

**Can Information Technology Energize
Voters?
Experimental Evidence from the 2000 and
2002 Campaigns**

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Abstract

Media-based campaigns have failed to engage the electorate. Few people find political campaigns interesting, nonvoters typically outnumber voters, and public evaluations of candidates, the press, and the political process itself are far from sympathetic (Popkin and McDonald, 2000; Patterson, 2000; Cook et al., 2000). This disconnect between modern campaigns and their intended audience can be traced to several factors, including the professional culture of journalism, competitive market pressures, and the inherent conflict between candidates and reporters (Patterson, 2002; Zaller, 2003).

In keeping with their professional aspirations, journalists preserve their own autonomy by refusing to broadcast and/or critiquing the scripted and often manipulative aspects of candidate behavior. But the preservation of journalistic independence inevitably heightens public distrust of the candidates and spawns generalized cynicism about the electoral process (Patterson, 2002; Cappella and Jamieson, 1997). Compounding the built-in conflict between candidates and the press, news organizations respond to market pressures by gravitating to the more “entertaining” facets of the campaign, while neglecting systematic coverage of the candidates’ positions and track records (Kalb, 1998; Iyengar, Norpoth and Han, 2003). The overall result is an excess of negative, non-substantive news coverage, providing virtually no opportunities for voters to encounter the candidates in their own voices. It is no wonder that the electorate is estranged. Information technology offers a promising avenue for a new form of campaigning, which, we believe, has the potential to resuscitate citizen engagement. The new array of media sources provides unprecedented freedom to control the acquisition of information and to obtain

direct, unmediated access to the candidates (see, for example, Prior, 2003; Sunstein, 2002; Iyengar et al., 2001). In the new, less homogenized media regime, the audience is no longer blinkered by editorial decisions.

Clearly, the use of new media in elections -- by both candidates and the public -- is still in its infancy. Resource constraints include cost, bandwidth and the multitude of competing nonpolitical content providers (e.g. ESPN.com or Playboy.com). So far, these factors have enabled traditional media sources to retain their standing as the major forum for campaign communication. Among the various species of new media, however, one holds special potential for facilitating interaction between candidates and voters. This genre does not require web access, bandwidth, or expensive equipment, and is relatively free of competition for the user's attention. We refer to the campaign "handbook" -- now cast in the form of a compact disc (or other portable storage device). A campaign handbook can deliver just as much multimedia content and richness of coverage as a political website, but is likely to reach a much wider audience. To put a CD into one's home or office computer, for instance, requires neither sophisticated hardware nor a fast Internet connection -- and certainly CD usage does not demand the level of interest or motivation required to seek out and visit political websites.

In this paper we report the results of two field experiments designed to assess the effects of exposure to campaign handbooks on voters' sense of involvement in the campaign. With the generous help of several foundations, the Political Communication Laboratory at Stanford University designed a campaign handbook for the 2000 presidential election and the 2002 gubernatorial

election in California. We arranged to distribute the handbook for the presidential race to a representative national sample of adult voters. The intervention for the governor's race was aimed at younger voters (between the ages of 16 and 29) because of their special familiarity with information technology. Both handbooks were identical in design and software, although the later version included a variety of youth-oriented interactive games not available in the 2000 presidential edition.

In both studies, our working hypothesis was that "user control" -- the ability to choose, retrieve and examine information of particular interest -- would empower voters and encourage them to approach rather than avoid political campaigns. Access to a CD-based handbook, accordingly, should boost standard measures of political engagement. We further anticipated that a youth-oriented CD in which substantive information about the candidates and the issues was synthesized with a variety of entertaining games would prove especially effective in capturing the interest of the young.

Methodology

Both studies relied on a "posttest-only" design. In each case, participants (who were recruited from the Knowledge Networks national panel) received the stimulus CD approximately two weeks in advance of the election. Participants were screened for home ownership of a PC.¹ They were informed that the CD was an educational product of Stanford University, which sought feedback on user experience and reactions. They were encouraged to "browse through or scan the CD at your own pace and convenience (and as many times as you

like).” Following the election, participants completed a wide-ranging survey of political attitudes and predispositions. Our analysis will focus on the effects of CD use on the following outcomes: (1) self-reported turnout, (2) interest in the campaign and (3) the sense of political efficacy. The indices of political interest and efficacy were scored to range from zero to one.²

For each outcome variable, we report two estimates of the treatment effect. First, we compute the average difference in the outcome between treated (CD) and control participants. This is, in fact, the standard “naïve” estimate reported in experimental work in political science where self-selection into treatment is either not an issue (randomization was successful) or ignored by the researcher. Second, we compute a “matched” estimate that adjusts for systematic differences between participants who self-selected into treatment (use of the CD) and those in the control group. In our experiments (just as in most others featuring political stimuli), a minority of participants offered the treatment actually accepted. Averaged across both studies, the CD acceptance rate was approximately 30 percent. A multimedia election handbook is of considerable interest to strong partisans and others predisposed to vote, but holds little appeal to chronic non-voters. This suggests that subjects who accept the treatment are drawn disproportionately from those generally more interested in politics than the typical subject, and, more importantly, than the typical member of the control group. Thus, not only is receipt of treatment likely to be non-random, it is also correlated with the outcome variables of interest (voter turnout, political efficacy, etc).

Self-Selection Into Treatment

The problem posed by outcome-related selection into the treatment condition is obvious. In the case of the 2000 CD study, for instance, self-reported turnout among treated subjects exceeded turnout among the control group by 12 percentage points. This observed difference is attributable not only to the treatment but also to the ex-ante greater level of political interest among participants who chose to accept the treatment. When acceptance rates for experimental treatments are less than universal, it becomes necessary to estimate the average treatment effect after adjusting for self-selection into the treatment group.

Fortunately, in recent years there has been considerable renewed interest among statisticians and econometricians in estimating treatment effects in non-randomized settings (i.e., experiments where randomization has failed, as well as in non-experimental or observational settings). Recent surveys include Imbens (2003), Angrist and Krueger (2000), Heckman, Lalonde and Smith (2000) and Heckman, Ichimura and Todd (1998). The general idea is straightforward: although respondents have self-selected into treatment, after we control for factors that predispose assignees to accept or refuse treatment, the outcomes of interest and treatment are no longer confounded. That is, if we have data on variables that structure receipt of treatment (covariates, denoted X), we can overcome the failure of random assignment into treatment or control groups, and recover an unbiased estimate of the treatment effect. In particular, we can form comparisons of treated and controls by *matching* on the covariates); under a set of conditions discussed presently, averaging

over these matched comparisons produces an unbiased estimate of the causal effect of treatment.

To formalize these ideas, we use the following definitions and assumptions, now standard in the literature. Let $i = 1, \dots, n$ index subjects. Each subject receives either treatment ($T_i = 1$) or no treatment ($T_i = 0$), either because they refused treatment or were assigned to the control group (for simplicity, in this section we restrict our attention to the case of a single treatment). Outcomes are denoted Y_i , and more specifically, $Y_i(T_i) = Y_i(1)$ for the treated, and $Y_i(T_i) = Y_i(0)$ for the untreated. Estimating a causal effect involves the assessment of a counter-factual, comparing what subject i actually did, with what they would have done had T_i taken on its other possible value. In this view, there is a treatment effect for each subject: e.g., $\tau_i = Y_i(1) - Y_i(0)$. This representation highlights the fundamental problem of causal inference: only one of the two outcomes is observed, the other remaining a hypothetical or potential outcome. Of course, when randomization succeeds, the fact that only one outcome is observed per subject poses no threat to validity: the difference between the sample averages $Y(\bar{1})$ and $Y(\bar{0})$ can be attributed to treatment and provides an estimate of the *average* treatment effect.³ But when subjects self-select into treatment, receipt of treatment is no longer independent of the outcomes. The idea behind matching is to return us to the unconfounded state we have with perfect randomization: that is, can we find covariates X such that after we know X , we could predict acceptance of treatment ignoring the outcomes. If this true, then in turn, differences between actual and potential outcomes can be validly attributed to treatment? Put differently, after we know

X , the probability of accepting treatment does not depend on outcomes. In short, do our covariates X sufficiently tap the possible confounds that would otherwise invalidate a naive comparison of $Y(1)$ and $Y(0)$?

In the context of our CD studies, relevant covariates include self-reported voting histories, the respondents' propensity to participate in surveys, and standard social-structural indicators related to political participation (i.e. age, occupational status, community involvement, education, etc). In comparison with non-participants, CD users were more likely to have voted in the previous election, were more cooperative survey takers, and enjoyed higher socio-economic status. In the empirical results below we provide descriptive statistics on these differences between those who comply with assignment to treatment, those who refuse treatment, and the control group.

A thorough treatment of the matching estimator is provided in Abadie and Imbens (2002). Here we provide a brief description of how the methodology works. Fundamentally, we are interested in the treatment effect for each subject: i.e., $\tau_i = Y_i(1) - Y_i(0)$. As stated, this definition of the subject-specific treatment effect can not be implemented, since only one outcome is observed per subject. Matching on covariates is a solution to this problem: for a treated individual ($W_i = 1$) with covariate scores X_i , we can impute $Y_i(0)$ as the average of the outcomes we observe among controls with the same covariate scores X_i , and vice-versa (we can impute $Y_i(1)$ for the controls by matching them against treated subjects). When the available covariates for predicting acceptance of treatment are plentiful and/or continuous, the resulting matching estimators are biased, since it may not be possible to come up with exact matches. Abadie

and Imbens (2002) demonstrate that subject to some regularity assumptions, the simple matching estimators defined above are inconsistent if the number of (continuous) covariates available for matching exceeds two. They develop a hybrid matching-regression estimator that has better statistical properties; non-parametric regression is used to interpolate in regions of the covariate space where we lack exact matches.⁴ Their bias-corrected matching estimator is consistent and has a sampling distribution that is asymptotically normal. Of particular importance, Abadie and Imbens (2002) provide expressions for computing the variance of the bias-corrected estimator making it possible to test the significance of the treatment effect without resorting to bootstrapping.

Matching is hardly a new idea for analyzing experiments where randomization has failed (e.g., Cochran 1968). Criticisms of matching are also not new (e.g., in political science, see Achen 1986). Matching only succeeds if we possess covariates X that make outcomes and treatment status independent; less formally, do the X variables soak up systematic differences between the treated and the untreated?⁵ If this condition holds, then recent technical and applied work has established the non-parametric matching techniques discussed above as perhaps the dominant technique for analyzing experiments in which random assignment to treatment has failed (again, see the surveys cited above).

Study 1: The 2000 Presidential Campaign

Research Design

This study featured two different election handbooks. The first (“In Their Own Words”) relied on the two major candidates as sources and included all their campaign speeches (delivered between July 1 and October 7), televised ads, the soundtrack of the first televised debate, and the texts of the party platforms. This CD was organized into an introductory chapter focusing on the two candidates and their running mates followed by a series of chapters on the major issues of the campaign. The second handbook (“Full Coverage”) was identical in appearance and user interface, but consisted of media sources -- a collection of typical print, radio, and television news reports on the candidates, the issues, and the state of their campaigns.⁶ The two CDs were calibrated to be roughly equivalent in terms of length (approximately 600 pages), ratio of multimedia to text content, and amount of coverage aimed at the two main candidates.

Each CD was presented in the form of a book, with directly “clickable” chapters and sub-chapters so that users could get directly and immediately to the material and candidate of greatest interest. The software also enabled users to highlight text, “dog-ear” pages and search the database selectively, applying their own criteria as a basis for considering the candidates. Navigation through the CD required no expertise beyond use of a PC.

Twelve hundred registered voters (split evenly by treatment) with home Internet access were mailed CDs on October 23, 2000, two weeks in advance of the election.⁷ The CDs were programmed to enable “user tracking.” Each

time the CD was accessed, the user's computer activated a log of the pages visited and the amount of usage time.⁸ Following the post-test survey, subjects were given instructions for returning the usage tracking data.⁹ Four hundred and thirty-three participants returned the CD usage data for a compliance rate of 36 percent.

The design also called for two parallel control groups. The first was drawn from Knowledge Networks panel members with Internet access (N=350). The second was a broader sample of all registered voters (N=300). The former is the appropriate baseline for people who received the CD, since returning the CD usage data required Internet access. The latter provides a useful baseline for assessing the potential effects of CD use on the broader electorate. In fact, the two control groups did not differ significantly on any of the outcome measures of interest, and for purposes of the analyses reported below they were pooled.

Results

The level of CD use was considerable. On average, participants registered between two and three CD sessions and the average number of page views was 192. But did use of either CD stimulate a sense of political involvement? Table 1 presents the naïve treatment effects -- the simple differences in the average value of each outcome variable between the two CD conditions and the pooled control group -- in the first row of each panel.

(Table 1 here)

The naïve estimates reported in Table 1 suggest that exposure to either CD substantially increased all three measures of political involvement. To

begin with self-reported turnout, the control group outperformed the national turnout rate among registered voters by some nine points.¹⁰ Even against this inflated baseline, the naïve estimates of both CD treatments exceed ten percentage points. We observed somewhat smaller, but equally robust, naïve treatment effects for political interest and political efficacy. When pooled across treatments, the effects of CD use were to increase interest in the campaign and participants' sense of their own political influence by eight and six percent respectively.

But can we be confident that these substantial treatment effects are in fact exogenous to the outcome variables? As we noted above, less than forty percent of the participants who received a CD actually used it. In fact, as might be expected, users and non-users differed systematically, with the former being drawn disproportionately from people with histories of voting, survey participation, and were generally of higher SES.¹¹ In order to isolate the effects of the treatment from these compositional differences between users and non-users, we re-estimated the treatment effects after matching CD users with individuals in the control group on the relevant covariates. The resulting Abadie-Imbens matched estimator is given in the second row of each panel of Table 1.¹²

Matching attenuates the naïve estimates of treatment effects. In the case of the pooled CD treatment, the attenuation ranged from one-fourth (for turnout) to one-half (efficacy) of the simple effect. Note that matching extracted a greater toll on the media CD treatment; the effects on turnout dropped from 12 to 8 points. On the other hand, the matched and unmatched estimates

of the turnout effect were virtually identical in the case of the Candidate CD. Encountering the candidates in their own words appears to represent a more empowering message than news reports on the election. Despite the noticeable erosion in the magnitude of the treatment effects, all nine effects remained significant after matching. Thus, even allowing for motivational bias in the composition of the treatment groups, use of an election CD, in and of itself, boosted users' involvement in the campaign. The observed effects were generally stronger than the effects of more conventional "get out the vote" efforts such as door-to-door canvassing or direct mail (see, for example, Green and Gerber, 2000).

Study 2: The 2002 Youth CD

This study was aimed specifically at younger voters. There is no doubt that youth are in the vanguard of computer-based media. School-age children and young adults are considerably over-represented among all computer and Internet users. Three out of four Americans under the age of 18 have access to a computer; on average, they use it for some thirty minutes every day (U.S. Dept. of Commerce, 2002). Thus, in stark contrast to their under-representation in any form of political action (see Levine and Lopez, 2002), youth enjoy a massive advantage when considering the daily use of information technology. We designed this study to assess whether young people's familiarity with information technology could be harnessed to stimulate a greater sense of involvement in political campaigns.

Of course, youth are hardly likely to forego the chance to play their favorite computer game or listen to music files in order to browse through an

election handbook. Young people are attracted to technology not because they seek political enlightenment, but rather, for social interaction and personal stimulation. If technologically enhanced political material is to catch their eye, the presentation must necessarily include popular elements of contemporary youth culture, most notably, video games and contemporary music. We tested this assumption by producing two versions of the handbook. The “adult” or purely substantive version resembled the 2000 edition and presented an exhaustive, easily searchable database about Democrat Gray Davis and his Republican opponent Bill Simon including televised advertisements, interviews with broadcast news sources, excerpts from the party platforms, and the audio of their one public debate.¹³ The “youth” version provided the identical information, but supplemented with a variety of interactive games, contests and quizzes all designed to make the presentation especially attractive to youth. Specifically, the youth version featured two different “whack-a-pol” games in which the user seeks to hit as many rapidly moving political targets (politicians or interest groups) with a hammer, a music quiz asking users to identify popular songs and associate the artists with candidates or causes, a similar “celebrity quiz,” and a self-administered “rate your campaign IQ” test in which users first watched well-known (and amusing) television ads from past political campaigns and were then asked to explain the strategy behind the ads. Thus, although the adult and youth versions provided identical substantive content (text and multimedia), the latter was designed to both inform and entertain. Naturally, we expected that exposure to the youth CD would prove especially influential among younger users.

Each version of the CD was mailed to 350 California residents between the ages of 16 and 29 on October 21st.¹⁴ Following the election, Knowledge Networks administered a web-based survey to all recipients of the CD in addition to a parallel control group of 250 participants. The survey included the identical battery of questions used in 2000 -- turnout, interest in the campaign, and the sense of political efficacy. In this study, however, we replaced self-reported vote with actual or validated turnout.¹⁵

One hundred and fifty-two participants assigned to treatment (i.e., mailed the CD) completed the survey for a response rate of 22 percent.¹⁶ We know for certain that these respondents received the CD. Unfortunately, we do not have access to a behavioral indicator of CD use.¹⁷ Instead, in the analyses that follow, we consider respondents returning the survey as having complied with their assignment to treatment and assume they were exposed to the CD. Results We present the simple and matched estimates in Table 2. Because we were especially interested in the effects of information technology on the behavior of young voters, we estimated the effects for the entire sample and for the subset of participants between the ages of 16 and 25.

(Table 2 Here)

Both versions of the CD significantly boosted *actual* turnout as well as interest in the campaign. Political efficacy, however, remained unchanged by either CD. Of the two versions of the CD, the youth version proved more powerful resulting in a 14 point increase in turnout overall and a 22 point increase among younger voters. Not only did the adult CD exert smaller-scale effects, it also failed to stimulate younger, first-time voters. The simple effects of exposure

to the adult CD were also weakened among younger participants. The youth CD, on the other hand, showed exactly the opposite pattern -- enlarged effects among the young. Overall, these findings suggest that in the case of the young, a synthesis of interactive games with substantive information is a more powerful political stimulant than substantive information alone.

We re-estimated the treatment effects after first identifying the covariates that discriminated between study participants and non-participants. These included participants' proclivity to respond to surveys, their age (study participation increased with age), education and income. Together, these factors correctly classified 89 percent of all participants as either "CD acceptors" or "non-acceptors."

The matching estimates demonstrated considerable attenuation of the original effects. Once again, the estimates based on matching were weaker by from 25 to 50 percent. Given the smaller sample in this study, the matched estimates often failed to attain statistical significance at conventional levels. More specifically, the use of the matching procedure erased entirely the naïve estimate of the effects of the adult CD treatment. Of the three significant unmatched effects of the adult CD, only one (on political interest) survived matching. In contrast, all four effects associated with exposure to the youth CD withstood the matching procedure. Thus, while the naïve effects of the adult CD were illusory, caused by self-selection into the CD group, the treatment effects of the youth CD were "real." Even after adjusting for the over-representation of especially "participant" subjects among the treated, the youth CD boosted turnout by 11 points overall, and by 18 points among the young.

General Discussion

Both studies demonstrate that election handbooks can mobilize voters. Even allowing for considerable inflation in the self-reported measures of involvement, the scale of the effects was extraordinary: across the two studies, the matched effect on turnout averaged more than ten percent, with a marginally smaller effect on interest in the campaign. Only in the case of political efficacy was the evidence equivocal; contrary to expectations, adult CD users registered gains in efficacy, but youth voters did not.

The scale of CD effects on turnout suggests that CD campaigns are comparable to in-person voter mobilization campaigns. In their New Haven study, for instance, Green and Gerber reported a turnout gain of 9 percent as a result of personal canvassing (Green and Gerber, 2000, p. 658). However, as we discuss below, unlike ordinary “get-out-the-vote” methods, a CD campaign instills “intrinsic” rather than extrinsic political motivation and is thus more likely to leave a long-lasting trace on participant attitudes.

Candidates and political professionals have long known that mobilization efforts are effective, especially when directed at young, first-time voters (e.g. college students). Using a series of field experiments, Donald Green and Alan Gerber have demonstrated that in-person and telephone-based canvassing both boost youth turnout significantly.¹⁸ They observed an effect of over five percent in the case of telephone contact, and ten percent in the case of in-person contact (Green and Gerber, 2001; Green, Gerber, and Nickerson, 2002). With adult voters, however, only personal contact proved effective (Green and Gerber, 2000).

Although effective in the short term, by providing the recipient of the contact with a salient situational rationale for voting, conventional mobilization campaigns may actually impede the development of participant attitudes and motives. At the very least, these campaigns have no effects whatsoever on the dispositions known to encourage political participation.¹⁹ Election handbooks place the recipient in a more active posture, at least as compared with those who are targeted by conventional mobilization campaigns. The fact that the intended audience is free to use the CD on their own has important implications not only for political behavior in the short term, but also for the psychological underpinnings of such behavior. Social psychologists have demonstrated that behavioral cues exert powerful effects on beliefs about the self (for a review of self perception research, see Schneider, Hastorf, and Ellsworth, 1979; Ross and Nisbett, 1991). Typically, individuals attribute their actions to either dispositional (internal) or situational (external) causes. Someone who votes, for instance, may believe that she decided to vote on her own or, alternatively, that she was influenced to vote by a phone call or campaign worker. Attributing the act to dispositional factors contributes to “intrinsic motivation” which is known to encourage long-term learning of the act in question. In one of the classic attributional studies, pre-schoolers who were promised rewards for drawing were later found to approach drawing materials less frequently than those not led to expect any reward (Lepper et al., 1973; also see Lepper and Greene, 1978; for a current review of this literature, see Lepper and Henderlong, 2000).

The implications of the intrinsic motivation literature for youth political

participation are clear: young people who encounter campaign information on their own accord and spend time interacting with political material may come to see themselves as interested in politics. The relatively inexpensive “act” of using a campaign CD (Iyengar, 2001) or visiting a political website (Lupia and Baird, 2003; Shah et al., 2001) may then encourage more significant acts including registering to vote and discussing the campaign with parents or friends. Thus, a trivial and unobtrusive addition to one’s “technology space” such as a CD, which can be turned on and off at will, promises far greater long-term payoff than conventional efforts at mobilization. The locus of causation for technology use is relatively personal; an eighteen year old, who in the course of playing a computer game, learns that certain groups or causes he dislikes are on a particular candidate’s “team,” has some basis for claiming an interest in politics. An eighteen year old who receives a phone call urging him to vote has some basis for claiming precisely the opposite.

Conclusion

Information technology has made possible alternative forms of campaigning which cast voters in a more autonomous role. Consider the contrast between voters with access to our election handbooks and those reliant on network television. The former, with minimal effort, could sample from over three hours of audio-video material featuring the candidates in their own words; the latter would have access to a daily sound bite and accounts of the horse race. Rather than waiting passively, and most likely in vain, for the media to provide coverage of relevant issues, CD users could seek out information that

was personally meaningful. Our evidence shows that this newfound autonomy fosters a general sense of political involvement.

Electronic voter handbooks are also attractive on more mundane economic grounds. When mass-produced, the cost of producing and mailing each CD is less than seventy cents. Assuming that a CD campaign generates a ten percent increase in turnout, the total cost per vote is \$7.00. The marginal costs are lower than those associated with either telephone or face-to-face canvassing. Green et al., for instance, report per vote costs associated with telephone or door-to-door canvassing in the range of 15 to 20 dollars.

Not only are CDs more cost effective, they also represent much more than a reminder to vote. They deliver relevant information as well as the opportunity to encounter the candidates in their own words, all with minimal effort. Thus, CD use raises interest in the election and civic mindedness, neither of which can be influenced by traditional canvassing methods. In short, either in terms of cost, or in terms of the range of treatment outcomes, the election CD is an especially effective form of voter mobilization.

The principal disadvantage of CD-based campaigns is a relatively low “contact rate.” Some one-third of the sample mailed the presidential election CD actually used it. This represents an exposure level that is similar to that of the typical personal canvassing campaign, but lower than telephone contacting.²⁰ As technology diffuses, the proportion of voters with the skills to use election CDs will grow. Sponsorship by credible, nonpartisan civic groups can only increase the likelihood of CD use. In the case of youth CDs, distribution by high schools and colleges will further enhance their visibility. A systematic CD

campaign, in collaboration with educators and civic groups could easily reach a majority of young voters.

The benefits of election CDs for voters are many, but bypassing the media is just as advantageous for the candidates. They can distribute their messages widely, devoid of punditry and media analysis. At 70 cents per household, a CD-based campaign is more affordable than sustained television advertising. As strategic actors, candidates can be expected to take advantage of this new mode of direct campaigning by addressing a more complete range of policy positions than can be conveyed in sound bites. The fact that the CD is just as public a forum as televised advertising, news, or candidate debates, makes it unlikely that CD content will be any more misleading or deceptive than standard campaign presentations. In the end, the use of campaign handbooks better realizes voter autonomy, the breadth and depth of the policy debate, and candidate control over their messages. These gains, significant in themselves, may ultimately be overshadowed by the collective benefit of having a more enthusiastic and engaged citizenry.

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Notes

¹In the case of the 2000 study, participants were also screened for home access to the Internet. Internet access was necessary for the CD tracking data to be returned to Knowledge Networks.

²The interest index consisted of four items: (1) Which of the following best describes how often you follow what's going on in government? Responses ranged from "most of the time" to "hardly at all." (2) How many days in the past week did you talk about politics with family or friends? Responses ranged from "every day" to "none." (3) Generally speaking, how much did you care about who won the presidential elections this fall? (4) How much did you personally care about the way the 2000 election to the U.S. House of Representatives came out? Responses to both these items ranged from "very much" to "not at all." We summed the four responses and then converted scores to a 0-1 scale. The average inter-item correlation was .42 in the 2000 study, and .54 in the 2002 study. We used three items to measure the sense of efficacy. (1) Sometimes politics and government seem so complicated that a person like me can't really understand what's going on. (2) Public officials don't care much what people like me think. (3) People like me don't have any say about what the government does. The response options ranged from "strongly agree" to "strongly disagree." We summed across the items and transformed scores to a 0-1 scale. The average inter-item correlation was .40 in the 2000 study, and .32 in the 2002 study.

³Consider the estimator $\hat{\tau} = Y(\bar{1}) - Y(\bar{0}) = \frac{\sum T_i Y_i}{\sum T_i} - \frac{\sum (1-T_i) Y_i}{\sum (1-T_i)}$. The expectation of the first term is $E(Y_i(1)|T_i = 1)$ and the expectation of the second term is $E(Y_i(0)|T_i = 0)$. If receipt of treatment is independent of outcomes (actual and potential), then we can drop the conditioning in the expectations, and in turn, $E(\hat{\tau}) = E(Y_i(1)) - E(Y_i(0))$ which is the definition of the average treatment effect. That is, $\hat{\tau} = Y(\bar{1}) - Y(\bar{0})$ is an unbiased estimator of the average treatment effect.

⁴Let $\mathcal{J}(i)$ be the set of m indices of matches to subject i among the set of subjects whose treatment indicator is the opposite of the treatment indicator for i ; i.e., for the set $\{j : w_j \neq w_i\}$, find the m “nearest neighbors” of i in the predictor space $\mathcal{X} \subset \mathbb{R}^k$, using a metric such as Mahalanobis distance (simulations reported by Abadie and Imbens (2002) suggest that $m = 4$ is a good choice). Abadie and Imbens (2002) define the following imputed potential outcomes:

$$\tilde{Y}_i(0) = \begin{cases} Y_i & \text{if } W_i = 0 \\ \frac{1}{m} \sum_{j \in \mathcal{J}(i)} Y_j + \hat{\mu}_0(X_i) - \hat{\mu}_0(X_j) & \text{if } W_i = 1 \end{cases}$$

and

$$\tilde{Y}_i(1) = \begin{cases} \frac{1}{m} \sum_{j \in \mathcal{J}(i)} Y_j + \hat{\mu}_1(X_i) - \hat{\mu}_1(X_j) & \text{if } W_i = 0 \\ Y_i & \text{if } W_i = 1 \end{cases}$$

where $\hat{\mu}_0(x)$ and $\hat{\mu}_1(x)$ are non-parametric estimators of $E(Y(0)|X = x)$ and $E(Y(1)|X = x)$, respectively. With these definitions, Abadie and Imbens (2002) define the resulting bias-corrected matching (bcm) estimator of the treatment

effect as

$$\hat{\tau}^{bcm} = \frac{1}{n} \sum_{i=1}^n (\tilde{Y}_i(1) - \tilde{Y}_i(0))$$

.

⁵More formally, matching on covariates X requires that the following “unconfoundedness” or “conditional independence” assumption hold:

$$(Y(0), Y(1)) \perp W \mid X$$

.

⁶For additional details concerning the content of the media CD, see Hahn, Iyengar and Norpoth, 2003. The entire contents of both CDs are available at <http://pcl.stanford.edu>.

⁷As part of a larger outreach effort, the candidate CD was also distributed to some 30,000 members of the public who heard of the initiative through advertising and news coverage. Individuals who registered at our online “store” received the CD free of charge.

⁸Of course, study participants were fully informed of this feature.

⁹Participants were informed (at the recruitment stage) that they would receive \$10.00 on the completion of the survey.

¹⁰Explanations for the higher level of reported turnout among study participants might include their willingness to participate in a political survey,

and the fact that a majority of participants were screened for home Internet access. Response set may have also contributed to the discrepancy. Based on our 2002 study, where we examined both actual (validated) and self-reported turnout among youth voters, we would estimate that the latter is inflated by approximately 25 percent.

¹¹The specific covariates were self-reported turnout in the 1996 presidential election, the number of Knowledge Networks surveys taken over the past year, level of education, frequency of church attendance, professional occupation, and self-reported frequency of Internet use. Together, these factors correctly classified 75 percent of all cases.

¹²Using the Abadie-Imbens matching routine in STATA, we computed the bias-corrected Simple Average Treatment Effect (SATE) with four matches (i.e., setting the quantity m in note 4 to four, matching each treated subject with four controls, and matching each control with four treated subjects).

¹³The ebook was organized into four chapters. The opening chapter (“Politics in the Golden State”) provided a general overview of electoral law and procedure (i.e. how to register to vote), the composition and partisan sentiments of the California electorate, a historical survey of gubernatorial elections, and a brief discussion of campaign strategy. The second chapter (“The Candidates”) provided biographical and career information about Davis and Simon. Next (“The Issues”), we provided excerpts from the candidates’ stump speeches on the economy, energy shortages, public education and other major issues. Finally, Chapter 4 (“The Media”) featured the one debate

between Davis and Simon, as well as a series of news reports (taken from newspapers across the state) about the candidates and the state of their respective campaigns.

¹⁴The assignment to either of the CD conditions, of course, was randomized.

¹⁵Using the Secretary of State's turnout database, we identified study participants based on their street address and date of birth. The level of over-reporting of actual turnout was approximately 25 percent. That is, self-reported vote exceeded actual vote by that amount.

¹⁶Failure to use the CD is the most likely explanation for the relatively low response rate in the treatment conditions. We assume that most participants opted out of the survey for the simple reason that they had not used the CD. Note the substantially higher response rate in the control group (62 percent). Non-response can further be attributed to the general lack of interest in the election, and the fact that our participants were drawn disproportionately from the ranks of the politically disengaged (the young).

¹⁷Unlike the earlier study, we did not have the necessary resources to retrieve participants' actual use of the 2002 CDs.

¹⁸In the case of adult voters, however, telephone canvassing appears to be counter-productive (see Green and Gerber, 2000).

¹⁹In fact, Green and his collaborators report that telephone calls encouraging young people to vote have no effects at all on standard

participant predispositions (Green et al., 2001, p. 25).

²⁰In the experiments administered by Green and Gerber, the in-person contact rate was, on average, under thirty percent, while telephone contact averaged nearly 60 percent (Gerber and Green, 2000). Media survey organizations report a similar telephone contact rate (.59), but their survey completion rate is, on average, .37 (see Holbrook, Pfent and Krosnick, 2003).