and, more importantly, misses their implications for selection bias. For the question of comparing effects between individuals who obtain college education and those who do not, the most consequential interaction is between college and the propensity for college (Heckman, Urzua, and Vytlačil 2006).

Allowing for variation in college effects, what hypotheses can we espouse as to the pattern in effects? One line of research finds that individuals who have the highest economic returns to college are the most likely to select into college (Becker 1964; Carneiro, Heckman, and Vytlačil 2007; Mincer 1974; Willis and Rosen 1979). This rational choice, comparative advantage framework might be extended to civic returns to college, such that individuals who have the highest civic returns to college have the highest likelihood of college. It could be argued high propensity individuals' higher social backgrounds and ability levels makes them better equipped to realize civic norms and cognitive and communicative

proficiencies through schooling. And as high income and occupational status is associated with high civic participation, and individuals with a high likelihood of college have the highest income and occupational status, they likely have the highest levels of civic participation. High social background, high ability, educated men and women may also be the most likely to be asked to participate.

An alternative theory is that the college effect on civic participation is greatest among individuals least likely to complete college. Prior research suggests that college markedly alters the life path for individuals who have a low likelihood of college attainment. In contrast to the rational choice literature cited above, Brand and Xie (2010) find that men and women with the lowest probability of completing college have the highest economic returns to college. Brand and Davis [forthcoming] find that women with the lowest probability of college have the highest fertility-decreasing effect of college. Studies that have used compulsory schooling laws, differences in the accessibility of schools, and similar features as instrumental variables have found larger economic returns (Card 2001) and larger civic returns (Dee 2004) than OLS estimates, suggesting larger effects of education among individuals who have a low likelihood of going to college.³

It is also possible that the explanations scholars have proposed to understand average effects of college on participation are more applicable to disadvantaged college goers than advantaged. Low propensity college goers have parents with little education and presumably low levels of civic participation, rendering college especially consequential for learning civic norms and responsibilities. College is also said to develop expanded, educated, civically active social networks, which should be especially consequential for college goers who come from more disadvantaged family and peer networks (Wilson and Musick 1997b, 1998). Likewise, mobilization of the educated by organizations and groups may be more extensive among persons from disadvantaged social backgrounds. Assuming individuals from disadvantaged social backgrounds maintain contact with the communities of their youth, educated members in short supply will be in high demand for civic service by the less educated residents.⁴

DATA AND DESCRIPTIVE STATISTICS

To study the effects of education on subsequent civic participation, I use panel data from the National Longitudinal Survey of Youth 1979 (NLSY). The NLSY is a nationally representative sample of 12,686 respondents who were 14-22 years old when they were first interviewed in 1979. These individuals were interviewed annually through 1994 and are currently interviewed on a biennial basis. I use information gathered from 1979 through 2006. I restrict the sample to respondents who were 14-17 years old at the baseline survey in 1979 ($n = 5,582$), who had completed at least the 12th grade ($n = 4,827$), and who did not have missing data on college completion or most of the pre-treatment covariates ($n = 4,229$),⁵ and who did not have missing data on measures of civic participation from the 2006 survey wave ($n = 3,074$). I set these sample restrictions to ensure all measures I use are pre-college, particularly ability, and to compare college graduates with individuals who completed at least a high school education. I restrict the sample to high school graduates as individuals without a high school degree are not "at risk" of a college education. The most disadvantaged individuals, who would by and large fall in the lowest propensity stratum, are thus excluded. If I were to retain high school dropouts, there would be substantially more imbalance between college and non-college graduates in the covariate distribution within the lowest propensity score stratum. The individuals we lose due to nonresponse and attrition tend to be from less advantaged family backgrounds and levels of achievement than those we retain. All analyses are weighted by the probability of sample selection and nonresponse.

Table 1 list measures of observed pre-college covariates; their measurement is generally straightforward. Parents' income is measured as total family income in 1979 dollars. College-prep indicates whether or not a student is enrolled in a college-preparatory curriculum in high school. 'Friends' plans' indicates the highest level of schooling a respondent reported his or her friends planned to obtain in 1979. Parents' encouragement indicates whether or not the most influential person in the respondent's life (in over two-thirds of cases, a parent) would disapprove if the respondent did not go to college. In 1980, 94% of the NLSY respondents were administered the ASVAB, a battery of ten intelligence tests measuring knowledge and skill in areas such as mathematics and language. I first residualize each of the ASVAB tests on age at the time of the test separately by race and ethnicity. Residuals were standardized

to mean zero and variance one. I then construct a scale of the standardized residuals ($\alpha = .92$) which has a mean of zero, standard deviation of 0.8, and range of -3 to 3. I use two dichotomous indicators of civic participation measured in 2006 asking respondents if they performed any unpaid volunteer work in the past twelve months for: (1) civic, community, or youth groups, and (2) charitable organizations or social welfare groups. Respondents were not asked these questions in prior survey waves, so I am unable to compare outcomes over time. I report descriptive statistics of all pre-college variables and civic participation in Table 1. The likelihood of college varies by gender, race and ethnicity, family background, academic achievement, friends' plans, and parents' encouragement in the expected directions. Pre-college measures of civic engagement are not available in the NLSY to match respondents in the propensity score stratification. Roughly 13% of college graduates compared to 5% of non-college graduates volunteer for civic, community, or youth groups and 9% of graduates compared to 4% of non-graduates volunteer for charitable organizations or social welfare groups.

-- TABLE 1 ABOUT HERE --

METHODS

My analysis proceeds in three steps. First, I estimate the probability an individual completes college relative to individuals who completed high school but did not complete college. I generate estimated propensity scores (Rosenbaum and Rubin 1983, 1984) for each individual in the sample using a logit regression model of the following form:

$$P_i = p(d_i = 1 | X) = \log \frac{d_i}{1 - d_i} = \left(\sum_{k=0}^k \beta_k X_{ik} \right) \quad (1)$$

where P_i is the propensity score for the i^{th} observation ($i = 1, \dots, n$); d_i indicates whether or not individual i completed college; and X represents a vector of observed pre-college covariates. I invoke an "ignorability" or "selection on observables" assumption that conditional on a rich set of pre-treatment covariates, there are no additional confounders between college and non-college graduates.

Second, I estimate effects of college completion on civic participation under an assumption of college effect homogeneity. I evaluate average effects of college on civic participation using logit regression models controlling for the estimated propensity score:

$$\log \frac{c_i}{1-c_i} = \alpha + \delta d_i + \beta P_i \quad (2)$$

where c_i is civic participation for the i^{th} observation; d_i indicates whether or not an individual completed college; and P_i represents the propensity for college completion as estimated by equation (1). The parameter δ is the average effect of college completion on civic participation. Rosenbaum and Rubin (1983, 1984) demonstrate it is sufficient to condition on the propensity score as a function of X rather than X itself, which I do here for simplicity.

Third, I assess whether or not heterogeneity in the propensity for college is associated with heterogeneity in effects of college. That is, I allow δ in equation (2) to be heterogeneous. I first group respondents into propensity score strata such that average values of the propensity score and each covariate do not significantly differ between college and non-college graduates ($p < .001$). Then in level-1, I estimate propensity stratum-specific effects using logit regression models:

$$\log \frac{c_{is}}{1-c_{is}} = \alpha_s + \delta_s d_{is} \quad (3)$$

where the s subscript represents the propensity score stratum and all other terms are defined above. Subjects indexed by i are nested in propensity score strata indexed by s . Separate logit regression models are estimated for each propensity score stratum. In level-2, I estimate the trend in the variation of effects using variance-weighted least squares regressions:

$$\delta_s = \hat{\delta}_1 + \gamma S + \varepsilon_s \quad (4)$$

where level-1 slopes (δ_s) are regressed on propensity score rank indexed by S . $\hat{\delta}_1$ represents the level-2 intercept (i.e., the predicted value of the effect of college completion for the lowest propensity

individuals), and γ represents the level-2 slope (i.e., the change in the effect of college on civic participation with each one unit change to a higher propensity score stratum).⁶

RESULTS

The first step in the analysis is to derive estimated propensity scores for each individual in the sample using the set of pre-college covariates described in Table 1. The results, reported in Table 2, support the literature on the determinants of college completion. Black and Hispanic students are significantly less likely to complete college. High socioeconomic background, cognitive ability, academic achievement in high school, friends' plans for college, and parents' encouragement for college also strongly predict college completion.

-- TABLE 2 ABOUT HERE --

Table 3 provides the estimated average effects of college completion on volunteering in (1) civic, community, or youth groups; and (2) charitable organizations or social welfare groups. The results suggest college graduates are about 2.1 times more likely ($e^{0.743}$) to volunteer for civic, community, or youth groups than non-college graduates and about 1.7 times more likely ($e^{0.555}$) to volunteer for charitable organizations or social welfare groups. Propensity for college, a conglomerate measure of social background and achievement, also has a significant positive effect on volunteering.⁷

-- TABLE 3 ABOUT HERE --

I next ask whether average college effects on civic participation reported in Table 3 conceal underlying systematic heterogeneity of college effects. I first generate propensity score strata such that within each interval of the propensity score the average propensity score and the means of each covariate do not significantly differ between college and non-college graduates (Becker and Ichino 2002). As expected, for college graduates the frequency count increases with the propensity score whereas for non-college graduates the count decreases. Table 4 provides covariate means by propensity score strata and college completion. These statistics demonstrate the characteristics of typical individuals within each

stratum. Individuals with parents who were high school drop-outs, who have four siblings, low ability, enrolled in a non-college-prep track, and who had friends who had not planned to go to college are characteristic of stratum 1. By contrast, individuals with parents who went to college, who have two siblings, high ability, enrolled in a college-prep track, who had parents who encouraged college and friends who planned to complete college are characteristic of stratum 7.

-- TABLE 4 ABOUT HERE --

Table 5 and Figure 1 report results from the multilevel model of heterogeneous college effects on civic participation (Brand and Davis [forthcoming]; Brand and Xie 2010). The level-2 slopes for both indicators of volunteering reveal significant declines in the effect of college completion as the propensity for college increases. For civic, community, and youth groups, the level-2 slope indicates a significant 0.28 reduction in the college effect for each unit change in propensity score rank. That is, level-1 estimates range from college graduates being 10 times more likely ($e^{2.381}$) to volunteer for civic, community, or youth groups than non-college graduates in stratum 1 to an (insignificant) 2 times more likely ($e^{0.788}$) in stratum 7. Similarly for charitable organizations and social welfare groups, the level-2 slope indicates a significant 0.29 reduction in the college effect for each unit change in propensity score rank. Factors range from college graduates being 4 times more likely to volunteer than non-college graduates in stratum 1 to 0.5 times as likely to volunteer in stratum 7. Figure 1 graphically depicts the results presented in Table 5. “Dots” in Figure 1 represents point estimates of level-1 slopes, i.e., stratum-specific logit regression effects of college on civic participation. The linear plots in the figure are the level-2 slopes. The figure depicts the similarity in the decline in the effect of college completion on both forms of civic participation as the propensity for college increases.

-- TABLE 5 ABOUT HERE --

-- FIGURE 1 ABOUT HERE --

Levels of volunteering by propensity score strata and college completion, shown in Table 4, are also informative. As an illustration, there is little differentiation in level of volunteering in civic, community, and youth groups by propensity score strata among the college educated: Roughly 15% of

college graduates in stratum 1 and 15% in stratum 7 volunteer for civic, community, or youth groups. By contrast, less than 2% of non-college graduates volunteer for civic, community, or youth groups in stratum 1 compared to about 8% in stratum 7. Thus, while levels of volunteering by socioeconomic background are equalized among college graduates, there is a socioeconomic gradient in volunteering among non-college graduates, – generating large observed effects of college among individuals from disadvantaged social backgrounds. For charitable organizations and social welfare groups, I observe a larger percentage of low propensity college graduates volunteering than high propensity graduates. Still, results are comparable to civic groups in that the differential between college and non-college graduates is larger for the low than high strata.

DISCUSSION

Americans' commitment to civic participation has been a defining feature of the cultural fabric of the United States (Tocqueville 1960[1835]). This commitment lives on. The current presidential administration has emphasized the importance of civic participation for the nation's economic recovery and renewal, and has promoted financial aid for college in exchange for community service. The prevailing wisdom is that educational attainment is a critical determinant of civic participation. Schools function to embed the nation's youth with moral and civic norms and prepare them to participate in an informed and intelligent manner. The educated also become targets of mobilization for civic organizations and groups. While some scholars have questioned the degree to which selection bias influences the observed relationship between education and civic participation, most researchers conclude that there is some causal effect of education on participation.

Despite an extensive literature on the average relationship between education and civic participation, prior research has not considered heterogeneity in civic returns to higher education by selection into college. Given theoretical basis to suppose variation in effects, and sociological concern for variation in effects, this is an important omission in the literature. This study provides empirical evidence

as to which segments of the college-going population yield the largest civic returns. I find that college completion has the largest impact on volunteering among individuals least likely to complete college. The effect of college generally decreases as the propensity for college increases. This pattern in effects is a result of the equalization of volunteering by socioeconomic background among college graduates relative to the socioeconomic gradient in volunteering among non-college graduates. My findings do not render the results of prior studies of civic returns to higher education invalid; rather, my results demonstrate that aggregating heterogeneous effects across individuals classed by their likelihood of college conceals the potential of higher education to equalize socioeconomic differentials in civic engagement. My findings complement prior sociological research that shows that the relationship between social origins and destinations as measured by occupational status is much weaker for college graduates than for non-college graduates (Hout 1988), as well as recent findings that college is an acutely consequential life-altering event among disadvantaged, low propensity college-goers (Brand and Davis [forthcoming]; Brand and Xie 2010).

This study is not without limitations. The empirical patterns approach hinges on the assumption that I have adequately accounted for all covariates influencing college attainment; measurement of theoretically relevant confounders makes this assumption more plausible, but not necessarily true. Unobserved factors, such as motivation or conscientiousness, could influence both selection into college and civic participation. Still, there must be differential selection bias across propensity score strata to render spurious the observed trend in effects. If the effects of college on civic participation among low propensity individuals were more strongly subject to selection bias than effects for high propensity individuals, the pattern in effects would be flatter than that which I observe. Conversely, attrition is more likely among the less civically active. As low propensity non-college goers are the least civically active and thus may be more prone to nonresponse, there may be downward bias on the college effect estimate in the low propensity strata and upward bias on the level-2 downward slope I observe, yielding conservative observed estimates of the level-2 slopes. It is unfortunate that more measures are not available in the NLSY to study volunteering over time and test this possibility. This study is also limited

in that I examine one, momentous as it may be, aspect of educational achievement. One avenue of future research would be to examine heterogeneous effects of elite college attendance on civic participation, like Brand and Halaby (2006) do for wage and occupational achievement. Suggestive of possible heterogeneity in effects of elite college attendance, Bowen and Bok (1998) found that Black alumni of highly selective colleges report that college made greater contributions to their oral communication skills and positive attitudes toward community service than their white counterparts.

Scholars of civic engagement have long focused on the individual and institutional correlates of participation. Much of this work is motivated by a conviction that participatory inequalities patterned by socioeconomic status are democratically troublesome. Such inequality allows some individuals to exert disproportionate influence over societal functioning. My findings of college effect heterogeneity reveal that individuals with a disadvantaged family background may effectively narrow the gap of participatory disadvantage and lessen socioeconomic inequality in social influence by way of a college education.

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ENDNOTES

¹ While current rhetoric on the purpose of education centers on preparation for economic roles in society (Grubb and Lazerson 2004), education's influence on civic participation remains a central theme in social and political discourse.

² Hauser (2000) finds that education has a significant effect on civic participation net of a reliable measure of cognitive ability.

³ Instrumental variable estimates can be interpreted as local average treatment effects, effects that pertain to units induced by the instrument, or in this case, individuals on the margin of school continuation.

⁴ A recently debated issue is whether relative levels of education affect participation similarly to absolute levels of education. According to Nie, Junn, and Stehlik-Barry (1996), participation is negatively affected by relative education. That is, when an educational credential is rare, the holder of that credential is conferred considerable social status which incites participation. However, Helliwell and Putnam (2007), comparing the education of geographically proximate individuals rather than a national average, find that participation is positively affected by relative as well as absolute education. The debate continues as scholars try to reconcile falling aggregate levels of civic participation in the face of rising aggregate levels of education.

⁵ I impute missing values based on all available background covariates for variables with about 5% or more missing cases: parents' income (477 values), high school college-preparatory program (283 values), and parents' encouragement (129 values). Multiple imputation is currently not feasible with the heterogeneous treatment effects methodology used in these analyses. Because the propensity score strata might differ among the imputed datasets, strata would have to be predefined to combine the estimates from different imputations.

⁶ A focus on variation in treatment effects by observed covariates is limited, as I overlook heterogeneity in effects due to unobserved variables. Without the ignorability assumption, however, alternative models for heterogeneous treatment effects, such as switching regression or marginal treatment effects, depend upon strong parametric or exclusion assumptions about unobservable variables.

⁷ Models with the full set of covariates rather than the propensity score support the literature on civic participation: Sex, race, ethnicity, and academic achievement are related to civic participation in the expected directions. The coefficients for college completion in models with the full set of covariates are substantively similar to those with the propensity score alone. Results are available upon request.

Table 1. Descriptive Statistics of Pre-College Covariates and Civic Participation (N=3,074)

<i>Variables</i>	No College Completion		College Completion	
	Mean	Std. Dev.	Mean	Std. Dev.
Male (0-1)	0.477	0.500	0.481	0.500
Race				
Black (0-1)	0.170	0.376	0.083	0.277
Hispanic (0-1)	0.070	0.255	0.032	0.175
Family background				
Mother's education (years of schooling)	11.201	2.399	13.139	2.406
Father's education (years of schooling)	11.128	3.057	13.932	3.252
Parents' income (1979 dollars)	18809	10713	27242	13882
Intact family age 14 (0-1)	0.714	0.452	0.837	0.369
Number of siblings age 14	3.328	2.287	2.574	1.666
Catholic (0-1)	0.320	0.467	0.334	0.472
Southern residence age 14 (0-1)	0.338	0.473	0.291	0.454
Ability and academics				
Mental ability*	0.001	0.623	0.706	0.523
College-prep (0-1)	0.227	0.404	0.580	0.485
Social-psychological				
Parents' encouraged college (0-1)	0.659	0.464	0.881	0.320
Friends' plans (years of schooling)	13.571	2.050	15.307	1.871
Civic Participation				
Civic, Community, Youth Groups (0-1)	0.050	0.218	0.132	0.338
Charitable. Orgs., Social Welfare Groups (0-1)	0.040	0.195	0.089	0.285
Sample Size		2274		800
Weighted Sample Proportion		0.68		0.32

Notes: Ability is measured with a scale of standardized residuals of the ASVAB. All statistics are weighted for sample selection and nonresponse.

**Table 2. Propensity Score Logit Regression
Model Predicting College Completion (N= 3,074)**

Male	-0.505 *** (0.125)
Black	-0.457 ** (0.170)
Hispanic	-0.691 ** 0.208
Mother's education	-0.307 * (0.127)
(Mother's education) ²	0.018 ** (0.005)
Father's education	0.106 *** (0.025)
Parents' inc. (1979 \$10,000s)	0.145 ** (0.056)
Intact family	0.298 † (0.157)
Number of siblings	-0.031 (0.031)
Catholic	-0.174 (1.210)
Southern residence	0.044 (0.137)
Cognitive ability	1.637 *** (0.123)
College-preparatory	0.666 *** (0.129)
Parents' encouragement	0.677 *** (0.155)
Friends' schooling plans	0.172 *** (0.031)
Constant	-5.075 *** (0.903)
<i>Wald χ^2</i>	548.26
<i>P > χ^2</i>	0.000

Notes: Numbers in parentheses are standard errors.
Regression is weighted for sample selection and nonresponse.

† p < .10 * p < .05 ** p < .01 *** p < .001 (two-tailed tests)

Table 3. Homogenous Effects of College Completion on Civic Participation (N= 3,074)

<i>Logit Regression Models</i>	Civic, Community, or Youth Groups	Charitable Orgs. or Social Welfare Groups
College Completion	0.743 ** (0.245)	0.555 * (0.283)
Propensity Score	0.778 * (0.362)	0.758 † (0.421)
Constant	-3.103 *** (0.134)	-3.340 *** (0.149)
<i>Wald χ^2</i>	50.14	27.75
<i>P > χ^2</i>	0.000	0.000

Notes: Numbers in parentheses are standard errors. Regressions are weighted for sample selection and nonresponse. Propensity scores were estimated by a logit regression model of college completion on the set of pre-college exogenous covariates as reported in Table 2.

† p<.10 * p <.05 ** p < .01 *** p < .001 (two-tailed tests)

Table 4. Mean Covariate and Outcome Values by Propensity Score Strata and College Completion (N=3,074)

<i>Variables</i>	Stratum 1		Stratum 2		Stratum 3		Stratum 4		Stratum 5		Stratum 6		Stratum 7	
	[0.0-0.05)		[0.05-0.1)		[0.1-0.2)		[0.2-0.4)		[0.4-0.6)		[0.6-0.8)		[0.8-1.0)	
	<i>E(X) </i> <i>d=0</i>	<i>E(X) </i> <i>d=1</i>	<i>E(X) </i> <i>d=0</i>	<i>E(X) </i> <i>d=1</i>	<i>E(X) </i> <i>d=0</i>	<i>E(X) </i> <i>d=1</i>	<i>E(X) </i> <i>d=0</i>	<i>E(X) </i> <i>d=1</i>	<i>E(X) </i> <i>d=0</i>	<i>E(X) </i> <i>d=1</i>	<i>E(X) </i> <i>d=0</i>	<i>E(X) </i> <i>d=1</i>	<i>E(X) </i> <i>d=0</i>	<i>E(X) </i> <i>d=1</i>
Male	0.540	0.330	0.431	0.347	0.420	0.607	0.443	0.393	0.518	0.491	0.505	0.528	0.425	0.475
Black	0.257	0.310	0.179	0.260	0.124	0.167	0.116	0.133	0.091	0.074	0.105	0.047	0.115	0.044
Hispanic	0.113	0.191	0.066	0.063	0.062	0.050	0.031	0.044	0.049	0.030	0.031	0.018	0.015	0.021
Mother's edu.	9.921	9.759	11.116	10.833	11.362	11.401	11.849	12.202	12.613	12.643	13.224	12.994	14.083	14.951
Father's edu.	9.203	9.143	10.949	10.901	11.513	11.287	12.164	12.320	12.937	13.151	14.083	14.350	15.660	16.170
Parents' inc./1000	14.120	12.909	18.589	16.233	20.020	16.958	20.990	21.181	2.321	2.399	2.646	2.711	2.739	3.718
Intact family	0.612	0.494	0.727	0.660	0.769	0.627	0.747	0.782	0.757	0.848	0.848	0.872	0.933	0.917
Num. of siblings	4.180	4.001	3.241	3.329	3.178	3.016	2.762	2.765	2.658	2.542	2.325	2.479	2.344	2.307
Catholic	0.282	0.447	0.312	0.342	0.337	0.351	0.361	0.348	0.322	0.332	0.351	0.325	0.397	0.324
Southern res.	0.390	0.349	0.345	0.338	0.316	0.338	0.291	0.355	0.278	0.280	0.369	0.264	0.300	0.268
Mental ability	-0.579	-0.368	-0.107	-0.145	0.146	0.206	0.372	0.342	0.615	0.633	0.759	0.833	1.054	1.107
College-prep.	0.057	0.063	0.093	0.109	0.208	0.223	0.357	0.400	0.477	0.473	0.706	0.694	0.842	0.808
Parents' enc.	0.510	0.482	0.574	0.550	0.648	0.700	0.776	0.830	0.922	0.861	0.921	0.939	1.000	0.971
Friends' plans	12.423	13.229	13.048	13.543	13.709	14.163	14.432	14.065	14.938	15.101	15.604	15.714	16.570	16.336
Propensity score	0.024	0.031	0.073	0.072	0.148	0.150	0.283	0.295	0.483	0.506	0.681	0.706	0.867	0.895
Civic, Comm., Youth	0.016	0.154	0.033	0.141	0.062	0.108	0.083	0.172	0.107	0.105	0.049	0.105	0.077	0.155
Charitable, Social Wel.	0.034	0.128	0.008	0.040	0.051	0.082	0.044	0.085	0.039	0.112	0.109	0.098	0.113	0.074
<i>Sample Size</i>	913	32	387	36	362	66	333	141	162	151	87	179	30	195

Notes: $E(X) | d=0$ indicates the mean of X for individuals who did not complete college and $E(X) | d=1$ indicates the mean of X for individuals who completed college. All statistics are weighted for sample selection and nonresponse.

Table 5. Heterogeneous Effects of College Completion on Civic Participation (N = 3,074)

	Civic, Community, or Youth Groups		Charitable Orgs. or Social Welfare Groups
Level-1 Slopes			
<i>Logit Regression</i>			
P-Score Stratum 1: [0.0-0.05)	2.381 **		1.444 †
<i>Sample size = 945</i>	(0.720)		(0.781)
P-Score Stratum 2: [0.05-0.1)	1.580 *		1.590
<i>Sample size = 423</i>	(0.718)		(0.976)
P-Score Stratum 3: [0.1-0.2)	0.610		0.510
<i>Sample size = 428</i>	(0.569)		(0.631)
P-Score Stratum 4: [0.2-0.4)	0.823 *		0.691
<i>Sample size = 474</i>	(0.348)		(0.468)
P-Score Stratum 5: [0.4-0.6)	-0.011		1.138 *
<i>Sample size = 313</i>	(0.409)		0.529
P-Score Stratum 6: [0.6-0.8)	0.818		-0.119
<i>Sample size = 266</i>	(0.650)		(0.471)
P-Score Stratum 7: [0.8-1.0)	0.788		-0.470
<i>Sample size = 225</i>	(0.770)		(0.681)
Level-2 Slopes	-0.279 *		-0.293 *
<i>Variance-weighted Least Squares</i>	(0.131)		(0.131)

Notes: Numbers in parentheses are standard errors. Regressions are weighted for sample selection and nonresponse. Propensity scores were estimated by a logit regression model of college completion on the set of pre-college covariates as reported in Table 2. Propensity score strata were balanced such that mean values of covariates and the propensity score did not significantly differ between college and non-college graduates.

† p < .10 * p < .05 ** p < .01 (two-tailed tests)

Figure 1. Multilevel Models of College Effects on Civic Participation

