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THE MISSING LINK: Exploring the Relationship Between Higher Education and Political Engagement[1]

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Empirical political behavior research has consistently observed a robust and positive relationship between education and political engagement, but has failed to adequately explain why education is so important. Using data from the Baccalaureate and Beyond (B&B) Longitudinal Study, I test three competing hypotheses explaining the enduring link between higher education and political behavior. I find that a verbal SAT scores and a social science curriculum are related to future political engagement, suggesting that the content of higher education, especially a curriculum that develops language and civic skills, is influential in shaping participation in American democracy.

Key words: political engagement; participation; turnout; civic education; college education; education effect.

The notion that formal educational attainment is the primary mechanism behind many citizenship characteristics is largely uncontested.[2] Education has consistently been found to increase political participation, electoral turnout, civic engagement, political knowledge, and democratic attitudes and opinions. Missing from the literature, however, is a theoretical and empirical investigation of *why* education is such a powerful explanatory variable. Little is known about how the educational process has such a profound effect on so many aspects of democratic behavior.[3] What are the connective mechanisms linking higher education with the various characteristics of democratic citizenship? Is it the quality of the academic institution, the specific curriculum

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studied, or the effort exerted by the individual student that is important in predicting political participation? In this article, I examine the explicit elements of higher education that might be influential in shaping political engagement in American democracy.

I examine the relationship between higher education and political engagement using the "Baccalaureate and Beyond" (B&B) study from the National Center for Education Statistics (NCES). With the combination of survey data and information from student transcripts, these data make it possible to peek inside the "black box" of a college education. Using this unique data set, I find evidence that the verbal skills students bring to college and the curriculum studied while there have a significant impact on future levels of political engagement. Specifically, pre-collegiate verbal proficiency, as measured by the Scholastic Achievement Test (SAT), has a strong effect on future political engagement even after controlling for a variety of experiences during and after college. Likewise, social science credit hours positively correlate with political participation and voter turnout some four years after college graduation. These findings suggest that the civic value of higher education rests in part on an education curriculum (both in college and before) that develops language and civic skills.

POSSIBLE CONNECTIVE MECHANISMS

Decades of political science research have concluded that education directly influences an individual's proclivity to participate in the political realm. In most empirical analyses, education is in fact the strongest predictor of political participation even when other socioeconomic factors are considered (e.g., Shields and Goidel 1997; Verba, Schlozman, and Brady, 1996; Wolfinger and Rosenstone 1980). Converse (1972, p. 324) describes the overwhelming significance of formal education on political participation by concluding that "education is everywhere the universal solvent, and the relationship is always in the same direction." Although there are literally thousands of empirical analyses that demonstrate a strong, positive relationship between formal education and democratic behavior, this same literature lacks a definitive explanation as to the explicit mechanism by which education influences political behavior. Too many studies blindly include education in the regression model, assuming a purely linear and additive relationship, and failing to explain why it matters. Theoretical explanations of the link between education and political engagement have rarely been fleshed out—much less empirically tested. As Miller and Shanks (1996, p. 580) lament, "We simply need a better understanding of the many ways in which education makes such a difference to rates of turnout on election day."

In reviewing the extensive literature on democratic behavior, three (somewhat implicit) explanations linking education with political participation can be ascertained: (1) the civic education hypothesis; (2) the social network hypothesis; and (3) the political meritocracy hypothesis. In this article, I operationalize and test these competing hypotheses in order to explore the mechanisms that underlie the enduring correlation between formal years of education and political engagement.

Civic Education Hypothesis

The most prominent explanation for the link between education and political participation can be called the civic education theory. The civic education hypothesis is rooted in the belief that education provides both the skills necessary to become politically engaged and the knowledge to understand and accept democratic principles. Rosenstone and Hansen (1993) argue that the well-educated participate at higher rates because their schooling provided them with the "skills people need to understand the abstract subject of politics, to follow the political campaign, and to research and evaluate the issues and candidates. In addition, because of their schooling, the well educated are better able to handle the bureaucratic requirements of registration and voting"(p. 136). Put simply, education lowers the material and cognitive costs of participation (Wolfinger and Rosenstone, 1980).

Undeniably, the fundamentals of education are important. Democratic citizens need some minimal understanding of the political system in which they express preferences and elect representatives to know even basic information like when and where to cast a ballot. If individuals cannot read, it is difficult to fill out the ballot or to write a letter to their elected representative. Yet, beyond the fundamentals of reading and writing—an 8th grade or even high school education—it is less clear why further schooling should influence democratic behavior.

The civic education hypothesis suggests that additional years of education can continue to equip citizens with political information that further eases the costs of political engagement. While literacy may be necessary for casting a ballot, it is perhaps not sufficient for reasoned and deliberative decision making by a voter. Higher education imparts the knowledge, skills, and political familiarity that help in navigating the political world. In addition to teaching concrete information about the political process, higher education might help citizens understand the relationship between political action and the preservation of a democratic system (Galston, 2001; Niemi and Junn, 1998; Torney-Purta, Schwille, and Amadeo, 1999). Not all formal schooling is expected to develop these skills equally well, however. Implicit in this literature is the notion that education (beyond the three "Rs") is influential in shaping political engagement in so much as that schooling includes *civic* education (Levine and

Lopez, 2004). A computer science course is unlikely to impart the verbal acuity necessary to engage in political discourse; a biology course does not typically give cause to encourage political attentiveness. It is a civic or social science curriculum that imparts the skills and resources necessary to be active in the political realm. For instance, Niemi and Junn (1998) conclude that a civics curriculum enhances what and how much students know about American government and politics, even controlling for individual motivation and family-socialization effects.

Thus, according to the civic education hypothesis, education—specifically a civic education—expands the capacity of citizens to engage in self-rule by teaching citizens the behaviors and knowledge necessary for identifying political preferences, understanding politics, and pursuing political interests. Yet, this hypothesis has recently come under scrutiny, and an alternative hypothesis linking education and democratic behavior has been offered.

Social Network Hypothesis

The civic education hypothesis suggests that increasing education in the population should produce a more informed and engaged electorate. Yet, we are all familiar with the aggregate trends that find a dramatic increase in educational attainment since the 1960s coupled with a simultaneous decline in political engagement (Brody, 1998). Developed in part as an explanation of this "puzzle of participation," the social network hypothesis offers an alternative explanation for the cross-sectional relationship between education and participation. Nie, Junn, and Stehlik-Barry (1996) argue that education is a determinant of political engagement not so much for its intrinsic skill-building value, but rather, because education predicts an individual's social network position.[4] Nie et al. (1996, p. 189) argue: "So long as the number of seats in the political theater remains fixed and education continues to play a strong role in determining social network position, the amount of inequality in the participatory hierarchy should remain constant regardless of the degree of increase in educational attainment over time." In other words, education works as a social sorting mechanism. Those with higher levels of education are substantially more likely to be found closer to the center of politically important social networks, while those with less education are much more likely to be found at the periphery. Nie et al., contend that "formal education is important to the characteristics of political engagement because it sorts citizens into positions in the social and political hierarchy that facilitates political engagement to a greater or lesser degree" (1996, p. 17). In other words, education places citizens either closer to or further from the center of critical social and political networks that, in turn, affect levels of political participation. Proximity to those who make policy decisions, along with accessibility to

sources of relevant political information, is simply easier and less costly for those well-connected individuals.

Given that voting has fewer social barriers than more difficult political activities, the link between social network centrality and turnout seems somewhat more tenuous. Nonetheless, Nie et al., argue that social networks can either encourage or discourage voter turnout. More educated individuals may have friends who engage them in political conversation; and they are more likely to be mobilized by campaigns or candidates. Rosenstone and Hansen (1993) and Verba et al. (1995) conclude that politically active individuals tend to be those who are mobilized by the political elite, and, not surprisingly, political elites tend to target those individuals at the center of social networks.

Besides the civic education hypothesis and social network hypothesis, one other explanation—what I call the political meritocracy hypothesis—has been offered to account for the strong correlation between years of education and political engagement.

Political Meritocracy Hypothesis

Perhaps the single challenge to the assumption that education increases political engagement comes from a variant of the "IQ meritocracy" hypothesis.[5] Put simply, this hypothesis suggests that intelligence begets educational attainment, not the other way around. Formal schooling separates individuals with a high degree of innate intelligence from those with lesser levels—the most cognitively proficient students are those who excel in grammar school, graduate from high school, and continue to college and beyond. Extended to political behavior, this hypothesis challenges the relationship between education and characteristics of democratic citizenship. The political meritocracy hypothesis does not question that a positive correlation exists between education and participation, but it does dispute the conclusion that education *causes* democratic behavior. According to this argument, there exists a spurious relationship between education and democratic behavior—intelligence produces both. In other words, brighter individuals tend to go further in school and also to participate at higher rates. Herrnstein and Murray (1994) argue, "Why does education matter so much [in explaining political participation]?. . .education predicts political involvement in America because it is primarily a proxy for cognitive ability"(p. 253). Luskin (1990) concludes that once intelligence and other variables are taken into account, education has no effect on political sophistication:

> The simplest explanation is the paucity of controls. The studies showing an education effect do not always partial on interest, and never on intelligence or occupation qua political impingement. So 'education's' effect may really be intelligence's,

> occupation's, and interest's. Education may be taking credit for the other variables' work. Students must pick up some political information in school, but apparently do not wind up knowing much or more, other things being equal, the longer they spend there. (p. 349)

In other words, intelligence, rather than education, is the more important determinant of political sophistication. And political sophistication in turn engenders political participation. Hess and Torney (1967) similarly find in a study of elementary age children that more intelligent children of all socioeconomic classes were more likely to discuss, read about, and participate in political activities than were less intelligent children. Neuman (1986, p. 261) concludes that "the evidence supports the idea of an independent cognitive effect" as part of the proved link between socioeconomic status and political participation.

In the next section, I will operationalize these competing hypotheses, and empirically test them using a unique data set collected by the NCES.

DATA AND EMPIRICAL MODELS

The analysis in this manuscript relies on small subset of respondents who were part of a massive data collection effort by the NCES. The B&B Longitudinal Study was designed to track the experiences of a cohort of college graduates who received their baccalaureate degree during the 1992–1993 academic year. The B&B sample design "represents all postsecondary students in the United States who completed a bachelor's degree in the academic year 1992–1993"(Green, Myers, Veldman, and Pedlow, 1999). Because this study has not been utilized to great extent in the field of political science, I first offer some background and detail about the survey data.[6]

The B&B study was sponsored by the NCES and executed by the National Opinion Research Center (NORC).[7] The B&B respondents were first interviewed as part of the National Postsecondary Student Aid Study (NPSAS:93) during which time detailed information was collected from the students' institutions and academic transcripts; the first follow-up interview (B&B:93/94) was conducted one year after they received their bachelor's degree; the second follow-up (B&B:93/97) was collected four years after they received their bachelor's degree.

From the NPSAS:93 eligibility sample of more than 80,000 college students,[8] 11,192 cases were eligible for the B&B studies because they had completed their Bachelor's degrees in the 1992–1993 academic year. These students were identified using institution-provided lists of students who filed for graduation or who indicated having graduated in the 1992–1993 academic year during their individual interviews. A full 83% of the sample responded to all three rounds of interviews; these 9274 respondents are classified as the

B&B panel. Given the restriction of the sample to college graduates, the interpretation of any results must be limited to generalizations about the college-educated subset of the general population, and not about the population as a whole. Nonetheless, these rich data offer a unique opportunity to explore the complex relationship between higher education and political participation.

The analysis here is restricted to only U.S. citizens who took the Scholastic Aptitude Test (SAT) and who attended not-for-profit, four-year institutions, leaving a sample size of 3873 individuals.[9] Although many entering freshmen take the Academic Achievement Test (ACT) instead of the SAT, the B&B dataset does not contain a breakdown of scores for the different ACT sections (English, Math, Reading, and Science), making it impossible to evaluate the effects of verbal proficiency versus overall aptitude. I have replicated the models in Table 1 using composite ACT/SAT score with nearly identical results, but the following analysis indicates that distinguishing the effects of verbal and math proficiency is critical to understanding the link between education and political behavior.[10]

The political behavior dependent variables in this analysis include a measure of voter turnout and a separate measure of participation in other political activities.[11] Question wording and coding can be found in Appendix A. The political participation variable measures whether, when asked in the second follow-up interview, the respondent had participated in any of the following political activities: written to a public official, attended a political meeting, contributed money to a political candidate, or contributed money or time to a political cause.[12] Voting is considered separately from political participation because it differs so fundamentally from other political acts (Verba et al., 1995). Voting can be considered political engagement insofar as it enables citizens to express their general preference for one leader or party over another, but it conveys little information about the context of specific interests. It is a political activity that requires much less time, effort, and information than the more difficult political acts included in the political participation variable. Among the B&B respondents, 63% reported voting in both the 1996 presidential and state/local elections (76% in 1996 presidential election, 66% in state/ local) and 29% reported participating in at least one political act.[13]

I include a number of independent variables in the models to test the three higher education theories. The civic education theory would predict that the type of curriculum studied in college has a direct influence on future political engagement because some courses are more likely than others to develop the skills fundamental to political participation. Specifically, the empirical test should find that social science courses positively relate to voting turnout and political participation. The number of normalized credit hours in business, humanities, social science, science/engineering, and education are included in the model to test the civic education hypothesis.[14]

TABLE 1. Empirical Results of Effect of Education Factors on Political Engagement

	Political Participation			Voter Turnout		
	Model 1: Pre-College	Model 2: College	Model 3: Post-College	Model 4: Pre-College	Model 5: College	Model 6: Post-College
Hispanic	.29(.19)	.27(.21)	.16(.23)	−.13(.17)	−.11(.18)	−.15(.20)
Asian	.05(.16)	.11(.17)	.24(.19)	−.94*(.17)	−87*(.18)	−.72*(.18)
Black	.08(.16)	.10(.17)	.13(.19)	.45*(.17)	.45*(.18)	.49*(.20)
Female	.03(.07)	−.04(.07)	−.01(.08)	−.01(.06)	−.04(.07)	−.09(.08)
Parent's Education	.02*(.01)	.02*(.01)	.02*(.01)	.01(.01)	.01(.01)	.01(.01)
SAT Verbal Scores	.003*(.001)	.003*(.001)	.003*(.001)	.002*(.0005)	.002*(.0005)	.002*(.0005)
SAT Math Scores	−.002*(.001)	−.001*(.001)	−.001(.001)	−.0007(.0005)	−.0003(.001)	−.0002(.001)
Age at graduation (<21)		−.07(.09)	−.14(.09)		.03(.07)	.05(.08)
Age at graduation (24–25)		.11(.12)	.05(.13)		.22(.14)	.19(.14)
Age at graduation (26+)		.13(.18)	.10(.20)		.51*(.19)	.46*(.20)
Social Science credits		.005*(.002)	.005*(.002)		.004*(.002)	.005*(.002)
Humanities Credits		.004*(.002)	.003(.002)		.002(.002)	.003(.002)
Science Credits		−.008*(.002)	−.009*(.002)		−.002(.002)	−.001(.002)
Business Credits		−.007*(.003)	−.007*(.003)		.001(.002)	.0002(.002)
Education Credits		−.001(.003)	−.001(.003)		.005*(.003)	.004(.003)
School Enrollment		−.03(.04)	−.03(.04)		−.01(.04)	−.01(.04)
School Quality		−.02(.02)	−.02(.02)		−.01(.02)	−.01(.02)
GPA		−.00001(.001)	−.0004(.001)		.001(.001)	.001(.001)
Married			.11(.08)			.15*(.07)
Currently Enrolled			.13(.12)			−.10(.12)
Advanced degree			.06(.11)			.15(.12)
Occupation (Professional)			.04(.09)			−.03(.09)
Political Interest			.56*(.08)			.23*(.09)
Constant	−1.37	−1.13	−1.65	−.52	−.83	−1.03
N	3818	3519	3046	3818	3519	3046
Wald Chi^2	56.65*	112.80*	119.64*	83.42*	102.41*	97.51*
Pseudo R^2	.012	.022	.033	.016	.019	.020
Reduction in Error	6.57%	6.79%	8.68%	2.50%	3.46%	2.51%

Notes: Robust standard errors clustered on school in parentheses, *$p < .05$ (two-tail). Reduction in error defined by (%correctly predicted-%modal)/(100-%modal).

The data set also allows for an imperfect test of the political meritocracy hypothesis. The dataset contains no direct measure of intelligence, and in fact, there is a heated debate among education researchers as to whether one even exists. The survey does, however, contain a couple of proxies for cognitive proficiency. The first measure relies on individual scores on the SAT. The SAT was designed to measure competence in vocabulary, reading comprehension and arithmetic reasoning. Scholars have long recognized the similarities between IQ tests and the SAT, and some research has concluded that all cognitive tests largely measure learned intelligence rather than innate intelligence (Anastasi, 1976). Although these scores may not measure innate intelligence, they are at least a measure of cognitive proficiency *prior* to college matriculation. The empirical model will test if other characteristics of education have an impact when controlling for pre-collegiate aptitude. The second proxy for aptitude is undergraduate grade point average (GPA), measured on a 4.0 scale. GPA is the clearest measure of student performance in an undergraduate program.[15] Certainly, a student's GPA is affected by more than just aptitude, but to the degree that GPA does not measure pure cognitive proficiency, it does, perhaps, reflect a student's motivation to excel. Whatever immeasurable things motivate an individual to succeed as a student may likewise motivate him or her to excel as a citizen—to perform her civic duty to help preserve a democratic system. The empirical model includes math and verbal SAT scores and cumulative GPA to test the political meritocracy hypothesis.

Network centrality has also been operationalized in a number of ways. First, I include in the model a measure of the quality of the institution attended. Institutional quality varies widely, and if it is accepted that this can affect career preparedness and opportunity, then it certainly seems plausible that it can also affect political preparedness and opportunity. A degree from a regional state university is simply not equivalent to a degree from an Ivy League. Attendance at a top university might improve network position through increased occupational prestige, income, and by placing students in a milieu among the "best and the brightest." If your friends are discussing politics (instead of last week's fraternity kegger), you are more likely to discuss politics yourself. The school quality measure included in the model is coded on an eight-tier scale, with the top universities and liberal arts schools (as ranked by the 2000 U.S. News and World Report) being coded as tier eight and the lowest ranked schools coded as tier one.[16]

Similarly, smaller college campuses may also play a role in future social network position in as much as an environment in which "everyone knows everyone" may encourage the development of important social networks. As a colleague recently noted about graduate program admittance, applicants from large state universities rarely have recommendation letters as strong as those for students from smaller institutions simply because students at larger schools

tend to be less acquainted with or familiar to their professors. The natural log of institutional enrollment is included in the model to test the effect of student body size on political engagement.

Finally, I evaluate the social network hypothesis with an occupational measure. Included in the model is an indicator variable if the respondent holds a professional occupation (in law, medicine, engineering, or other). Again, the social network hypothesis would expect that individuals in more "prestigious" occupations should be more likely to participate in politics because they are more likely have connections with the political epicenter. Admittedly, individuals might not have settled into their long-term careers just five to six years after college graduation, but these three measures will still gauge the effect of social network centrality on political participation at this stage in an individual's life cycle.[17]

In addition to the variables included to test the three hypotheses, I have also included a number of control variables to ensure that any observed correlations are not an artifact of omitted variables. The position of recent college graduates in their life cycle, for example, undoubtedly has an impact on the ability and motivation to participate in the political world. Recent college graduates may be more likely to be residentially and occupationally mobile, so they may not have developed the stakes in the politics of a particular locality that comes with extended residence, home ownership, and children in school (Rosenstone and Hansen, 1993). Additionally, continuing students face the specific legal obstacles to voting associated with short residence. All of these factors contribute to the steep "start up" costs of participation that produce the lower levels of turnout and participation among younger respondents that is so often noted in political behavior literature (e.g., Highton and Wolfinger, 2001; Miller and Shanks, 1996). I control for such life cycle effects by including marital status and graduate student status in the explanatory equations.[18]

Finally, I include controls to attempt to account for possible self-selection effects of college curriculum. It certainly seems plausible that individuals with an interest in politics—because of personality, family background or some other reason—might self-select political science as a major (though it might make somewhat less sense for other majors). One way to address this issue is to see whether the impact of curriculum remains when the effect of political interest is controlled. If political interest is driving curriculum selection then the effect of curriculum will disappear when interest is included in the model. The survey contains a question that measures an individual's general propensity to engage in political activity: "Is it important to you to influence the political structure?"[19] This variable will account for those who have a prior interest in politics and government—whatever the root cause. Similarly, skills held prior to college matriculation might have an impact on curriculum selection, but are already controlled for by including SAT scores in the explanatory equations. I also include a measure of parents' level of education,

measured as the highest level of education by either parent, as the best measure of pre-college political interest and socialization. It is well-established that highly educated parents tend to have highly educated children, and politically active parents tend to have politically active children. Unfortunately, the survey does not include a measure of parents' levels of political involvement, but the next best proxy is their level of education.

Before turning to the results of the model with these additional controls, I want to again emphasize the motivation for this model specification. Some readers have recommended a two-stage model to account for endogeneity concerns, but this would not be an adequate statistical solution for both theoretical and empirical reasons. As is commonly the case, the data set contains no reasonable instruments—variables that are related to social science curriculum but also uncorrelated with the main equation error term.[20] More importantly, the real statistical concern is not one of endogeneity. At a literal level, we recognize that voting in 1996 does not *cause* an individual to select a particular college course in 1988. Does, however, a student select a college curriculum because of an expectation of voting or participating in the future? Although somewhat more plausible, this too remains a bit of a logical stretch. As most faculty recognize, there are all number of factors that contribute to a student's course selection that are completely unrelated to future political engagement, including basic university requirements, perceived class difficulty, professor likeability, course availability, and course time schedule, in addition to each student's individual scheduling needs around extracurricular activities, employment, peer schedules, etc. In fact, the correlation between social science curriculum and political interest is a meager .08, and an average of just 3 social science credit hours separate the politically interested and uninterested respondents. The real concern is that students might select a social science curriculum because of their interest in politics, and they will also participate in politics later in life because of that interest in politics. In other words, the issue at hand is whether there is spurious relationship between curriculum and engagement, which I account for by including political interest and parent's education in the model. All of this is to say that the model specification and statistical approach presented here are not unreasonable.[21] At very least, these curriculum measures can be viewed as critical controls to evaluate the lasting impact of verbal skills on future levels of political engagement. In fact, I present the empirical results in sequential order (pre-college factors, college factors, post-college factors) so that the effects of various cumulative factors over the course of a student's life cycle can be compared.

FINDINGS

The findings for the analysis are reported in Table 1.[22] Turning first to the effect of pre-college variables on voter turnout (Model 1) and political

participation (Model 4) five to six years after college, we find effects consistent with existing analyses of political behavior. For instance, we find that parent's education is positively related with turnout and participation (only statistically significant at conventional levels for participation). More interestingly, college-educated Blacks were quite consistently more likely to vote than college-educated whites, while college-educated Asians were significantly less likely to vote. The model finds no significant difference between men and women for either turnout or the more involved political activities.

The findings concerning the effect of SAT scores on the dependent variables are somewhat surprising. If overall intellectual ability is some combination of mathematical and verbal capacities (and verbal and math scores are correlated quite highly at .65), then more intelligence does not appear to increase future political engagement. Given the opposing effects of math and verbal SAT scores on the measures of democratic engagement, there appears no evidence that general intelligence influences political activity.[23] In fact, quantitative aptitude has no impact (vote turnout) or even a significant negative impact (participation). In other words, controlling for all else, those who score better on the Math section of the SAT actually perform *fewer* participatory acts than do others.[24] In contrast, the effect of verbal aptitude is exactly the opposite—positive and significant. Individuals who scored well on the verbal portion of the SAT before beginning college were significantly more likely to participate in politics some four years after finishing college.

It is probably of little surprise that verbal ability is important in determining an individual's level of participation. Politics, after all, is a game of language, persuasion, and oral and written communication. To write a letter to a public official, an individual must feel comfortable in finding the words and forming the sentences to express his or her opinion (e.g., Verba et al., 1995). To engage in political persuasion an individual must have the verbal acuity to communicate a position. Political philosophers have long emphasized the relationship between politics and language. And social scientist Edelman (1977, p. 4) has written extensively on the importance of language in politics, arguing that "language is an integral facet of the political scene: not simply an instrument for describing events but itself a part of events, shaping their meaning and helping to shape the political roles officials and the general public play."

These findings suggest that it is verbal aptitude, not overall intelligence itself, that matters. Aptitude for quantitative reasoning plays either no role or perhaps even a small negative role in an individual's level of political engagement. And B&B respondents with strong verbal skills appear more politically active than those with weaker verbal skills. As we will see when we consider the effect of college-related factors, this interpretation is also supported by the positive significant effects of a curriculum that helps to develop verbal and civics skills.

Turning to Models 2 and 5, we can evaluate the effect of a student's college experience on future political engagement. Most notably, we find a number of interesting null findings. The quality of the institution attended appears to have little or no effect on political engagement, and actually has the opposite sign as would be predicted by the social network hypothesis. Thus, despite theoretical reasons to hypothesize otherwise, institutional quality does not have a pervasive impact on the political engagement of recent graduates. It is certainly plausible that the effect of attending an elite institution has simply not had time to take effect. As these recent graduates age, settle into their communities, and some decide to get involved in politics themselves, perhaps the importance of an elite education and the political networks it creates will be magnified. Alternatively, it could be the case that institutional prestige is not an adequate predictor of network centrality because individuals end up in social and professional networks with similar college pedigrees. In this case, it might be the case that institutional prestige relative to the other members of your social networks is more important than absolute institutional prestige.[25] Similarly, the size of the student body is not statistically significant for either measure of political engagement. GPA also appears to play no independent role in political participation or voting. Whatever combination of ability and effort goes into its production, cumulative GPA—clearly the best overall measure of undergraduate academic performance—shows no relationship with future political engagement. Whatever motivates an individual to succeed as a student does not appear to also inspire him or her to excel as a citizen.

Although the sample is largely homogeneous with respect to age, I have nonetheless included a categories measuring a respondent's age at graduation to account for life cycle effects. As expected, older students are more likely to vote and participate in politics. Interestingly, this effect is significant only for those 26 and older, perhaps reflecting the fact that those who graduate at age 24 or 25 may have simply taken longer to graduate (a slacker effect?) instead of entering college as non-traditional students.

The effects of a college curriculum on future engagement are especially notable. A social science curriculum has a consistent, positive and statistically significant effect on both measures of political engagement. B&B graduates who concentrated study in social science were found, six years later, to be among the most politically active citizens compared to those who majored in any other field, even controlling for a multitude of other factors. The impact of a humanities curriculum is somewhat smaller and less consistent, but also tends to find a positive relationship with future participation. This finding that skills related to political engagement can be learned outside of political science or even social science courses is consistent with existing findings about the effects of high school curriculums (Conover and Searing, 2000).

The pattern for science and business school majors, on the other hand, is just the opposite. In fact, an increase in the number of business and science

courses is correlated with a statistically significant decrease in political participation. This finding is somewhat unexpected. After all, politicians are often business leaders themselves (Burrell, 1994). Likewise, business and science majors are often associated with higher starting incomes, and income is often considered another important predictor of turnout (income was always insignificant when included as a measure in the models). Again, students who concentrated their studies in biology, chemistry, engineering and the like appear less inclined to participate politically, while those in the social sciences and humanities are more likely to vote and participate in other forms of political activity. Credits in Education, perhaps surprisingly, has no relationship with participation, but a positive and significant relationship with vote. Although not thoroughly explored in the current analysis, one possible explanation for this difference might be the voter mobilization efforts of teacher's unions during political campaigns.

It is important to note that the pre-college effects on future political engagement do not change, even when we account for the more proximate college experiences. If the selection of social science courses was completely dependent on verbal skills, we would have found that the effect of SAT verbal skills would have disappeared once curriculum was included in the model. Instead, we find that both skills and curriculum have independent effects on future levels of political engagement. We next look at whether these effects remain once we consider even more immediate factors that might be related to political engagement. Models 3 and 6 present the results with the post-college measures added to the analysis.

With respect to post-college factors, we find that current school enrollment and attainment of an advanced degree have no impact on current levels of political engagement. It is perhaps surprising that one of the primary outcomes of skills and training, one's occupation, is also not related to political engagement. Recall that the social network centrality hypothesis would have led us to expect that individuals with a professional degree would be more connected to the political elite. Being married, in contrast, consistently has a positive and significant effect on voting, as we would expect given well-documented life-cycle effects.

Most critically, however, we find that the effects of verbal skills and a social science curriculum remain positive and significant even controlling for post-college political interest, a quite strong predictor of political engagement itself.

To evaluate the substantive effect of the key results from the fully specified models (Models 3 and 6), I graph in Fig. 1 the predicted probability of participating in a political activity across the 20th–80th percentile of SAT Math and Verbal scores.[26] Holding all other controls to their means and indicator variables to zero, the predicted probability of political participation for those in the 20th percentile in verbal aptitude (460 of 800) is just 30.8% compared to 41.1% among those in the 80th percentile (620 of 800). In contrast, higher

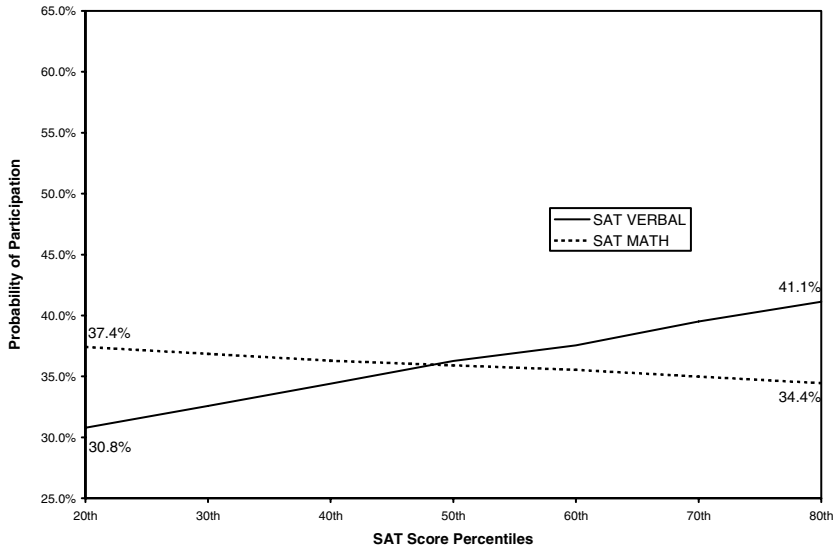

FIG. 1. Predicted probability of political participation by SAT percentiles.

math SAT scores are related to lower levels of political participation. Those scoring in the 20th percentile (460/800) on the SAT math scores are predicted to have a 37.4% chance of participating in politics versus a 34.4% chance among those in the 80th percentile (620/800). A positive effect of verbal proficiency is also found for vote turnout, illustrated in Fig. 2, with the predicted probability increasing from 56% to 63% from the 20th to 80th percentile. There is virtually no substantive effect of SAT math scores on future voter turnout. Finally, I estimate the predicted probability of political engagement for different levels of social science credits.[27] Among those in the 20th percentile (nine normalized credit hours) the predicted chance of voting was 57.9% compared with 61.6% among those in the 80th percentile (43 normalized credit hours). Similarly, the predicted probability of participating in a more difficult political activity was 34% among those with nine normalized credit hours and 38% among those with 43 normalized social science credit hours.

DISCUSSION

Of the three competing explanations for the enduring relationship between education and political engagement, the empirical analyses here offer the greatest support for the civic education hypothesis, though the findings suggest that a more complex theory about the relationship between education and

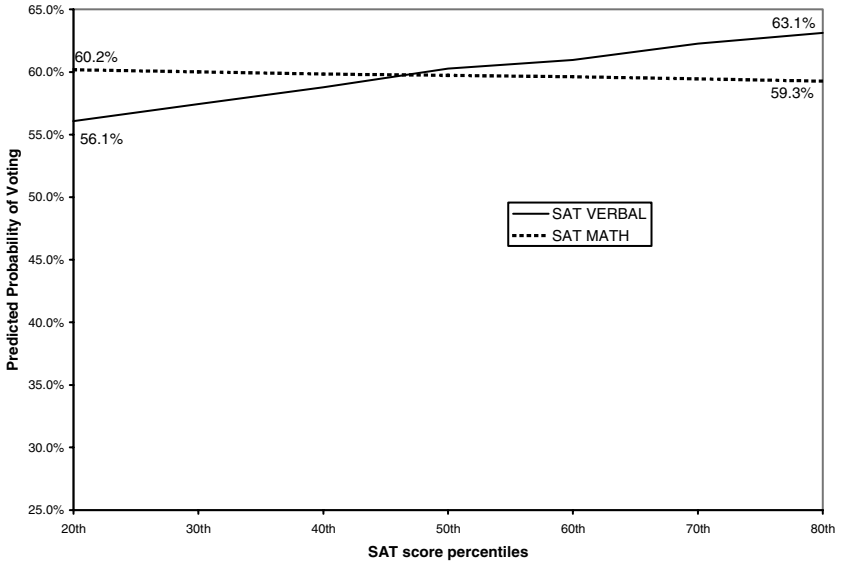

FIG. 2. Predicted probability of voting by SAT percentiles.

political engagement may be in order. Verbal skills have a clear and significant influence on future political engagement, with such skills undoubtedly reinforced through college and career. Even taking into account those initial verbal skills, a social science curriculum affects voting turnout and political participation in a positive direction. Although SAT verbal scores have an enduring impact on political engagement, the political meritocracy hypothesis holds little water given the opposing relationship between SAT Math scores and political engagement. Likewise, the social network hypothesis found no support—none of the measures had the expected effect on political engagement. Again, it is certainly possible that social networks become more influential and pronounced as individuals age, but they do not explain variation in political participation and voting at this stage in a college graduate's life cycle.

Although these empirical tests of the competing hypotheses presented here are far from definitive, they complement and expand the results of Nie and Hillygus (2001), who find that college students concentrating study in the social sciences and humanities were more likely to participate in community service, vote, discuss politics, and participate in politics immediately following college. The results here suggest that college experiences and the post-college outcomes of those experiences have an even longer term effect on future levels of political engagement. More critically, this article has operationalized and tested the various hypotheses that exist for explaining the relationship between education and political engagement.

In what ways does this analysis inform the "black box" of college education? Certainly, the findings here suggest that the impact of higher education on future political engagement is not a function of the size or quality of school attended, the grades received while there, or even the prestige of the occupation obtained afterwards. Rather, it appears that higher education influences political engagement in the years following college graduation in so much as the curriculum studied while in college was relevant to the political world. Of course, it should also be recognized that these results do not entirely explain the disparate rates of engagement between those with and without a college degree. Even college graduates in the B&B survey with no social science credits have a predicted 56.8% chance of voting, which is still far higher than young people in the population with no higher education at all (and thus no social science courses).[28] Accordingly, it seems plausible that a college education, in and of itself, may directly affect democratic behavior. Participation in a university community may socialize individuals to participate in political communities or may impart some of the basic associational skills necessary to function in the political and civic realm (Galston, 2001). As Tocqueville first recognized, the norms and skills of community and civic involvement carry over to political involvement as well. But even if participation in an educational community—a classroom, a department, or a university—is an important connective mechanism between higher education and participation, this paper has shown that the specific content of education (both in college and before) is also critical. The findings suggest that an educational system geared towards developing verbal and civic skills can encourage future participation in American democracy. Thus, as universities increasingly move away from broad liberal-arts curriculum toward a more technical and specialized curriculum designed to prepare students for the working world, we should be aware of potential unintended consequences for democratic engagement.

APPENDIX A: QUESTION WORDING/CODING

More detailed variable information (including entire survey instrument) is available on the website of the NCES (http://nces.ed.gov).

Political Participation: (B&B97) indicates in the individual has been involved in at least one political activity besides voting in the last 2 years. Created using the following questions: "In the last 2 years, did you go to any political meetings, rallies, dinners, or things like that?"; "Did you give any money or other financial support to help the campaign for any political party or candidate?"; "Have you given any time or money to community action groups or other political action groups?"; "Have you written to any public official to express your opinion?"

Vote: (B&B97) indicates whether an individual has voted in the presidential and local elections—created using "Did you vote in the 1996 presidential election?" and "Have you voted in any local, state or national election in the last two years?".

School Quality: The author recorded each institution's ranking by matching the school name and IPEDs number with the tier ranking according to the 2000 U.S. News and World Report. The rankings range from 1 (lowest) to 8 (highest). The 2000 U.S. News and World Report ranks national universities, national liberal arts colleges, regional universities, and regional liberal arts colleges on different 4 tier scales. To create a single scale, national colleges (both PhD-granting and liberal arts) were combined and assigned rankings of 5, 6, 7, or 8 based on tier ranking, while regional schools (both PhD-granting and liberal arts) were coded as 1–4 based on tier ranking. For example, the top 50 national universities (tier 1) and top 50 national liberal arts colleges (tier 1) were given a code of 8, while the 4th tier institutions in the North, South, Midwest, and West were all given a code of 1. The 2000 rankings were used (even though students graduated in 1992–1993 academic year and their political engagement was measured in 1997) because these scores were available online; it is assumed that there are few movements across tiers.

The U.S. News rankings use 15 independent data items assembled from various data sources, both public and private. These 15 data items are first combined into 7 variables: Academic reputation (1 item), retention (2 items), faculty resources (5 items), student selectivity (4 items), financial resources (2 items), value added (1 item derived from data already included in other variables), and alumni giving rate (1 item). The variables are then combined into a single score that is scaled against the top score, and that is expressed as a percentage of the top score.

Political Interest: (B&B93/94) "As I read the following statements, please tell me whether they are important or not important... influencing the political structure?"(*g97a*) Alternative measure used (see footnote 18): "Did you talk to any people and try to show them why they should vote for one of the parties or candidates?"(*b2polshw*)

From Student Transcripts that NCES matched by social security number: normalized curriculum credit hours (*tzcred01–07*), School Enrollment (*enroll92*), SAT scores (*satvr10, satmr10*).

Professional Occupation: (B&B97) indicates if an individual holds a professional occupation(medical, legal, engineer, physician) (*b2ajobr*). *Parent's education* (B&B97) refers to the highest level of education by either parent (b2*pared*). Indicator variables created from following 1997 B&B variables: married (b2lstmar), citizenship (*Ctznshp2),* age at graduation (*age),* gender (*b2rsex),*Hispanic(*rhispor),* race (*b2rrace),* Graduate Degree (*b2hdgprg*), Graduate Enrollment *(b2curenr).*

APPENDIX B: TWO-STAGE LEAST SQUARES RESULTS

TABLE B.1. Two Stage Least Squares Model of Political Participation (additive scale)

Social Science credits	.05(.01)
Hispanic	.08(.14)
Asian	.27(.14)
Black	.04(.10)
Female	−.01(.04)
Age at graduation (<21)	−.23(.07)
Age at graduation (24–25)	.24(.09)
Age at graduation (26+)	.43(.13)
School Enrollment	−.04(.02)
School Quality	−.03(.01)
GPA	.003(.001)
Married	.16(.05)
Currently Enrolled	.001(.08)
Advanced degree	−.10(.07)
Occupation (Professional)	.11(.06)
Political Interest	.18(.04)
Constant	−1.10
N	3036
F	4.87
Root MSE	1.18

Note: Political participation measured as a additive scale of the four possible political activities. In the first stage model, social science credits are predicted by parent's education, SAT math and verbal scores. Standard errors (clustered by school) are presented in parentheses.

NOTES

1. Analysis for this article relied on restricted-use data from the National Center for Education Statistics. Application procedures for obtaining an NCES restricted data license to access the Baccalaureate and Beyond Longitudinal Study are available at http://nces.ed.gov/surveys/b&b/. Replication code and supplemental variables (including school quality) are available on the author's website.
2. The few exceptions include Hess and Torney (1967) and Neuman (1986).
3. Niemi and Junn (1998) analyze the varied effects of secondary education on the political knowledge of high school seniors. A thorough examination of the specific role of higher education in the development of democratic citizenship, however, is still lacking. Nie and Hillygus (2001) offer an exploratory look using the first follow-up, but do not explicitly test competing theories about the link between education and political behavior.
4. Although Nie et al. (1996) argue that social network position is the primary reason for the link between education and political activities, they acknowledge that education is a predictor of voting behavior both because of social network centrality and verbal cognitive proficiency.

5. Classic works on this theory include Jencks, Smith, Aclard, Bare, Cohen, Gintis, Heyns, and Michelson (1972) and Olneck and Crouse (1979).
6. The full methodology report for the survey is available at http://nces.ed.gov/pubs99/1999159.pdf. This analysis here relies on restricted-use data; the procedure and application material for access are available at www.nces.edu. The code for replicating the analysis, as well as a file of author-added variables, are available on the author's website.
7. Respondents were interviewed using one of two computer-assisted-interviewing systems. The majority of interviews were conducted by telephone interviewers located at a central facility using a computer-assisted telephone interviewing (CATI) system. Remaining cases were completed by field interviewers using a computer-assisted personal interviewing (CAPI) and case management system (CMS) that was loaded into their individual laptop computers.
8. The B&B:93/94 sample was a subsample of the students selected for the 1993 National Postsecondary Student Aid Study(NPSAS:93), a nationally representative sample of all postsecondary students. The NPSAS:93 survey employed a stratified two-stage sample design with postsecondary institutions as the first-stage unit and students within schools as the second stage. To be eligible for inclusion in the sample, an institution was required to satisfy all of the following conditions: (1) offer an educational program designed for persons who have completed secondary education; (2) offer an academic, occupational, or vocational program of study; (3) offer access to persons other than those employed by the institution; (4) offer more than just correspondence courses; (5) offer at least one program requiring at least three months or 300 clock hours of instruction; and (6) be located in the 50 states, the District of Columbia, or Puerto Rico. A total of 1386 postsecondary institutions were sampled for NPSAS:93; 143 were deemed ineligible based on the criteria outlined above. Of the 1243 eligible institutions, 88% participated by submitting lists of students for selection into the NPSAS:93 sample. Within participating institutions, students eligible for selection into NPSAS:93 were those who were attending the sampled institution and were enrolled either in courses for credit toward a degree or formal award, or in a degree, occupational, or vocation program of at least three months' duration. A total of 82,016 students were selected for the NPSAS:93 sample, with a final eligible sample size of 79,269. In addition, NPSAS:93 included students in each institution who received a baccalaureate degree between July 1, 1992 and June 30, 1993.
9. Just 219 of the 9272 panel respondents were attending for-profit or 2-year institutions. A quick comparison to the Current Population Survey (CPS) finds that the final sample remains quite comparable to the general U.S. citizen population with Bachelor degrees and between the ages 20–30: 55% are female (57% CPS), 85% Caucasian (89.5% CPS), 5.7% Black (7.1% CPS), and 4.9% Asian (2.6% CPS).
10. For comparability, the SAT/ACT quartiles were used (ACT quartile used where SAT scores not available). Within the B&B panel, 6282 respondents had either SAT or ACT scores available. Of those without test scores, 765 did not take the ACT or SAT (7% of sampled institutions did not require the SAT or ACT). The remaining cases did not have scores available on their transcript and did not recall their scores in their first interview. Leaving these groups in the analysis (with indicator variables) does not change the results.
11. Both dependent variables are coded as dichotomous variables.
12. The analysis was replicated for each activity individually with similar results. Social Science curriculum and SAT scores were always in the expected direction (positive) and were statistically significant at traditional levels for nearly all political activities. The only exceptions: verbal SAT scores were not significant at traditional levels for contributing money and social science credits were not significant at traditional levels for writing a political letter. Given the infrequent nature of some of the activities and for ease of exposition, the political participation variable captures whether an individual participated in *any* of these activities.

13. As has long been recognized, self-reported voting is consistently exaggerated in surveys (Traugott, 1989), but recall that college graduates are also more likely to participate than the general population.
14. The B&B survey reports the normalized credit hours—transformed on a 120 credit hour BA requirement scale to account for varying institutional formats (semesters, quarters, etc) and credit hour scales.
15. Plutzer (2002) similarly relies on GPA as a "rough measure of cognitive skill, work habits, and future socioeconomic success" (p. 49).
16. It could certainly be argued that a university's 1996 (or earlier) ranking would be a preferable measure of school quality for this analysis; 2000 U.S. News and World Report rankings were used simply because they were available electronically. It is assumed that there is little movement from tier to tier. The analysis was also estimated using a categorical variable for each of the tiers with identical results.
17. And given that the best predictor of an individual's voting behavior is their voting history (Plutzer, 2002), this seems a justifiable approach.
18. The model was also analyzed including a measure of whether the respondent had children, but the variable never was statistically significant and correlated with marital status.
19. Ideally, the data would include a measure of political interest prior to college matriculation, but it would undoubtedly correlate highly with the measure available (and recall that this measure was still measured some 4 years before the political behavior variables). The available measure is a stricter control because it controls for political interest developed during the college experience. Moreover, given that it was measured after college it may, in a sense, actually over control for the effects of curriculum. It is entirely plausible that curriculum has an indirect effect on participation by sparking an interest in politics. The model will estimate the effect of curriculum while controlling for such interest. Finally, I also estimated the model with an additional proxy of political interest, "Did you talk to any people and try to show them why they should vote for one of the parties or candidates?", with nearly identical results. Given that the measure is highly correlated with the other political interest and is perhaps too close to the dependent variables (it was measured in 1997 interview with political behavior measures), I have omitted it from the final models.
20. I nonetheless estimated a two-stage model in which social science curriculum is endogenous and predicted by parent's education and SAT scores. The effect of social science curriculum remains positive and statistically significant. The results from the political participation model (in which an additive scale of participation was used as dependent variable in order to make least squares appropriate) are reported in Table B.1 in Appendix B.
21. I also estimated a number of other models to further test the robustness of the results. I find nearly identical results when the model is estimated only for individuals who are not social science majors (fewer than 15 hours of social science) and when the model is estimated only for those not interested in politics.
22. Given that the sample that is homogenous across two of the most important correlates of participation—age and education—the empirical models should not be expected to have tremendous predictive power. The goal of this paper is not to explain completely the causes of political participation as such, but rather, to look at the effect of individual components of education on political engagement. Given that, the substantive and statistical significance of the individual variables on the political engagement measures is the more interesting portion of the findings.
23. Proponents of the political meritocracy theory might argue that many of the independent variables included in the model are determined by intelligence (including GPA, graduate school, school quality, SAT scores), so that collinearity may be inflating the standard errors of the included intelligence measures. A special thanks to Bob Luskin for clarifying this argument. Indeed, GPA is significantly correlated with the political engagement measures.

However, math SAT scores has a negative correlation with political participation and turnout (though not statistically significant). Similarly, school quality does not have a consistent positive effect (and was actually negative and significant for political participation). Furthermore, the effect is negative for voting measures. When these "intelligence" correlates were included in a multivariate model with only demographic and curriculum controls, the results still find no support for the political meritocracy hypothesis.

24. If more intelligent people participate more as the political meritocracy hypothesis suggests, these findings would actually imply that individuals with higher math scores are less intelligent than those with lower scores. This simply does not seem plausible.
25. Thanks to an anonymous reviewer for pointing out this possibility.
26. The mean SAT verbal score was 544/800 (s.d. = 97.6) and mean math score was 540 (s.d. 94.5).
27. The mean number of social science normalized credit hours was 25.7 (s.d. = 18.7), compared to 20.7(16.3) humanities credits, 16.7(22.1) science/engineering credits, 7.6(15.1) business credits, 5.9(14.3) education credits.
28. According to the 1996 Current Population Survey Voting Supplement, just 32.3% respondents age 18–30 with only a high school education reported voting (compared to 52.2% of those with at least some college and 69.5% of those with a college degree).

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