LEARNING CURVES: 
THREE STUDIES ON POLITICAL INFORMATION ACQUISITION

by

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Department of Political Science
Duke University

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John E. Transue

Dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Political Science in the Graduate School of Duke University

2008
ABSTRACT

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Abstract

What are the effects of political information on public opinion, political participation, and electoral outcomes? In this dissertation, I address these questions and investigate the ways that people acquire and incorporate information based on their levels of political knowledge and attentiveness. I examine the effects of political information among three groups whom we would expect to learn differently: those people with little knowledge or interest in politics; the potentially interested who possess some, but not much, knowledge; and the attentive experts.

In my first chapter, I look at the effects of information on people with little or no knowledge of politics by asking, “Do candidate visits affect voting decisions and candidate evaluations?” I link survey data with the location and topics of all speeches given by George W. Bush and John Kerry in 2004 to empirically test the conventional wisdom that candidate appearances change electoral outcomes. I find that candidate visits do provide information to voters and that those effects are conditioned on consumption of local media. In my second chapter, I look at people with some knowledge of politics: college students. I ask, “How does the information that students ‘incidentally’ encounter in electronic social networks like Facebook.com shape their knowledge of current political events and their participation?” To answer these questions, I conducted a survey with an embedded experiment. I find that students do learn from Facebook, though the effects are small and vary across groups. My third chapter investigates the ways that the politically attentive incorporate information by asking, “What campaign information matters? Which campaign
events are actually informative?" I develop a new measure of information flow using data from a political prediction market and a Bayesian estimation technique that adapts models from the economics literature. This measure offers a reliable way to describe the importance of campaign events that does not suffer from either post hoc judgments or reports from the principals involved in the campaign. Together, these projects address the consequences of political information in contemporary politics.
To my husband, Carlos Carvalho, my brother, Chip Rickershauser,
and my parents, Karen and Joe Rickershauser—they kept me laughing *and* thinking.
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theory (yet). More to the point of these acknowledgments, I should say that this dissertation would not have been written without him—though I must also say that I would not be the person I am without him.

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changed the way I think about the world (for better or worse!). His advice over the years has taught me how to be a political scientist and thinker, and his example has demonstrated how important it is to be a public-goods provider. In particular, his advice on navigating graduate school and academia as a woman will stay with me. I am extremely grateful that Dave Rohde came to Duke. His mentorship helped professionally—coauthoring a paper with him, John Aldrich, and Paul Abramson made me understand this whole research endeavor. His advice will also help me personally in the long run—he regularly tells us to find hobbies outside of our work to keep us healthy and happy and, thus, productive. I’m still working on that, but I definitely appreciate the sentiment.

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When you spend so many hours staring at the same problem and engrossed in one area of research, it is easy to lose perspective. Luckily, the Duke Americanists Working Group (more commonly referred to by its acronym) helped kick me out of those ruts. The weekly meetings were often raucous (it is not okay put bare feet on the conference table, and I will yell whenever I see it in the future!) and occasionally tangential, but I am a better scholar because of those meetings. Brendan Nyhan, Mike Brady, Efren Perez, Ian McDonald, and Anne Flaherty contributed immensely to the projects in this dissertation. Any shortcomings of this dissertation probably exist because I did not follow their very smart and clever advice.

People say that you learn as much from other graduate students as you do from classes and professors; I think that that is true—a number of my fellow students helped me professionally (with research, teaching, and the job search) and personally. Before PIPC, my office in the very back of the basement in Perkins was actually good—not because of the constant sound of the furnace, but because of Mark Axelrod. Whether he was in India, East Lansing, or Durham, he has provided support and perspective. Vicky DeFrancesco has talked me down from the metaphorical academic ledge on many occasions, and has given me helpful advice as I navigated graduate school and now begin as a professor. Conversations with Joe Ura (whom I was lucky enough to meet through the Duke-UNC collaboration) and Claire Kramer helped with work and with life. I met Jenn Tanaka when she was a first year undergraduate at Duke, and I have been privileged to see her develop as a thinker and a
person. Though she may think that the relationship taught her a lot, I am certain that her help with John Aldrich’s research and my own research taught me much more. I did not meet Stefan Dolgert in classes or while working on research, but rather during a particularly memorable experience in graduate school: organizing the prospective students’ weekend visit. I might regret taking on the job except for the fact that I got to know him. First, our relationship is proof that Americanists and political theorists can, in fact, be good friends. Second, when I had dark days, he was there to go for a drink or have tea and listen. When I had great days, he was there to celebrate with me. His refreshing lack of political correctness and his pragmatic approach to idealism make me look at the world differently. His relentless social organizing (previously in graduate school, now at conferences, friends’ weddings, and other reunions) make life more entertaining for me and all our friends.

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work. Whether we were shopping, cooking together, or drinking wine, the conversations we had always made me think about the world more profoundly. Though the kinds of political science we do are very different, the support she gave me translated into a better dissertation.

This past spring, it became clear to me that for the final push towards completing the dissertation, being 800 miles and a time zone away from Duke wasn’t going to work. I was discouraged and unsure of how to get back to North Carolina until two amazingly kind and generous friends offered me their spare bedroom. Jarad and Camille Niemi were understanding enough to let me be anti-social and close my door when I needed to work and then cheer me up and laugh with me when I needed that. Not only did they share their home with me, but they gave me the honor of sharing in the excitement and anticipation of their daughter’s birth (which, while writing this, is just days away). I had no idea that eating salads with avocados, watching volleyball and ‘So You Think You Can Dance’, and talking about baby gear could be so enjoyable! When I look back on graduate school, those two months were some of the most challenging work-wise, but they were also some of the most fun because of Jarad and Camille. I truly cannot say how much I appreciate that time with them—this dissertation absolutely would not have been completed without them, and I would not be going into the next stage of my life as joyfully as I am without their support.

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College, we were very different people. Looking back at pictures of us on the third floor of
Comstock, I hardly recognize us. Through many, many late nights writing papers and
analyzing relationships—romantic, platonic, and familial—we developed theories that still
focus me: everything looks better in the morning, and never reevaluate your life when you
have a paper due. Though a dissertation is a very different beast than is a 10-12 page paper,
the latter mantra has helped immensely as I’ve worked toward completing this project! She
has both grounded me and pushed me over the years—I would not have gone to graduate
school without her, and I certainly could not have finished graduate school without her.

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endless commitment to helping her friends and everyone around her demonstrates that 
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getting me interested in politics and teaching me to debate—if only to fight with him!
Whenever he encounters someone, whether it be in person or via ‘reply-alls’ to my friends (a 
clear violation of etiquette, for the record!), he makes everyone think and question the world 
and themselves. I am not sure when Chip and I became best friends, but we are—and I am 
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me for months in our small Durham apartment, nothing can change it! His support with 
graduate school, and my life, is something I could not possibly live without. In addition, the 
idea for my chapter on electronic social networks was sparked when he asked me about the 
cost of George W. Bush’s second inaugural after reading about it in a friend’s IM away- 
message, so he is responsible for a large piece of this dissertation.

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graduate school, I never could have imagined marrying a Brazilian statistician—or being so 
happy and intellectually challenged while living in a garden apartment in the cold (but 
fantastic) city of Chicago. I am a better scholar—and friend, debater, cook, and person—
because of him. Thus I suppose he could be blamed for the fact that I am heading to a 
wonderful job that requires we get at second apartment in another great city and spend
significant time at O'Hare. Instead, I will credit him with any success I ever achieve, professional or otherwise, and hope that he is as proud of me as I am to be his wife.

I began graduate school in the fall of 2002, when Republicans won seats in the midterm election, a nearly unprecedented event. In 2004, people talked about the emergence of a permanent Republican majority. Two years after that, we saw a “thumpin’” of Republicans in the congressional elections and people (aptly) described the GOP as an unwanted brand of dog food. After years of deploring the front-loaded presidential primary season that deprives voters in most of the country a voice in picking the nominees, we witnessed a seemingly never-ending primary season where millions of people showed up at the polls to vote for a woman and a black man. Now an African-American man is most likely to become the next president. To borrow an over-used term in this election cycle, “change” appears to be the one constant in American politics—and the need to re-investigate our conclusions and prior understandings is the one constant in the study of American politics.

As an observer and student of American politics, with incredible mentors, colleagues, friends, and family, I count myself as one of the most fortunate people anywhere.
1. Introduction

What are the effects of political information on public opinion, political participation, and electoral outcomes? Fundamentally, this project is based on the idea that information and ideas matter can impact both political behavior and attitudes. Knowledge—whether superficial or substantial—can be consequential. This is especially true in the political arena. There is so much information available, in different forms and with varying levels of quality, from the media, politicians, campaigns, and from friends and acquaintances. The information people have determines how people vote and how and when people participate in the political process, so the very shape of our government and public policy is a function of the aggregate information in our society. In this dissertation, I investigate the ways that people acquire and incorporate information based on their levels of political knowledge and attentiveness. I examine the effects of political information among three groups whom we would expect to learn differently: those people with little knowledge or interest in politics; the potentially interested who possess some, but not much, knowledge; and the attentive experts. The projects presented here use very different methodologies and draw from existing scholarship in economics and finance, sociology, and psychology in addition to political science in order to address these normatively important issues.

In my first chapter, I look at the effects of information on people with little or no knowledge of politics by asking, “Do candidate visits affect voting decisions and candidate evaluations?” I link survey data with the location and topics of all speeches given by George W. Bush and John Kerry in 2004 to empirically test the conventional wisdom that candidate
appearances change electoral outcomes. I find that candidate visits do provide information to voters and that those effects are conditioned on consumption of local media. My second chapter looks at the online social networks of people with some, but not much, knowledge about politics: college students. I ask, “How does the information that students ‘incidentally’ encounter in electronic social networks like Facebook.com shape their knowledge of current political events and their political participation?” To answer these questions, I conducted a survey with an embedded experiment. I find that students do learn from Facebook, though the effects are small and vary across groups. My third chapter investigates the ways that the politically attentive incorporate information by asking, “What campaign information matters? Which campaign events are actually informative?” I develop a new measure of information flow using data from a political prediction market and a Bayesian estimation technique that adapts models from the economics literature. This measure offers a reliable way to describe the importance of campaign events that does not suffer from either post hoc judgments or reports from the principals involved in the campaign.

Together, these projects address the consequences of political information in contemporary politics. There are many interesting empirical results, but arguably more importantly these projects address significant normative questions about the quality of governance by adding to our understanding of how political information affects citizens. In the remainder of this introduction, I will summarize the three substantive chapters that comprise this dissertation.
1.1 ‘Going Local’: The Effects of Candidate Appearances on Voting Decisions and Candidate Evaluations

Are voters responsive to local visits by candidates? Do candidate appearances in battleground states really change election outcomes? Both scholarly research (e.g. Shaw 1999) and anecdotes from campaign consultants suggest that they do, but empirical evidence about the individual-level effects of candidate visits is lacking. In contrast to previous research that focuses on macro-level effects such as aggregate vote and turnout, this paper investigates the effects of candidate visits on an individual’s vote choice and candidate preference. I link a data set that contains information about the location and topics of all speeches given by both presidential candidates in 2004 to data from a national three-wave panel survey that records the geographic location of all respondents. I find that candidate appearances do, in fact, have localized effects, though these effects are conditioned on several factors. First, independents are more affected by visits, though partisans also learn about their party’s candidate. Second, the timing of a candidate appearance is important; effects occur after people have started paying attention to the campaign and before they have made up their mind. Third, effects of candidate visits are significantly mediated by local news consumption. Lastly, results presented here support the on-line processing model of candidate evaluations; apparently, voters incorporate information about the candidate into their assessments after a candidate visit that is covered in the local news, and then retain that summary evaluation throughout the campaign season.
1.2 Incidental Information Acquisition:
College Students, Electronic Social Networks, and Political Learning

Do electronic social networks, an emerging communication medium, increase political learning and participation among the youngest and most inexperienced voters? What are the political effects of popular online social networks such as Facebook.com? To address these questions, I conducted a survey with an embedded experiment immediately following the November 2006 election. The survey documents the correlation between people’s Facebook exposure (time online, number of friends and groups, and number of profiles viewed regularly) and their knowledge of current political events (e.g., election outcomes) and their past and intended future political participation. The experiment tests whether people are affected by the opinions of other students in their electronic network. Findings suggest that exposure to Facebook can increase students’ political learning and rates of participation. After controlling for prior political knowledge and interest, Facebook exposure was a predictor of students’ knowledge about current political events such as the candidates running for president and of the likelihood of participating. In addition, students are more likely to report that they will participate in future civic activities such as voting when they know that members of their electronic social network are interested in politics. Interestingly, students who are at least occasionally electronic opinion leaders are affected differently than are students who are not. Opinion leaders learned more and non-opinion leaders were more likely to increase their political participation. These findings support the need for additional research in this area and provide some hope for the increased political engagement of young people.
1.3 Volatility in Prediction Markets:
A Measure of Information Flow in Political Campaigns
(with Carlos M. Carvalho)

In each U.S. presidential campaign, anecdotes that seem to summarize the election
emerge, such as Bill Clinton’s campaign slogan, “It’s the economy, stupid,” in 1992 and John
Kennedy’s performance in the televised debate against Richard Nixon in 1960. However,
some stories may seem to epitomize the campaign when they actually did not alter the
outcome of the election or even relate to the underlying factors that did influence the
outcome. How can we adjudicate between the events that mattered and those that did not?
Building on work in the market microstructure literature in economics, this paper builds a
measure of information flow based on the returns and volume of the ‘Bush wins the popular
vote in 2004’ futures contract on the Tradesports (now Intrade) prediction market with a
Bayesian estimation technique. This measure allows us to associate a particular event to an
information level, providing a direct way to evaluate its impact in the election. In the 2004
presidential race, our findings show that the televised debates, Kerry’s acceptance speech at
the Democratic convention, and several national security-related stories such as the report
that explosives vanished in Iraq under the U.S.’s watch, the CBS story about Bush’s National
Guard service and the subsequent retraction, and the release of the bin Laden tape a few
days before the election increased the information flow. Contrary to popular accounts of
the election, we find that ads attacking Kerry’s military service aired by the Swift Boat
Veterans for Truth in August contributed only a limited amount of information to the
campaign.
2. Going Local: The Effects of Candidate Appearances on Voting Decisions and Candidate Evaluations

During the long campaign season, presidential candidates spend virtually all of their time traveling, touring factories, standing in front of tractors, and eating local delicacies. They often speak to voters in small towns as well as larger cities. Are voters responsive to these local visits by candidates? Do candidate appearances in battleground states really change election outcomes? And if so, why? Some previous work suggests that candidates benefit electorally in the aggregate by visiting states, though the findings are mixed. It is worth investigating whether and how these visits increase candidate support at the individual level. By linking together two unique data sets, I show that voters are affected by candidate visits: when candidates make a public speech, people in that town or city are more likely to vote for the candidate. In particular, candidate appearances increase the likelihood of voting for a candidate among people who could potentially change their mind—e.g. independents; when they are making up their minds; and if people hear about it the visit on the local news. People process the information from visits and incorporate it into their summary judgments of the candidates. These evaluations tend to last throughout the course of the campaign, even long after the visit. By ‘going local’ and appearing on Main streets and on tarmacs, candidates and campaigns believe they can influence voters and gain votes; apparently, they are correct.

One potential reason that presidential candidates visit cities and towns is that they are seeking good photo opportunities for the national campaign. It may be that by visiting a farm, a candidate is able to signal to farmers across the country that he will support their
preferred agriculture legislation. However, the findings I present here suggest that something very different is going on when candidates appear in a corn field. Campaign appearances are designed to garner local media attention because local media provide a more direct, less-filtered image of the candidate and his message (Shaw and Sparrow 1999). The national media tends to be more negative and partisan than local news coverage (Kerbel 1995), so news coverage on local television stations is more valuable to the candidate.

A candidate visit provides information to people who hear about it. Because local news coverage is driving the effects of candidate visits, we must consider how much news people consume in addition to how much they know about politics. To test whether candidate visits have effects and under what condition they have effects, two kinds of data are needed. First, we need information about where candidates visit so that we know which areas saw local news coverage of the event. Second, we need individual-level survey data that includes specific geographical information of the respondents as well as their political opinions. I link together data sets so that I know which people lived in an area that was visited by a presidential candidate in 2004 and what those people thought about the candidates. I can thus test whether candidate visits influence voters’ opinions at the individual level.

I find that candidate appearances do, in fact, have localized effects, though these effects are conditioned on several factors. First, independents are more affected by visits, though partisans also learn about their party’s candidate. Second, the timing of a candidate appearance is important; effects occur after people have started paying attention to the campaign but before they have made up their mind. Third, effects of candidate visits are significantly mediated by local news consumption. Lastly, results presented here support the
on-line processing model of candidate evaluations; apparently, voters incorporate information about the candidate into their assessments after a candidate visit, covered in the local news, and then retain that summary evaluation throughout the campaign season.

In the rest of this paper, I will first briefly discuss the theoretical foundations of this project. I will focus on research regarding the effects of candidate visits and findings regarding the impact of local media. Next, I will describe my data and hypotheses and then present results supporting my hypotheses. Finally, I will discuss the larger importance of my findings.

2.1 Campaign Effects and Candidate Visits

Early work on campaigns concluded that they had little effect on voters or elections. This “minimal effects” literature began with Lazarsfeld’s and colleagues’ impressive studies of the 1940 and 1948 presidential elections in Erie County, Ohio (Lazarsfeld et al. 1948) and Elmira, New York (Berelson et al. 1954), respectively. They interviewed citizens at the beginning of the campaigns and at the ends of the campaigns, and found very few people who actually changed their vote. The seminal study conducted by scholars from Michigan school, *The American Voter*, argued that partisanship was the strongest predictor of vote and that short-term factors played little role in voting. It was not until the late 1980s that the political science community began to challenge the minimal effects paradigm.

There is now consensus that “campaigns matter”, but that the net effects of campaigns are ultimately small and do not often change election outcomes (Holbrook 1996; Gelman and King 1993; Finkel 1993; Campbell 2000; Johnston et al. 2004). However, there is significant evidence of other kinds of campaign effects, including agenda-setting,
mobilization, and learning. Campaigns are information sources for voters (Popkin 1991; Lupia and McCubbins 1998; Zaller 1991) and people do learn over the course of the campaign (Alvarez 1998; Bartels 1988). Campaigns are able to set the agenda and thus alter the priorities of voters (Iyengar and Kinder 1987; Petrocik 1996; Carsey 2000). In addition, campaigns can increase turnout (Rosenstone and Hansen 1993; Gerber and Green 2000). There has been significant debate about the mobilizing or demobilizing effects of negative campaign advertisements (Kahn and Kenney 1999; Lau et al. 1999; Ansolabehere et al. 1994; Ansolabehere et al. 1999) but competitive races do increase voter turnout (Cox and Munger 1989).

2.1.1 Previous Research on Candidate Visits

When the minimal effects thesis reigned in the 1970s and 1980s, research on candidate appearances focused on candidate strategy, not on voter reactions. In a game-theoretic analysis, Brams and Davis (1974) conclude that candidates should use their resources according to the “3/2’s rule”—that is, the optimal allocation of campaign resources was proportional to the state’s Electoral College vote to the 3/2’s power. They then test that equilibrium result using data on the number of candidate visits to each state and find that candidates did, in fact, allocate resources to states according to that formula. Though critical of the 3/2’s rule, Colantoni, Levesque, and Ordeshook (1975) are also interested in the allocation of resources, and in particular the concern that the Electoral College favors large states. Other works used candidates’ travel time as a measure of resources (Aldrich 1980; West 1983), also as a means of determining candidate strategy. West (1983) investigates the ways that candidates build electoral coalitions with appearances
in front of various groups of people, though his work is innovative because he uses campaign itineraries as the source of data.

Though studies of campaign advertisements and spending have dominated the research in the campaign effects literature (Brians and Wattenberg 1996; Freedman and Goldstein 1999; Gerber 1998; Lau et al. 1999) a number of scholars are now focusing on candidate appearances (e.g. Jones 1998; Shaw 1999a, 1999b; Herr 2002; King and Morehouse 2004) Scholars have investigated the effects of candidate visits on a number of phenomena, such as voter turnout, vote preference, vote share, and partisan composition of the electorate. Results of this research are mixed: some scholars find effects, some find effects in very specific circumstances, and others conclude that candidate appearances have no impact at all.

Several authors find significant effects of candidate appearances. Jones concludes that they “regularly increase a party’s share of the vote a few percentage points” (1998 p.410) though he notes that frequent visits towards the end of the campaign have the most impact and that visits by Democratic candidates have more impact on turnout and vote share than visits by Republicans. Like Jones (1998), Daron Shaw also finds the candidate visits can have a measurable impact on voters. His work on candidate appearances is best known among the relatively small number of articles focused on this kind of campaign strategy (Shaw 1999a, 1999b; Althaus et al. 2002; Shaw 2006). Using the election results and weekly tracking polls, Shaw finds that candidate appearances can increase a candidate's vote share considerably. However, because the opposing candidate is also campaigning and the resources required to move many voters are not always available, candidate visits often do not have large effects. In his 2006 book, Shaw describes his work as a consultant for the

Both Jones and Shaw make the important point that effects are stronger in media markets that a candidate visits and often do not appear at the state level. This makes sense: a candidate visit to an area causes local media to pay attention, so only people in that area will hear about it (or will hear more about it). Notably, this helps to explain why other research finds little effect—by looking at states as the geographic unit of analysis, the effect of a visit to a particular media market is diluted because it is mixed in with the rest of the state, which did not receive a visit. In Shaw’s analysis of the 2000 campaign, he finds that Gore increased his state support by about .5%, whereas he increased his support in the media market by 1.5%.

Other scholars make more qualified conclusions. Herr (2002) investigates the effects of both appearances and television advertising in the 1996 election. He finds that candidate visits have a small impact and can increase a candidate’s vote share, but only if the visits occur in October. This effect is strongest for Clinton; Dole’s and Perot’s visits are less effective. Herr’s work is problematic because he only considers states that received a visit, and thus selects on the key independent variable (King et al. 1994). Nonetheless, his mixed results are similar to other research (e.g. Kenny and McBurnett 1997; Vavreck et al. 2002). Vavreck et al. (2002) add considerably to the literature because they study the individual-level effects of candidate contact, which includes appearances as well as phone calls and mailings. They note that the effects are “complex” (595). Looking at a survey conducted in New Hampshire during the 1996 presidential primary campaign, they find that people are more likely to view a candidate positively if they meet the candidate, but people tend to come in
contact with candidates that they are already inclined to support, so the effect is somewhat less direct.

Still other scholars conclude that candidate visits do not have any impact. Holbrook and McClurg (2005) find that candidate visits do not affect partisan mobilization, composition of the electorate, mobilization of independents, or the margin of victory. Their research suggests that campaigns are important, but that the mechanism through which people are mobilized and persuaded is not a candidate visit. Similarly, Herr (2002) concludes that appearances do not increase overall turnout.

Several issues in the extant literature explain the mixed conclusions. Most importantly, nearly all of the research has focused on aggregate-level measures such as pre-election polling, turnout rate, and election outcomes (Vavreck et al. 2002; but see Kenny and McBurnett 1997). This does not allow us to consider mediating variables such as political knowledge and media exposure. In addition, because aggregate measures are affected by many things and are notoriously hard to predict, it is not surprising that subtle—but significant—effects are not visible. Second, previous literature has focused only on the fall campaign. If the effects of visits have an impact at any point throughout the spring and summer, they will not be detected. My research improves on previous work by examining the individual level effects of candidate visits and by utilizing data beginning in the spring before the election.

2.2 Theory & Hypotheses

This project asks whether the campaign strategy of traveling back-and-forth across the country, landing at small airports, holding a brief rally there, and then flying to the next
event actually “works” in the sense that voters change their opinions or attitudes because of that strategy. Candidate appearances may, and probably do, have other important purposes as well, such as fundraising and recruiting and energizing campaign volunteers. However, this project solely questions the strategy in terms of its impact on voters.

I begin by theorizing about where we might expect to see campaign effects. First, we should see the effects of candidate visits among people with some, but not much, political knowledge. Second, we should see effects before people have made up their mind about which candidate they prefer. Third, we should see the effects of candidate visits among people who learned about the visit through the local media.

There is no reason to expect that all voters respond in the same way to new information garnered during the campaign, or even that they all respond to the same kinds of information. Political knowledge and expertise mediate the ways that people acquire and incorporate information. People who pay a lot of attention to politics or know a lot about the political world will not be influenced much, if at all, by new campaign information. These ‘experts’ have opinions about and knowledge of Kerry’s and Bush’s campaign early in the campaign, thus appearances by candidates will likely make little difference. The people who do not pay any attention to politics or have no interest in it will also not be moved much by new information, even if they receive it in the first place. In contrast, the people most likely to be affected by campaigns are the people “in the middle” (Converse 1966; Zaller 1992), with some knowledge about politics but without fixed opinions about the candidates (or at least about the challenger). They are the group we would expect to be most likely incorporate information about candidates and parties when they receive it. These people may not seek out information about the presidential campaign, but when watching
the local news or reading the newspaper, they see and hear information about the candidate’s visit to their town. Because independents do not have a partisan affiliation, they will also be more likely to be affected by new information about the candidates that comes out of the campaign (Hillygus and Jackman 2003).

Scholars have argued that campaign effects vary over the course of the campaign, so we should look for effects at different points in the campaign (e.g. Holbrook 1996). Gelman and King (1993) seek to explain the paradox that polls vary significantly over the course of the campaign but that election outcomes can nonetheless be predicted well in advance of the election using relatively straightforward forecasting procedures (Rosenstone 1983; Campbell 1992, 2004). They argue that campaigns are important because they teach people about candidates’ positions. People incorporate information about candidates into their preferences, but until they learn enough, those preferences are incorrect. They are agnostic as to when this happens, but the closer to the Election Day, the more accurate are the polls. Wlezian and Erikson (2002) also investigate the “timeline” of presidential campaigns. They conclude that campaigns do not have lasting effects until late summer. The effects in the fall are smaller, but they do persist so the campaign ultimately has more influence. Both of these articles suggest that careful attention to when people are affected by campaigns is needed.

People will not be affected by information when they are not paying attention early in the campaign, and will not be affected by new information once they have made up their minds. Lastly, people cannot be affected by information from the campaign if they do not receive it. It is an obvious but important point. If people are not exposed to the information, they cannot possibly incorporate it or be persuaded by it (Zaller 1992). However, if they are exposed to information, they can learn and update their preferences
over the course of the campaign (Bartels 1993; Alvarez 1998; Lupia and McCubbins 1998). People learn about candidates from many sources, including friends (Huckfeldt and Sprague 1987) and the campaigns directly. Nonetheless, people get most of their information about political campaigns from the media.

In particular, they get most information about the presidential campaign from the local news (Just et al. 1996). More than one third of people report getting the majority of political news from the local news, whereas less than 10% report getting most news from the national television networks (Pew 2003). This is important because the local news and national news media differ in several relevant ways. The national news is dominated by “horse-race” coverage (Broh 1980) and is focused on campaign strategy (Jamieson 1996). In contrast, local news is less cynical and more favorable toward candidates (Shaw and Sparrow 1999) and less process-oriented (Lichter and Noyes 1996).

Candidates are aware of the less-negative campaign coverage on local news. They also know that local news happens to be more trusted than campaign ads (Althaus et al. 2002) and is free. In fact, “the campaigns themselves believe that candidate appearances influence local news media coverage and may affect voters in strategically chosen locals” (Althaus et al. 2002) so they make visits in order to gain positive local news coverage (King and Morehouse 2004). We expect that a candidate visit to a state will result in news stories by local media that more closely reflect the candidate’s preferred message. This leads to the expectation that people who watch local news when a candidate visits their town will be more affected by an appearance than people who did not watch local news.

Thus if there are effects of candidate visits, we would expect them to differ across people and over time. I will test the following hypotheses:
1. Candidate appearances will affect people who could potentially change their mind—people with some interest in politics who do not have strong partisan predispositions, e.g. independents.

2. Candidate appearances are likely to impact people when they are making up their minds.

3. Candidate appearances will affect voters who encounter the information, particularly in the local media.

### 2.3 Data

To investigate the effects of candidate visits on voters while properly considering the mediating effects of political knowledge and media exposure, two kinds of data are needed. First, we need to know where candidates visited, and specifically which media markets they visited. Second, we need survey data that includes information about people’s political preferences, location, and media consumption. To compile such a data set, I combined an impressive survey conducted by Brigham Young University and the University of Wisconsin\textsuperscript{1} with data I collected that records each candidate visit made by John Kerry and George Bush in 2004.

The BYU–UW 2004 Election Study is a panel survey; the same people were interviewed at three points during the 2004 campaign. The first wave was conducted from June 24 to July 3, the second was conducted from September 12 to September 30, and the last wave was conducted immediately following the election. Approximately 2800 people

\textsuperscript{1} I sincerely thank J. Quin Monson and Kelly Patterson for graciously sharing this data with me.
completed the July wave of the study; 1500 completed the September wave of the survey; and 1400 completed the final wave of the survey in November. The survey asked questions about both candidates running for president (preference; favorability; traits), both political parties, candidates for Congress, and the person’s prior and intended political behavior (voting; speaking with friends about politics; volunteering for a campaign). It also asked detailed questions about media consumption—both news and entertainment programs. Lastly, it included a number of standard demographic questions and measures intended to gauge a person’s political knowledge and interest. The survey design included a significant over-sampling of battleground states, both Senate and presidential. As a result, all descriptive statistics and regression analysis results presented here are weighted.

In addition, the survey also records the respondent’s media market (also called a DMA or “designated market area”). A media market is a group of counties that all receive the same television and radio stations, and thus the same advertisements and local news programs. Nielson Media Research defines these media markets in order to price advertising spots on television and radio stations. Each county is in only one media market and most market areas are contained in one state, though a number of them do extend across state boundaries (e.g. the Memphis media market includes counties in Arkansas, Mississippi, and Tennessee). Currently, there are 210 DMAs. They are based roughly on metropolitan areas, so both the geographic size and the populations of media markets vary widely. The largest, and thus most expensive, media market is the New York market; in 2004, it contained 7.3

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2 The University of Wisconsin is involved in a project that has been collecting all advertisements aired in the largest media markets (75 in 1996 through 2000, and 100 in 2004) with the help of the Campaign Media Analysis Group. This CMAG data is available after subsequent the election. The BYU-Univ. of Wisconsin data set was designed in order to supplement the CMAG ad data.
million households. The next largest is the Los Angeles media market, with just over 5 million households in 2004. The smallest markets have fewer than 30,000 households.

Candidates visit areas so that the local news stations in that area will cover it (King and Morehouse 2004; Althaus et al. 2002; Shaw 2006). Candidates often, though not always, travel to areas with large media markets to maximize the number of people who hear about the visit. Many states have multiple DMAs, so strategic candidates choose towns in Wisconsin like Prairie du Chien (population 7,100) and Mequon (population 22,000) because these small towns are in the La Crosse- Eau Claire and Milwaukee media markets, respectively. Visits to both towns ensure that local news channels in both media markets show coverage of campaign events and thus more Wisconsin voters see them.

My candidate visit and speech data is also organized by media market. It contains the locations and topics of all public speeches given by George W. Bush and John Kerry in 2004. The data begins in early March, when Kerry became the presumptive nominee. The data do not include visits that a candidate made for fundraisers or private events, though most fundraisers are also paired with a public appearance. This decision was made because the hypothesis is that local news coverage is where people learn about campaigns and candidates. Visits without an appearance intended to receive media attention are thus not appropriate. The visits were cross-referenced to reports about the candidates’ itineraries to ensure that no speeches were missed.

Speech topics were coded directly from the text of the speeches. Transcripts were taken from the candidates’ websites, the Associated Press, and from the White House webpage (for Bush). The candidates spoke about approximately 20 different issues in total. The breakdown, by percentage, of topics that Bush and Kerry discussed in their campaign
speeches is in Table 1. Both candidates focused most frequently on the economy, though Bush spoke about terrorism almost as frequently. Not surprisingly, Kerry did not discuss terrorism nearly as much, but he did talk about Iraq and other foreign policy issues more than Bush. From the middle of September to the election, Kerry talked about Iraq much more frequently; through the summer, he focused more on the economy.

By linking together these two data sets, I can determine which respondents lived in media markets that received visits from the candidates and which respondents were more likely to have seen them because they watch more television news. This combined information allows me to test my hypotheses.

2.5 The Model

This project investigates the effect of candidate visits on individual voters. To test my hypotheses that independents are most affected by visits, that visits have the most impact in the late summer, and that local news consumption is the mechanism through which visits translate to individuals’ opinions, I conduct analysis on each of the three waves of the survey (July, September, and November) and analyze independents, Democrats, and Republicans separately. Most of the regression analyses are done on vote choice, which provides a particularly difficult test for finding campaign effects, though in two analyses I investigate the effects of visits on two variables closely linked to the vote. I will describe the variables used and then present the results.

The central explanatory variables are whether or not Bush visited the respondent’s media market and whether or not Kerry visited the respondent’s media market prior to the survey. That is, in analyses of the September survey, the variables indicate whether or not
Bush and Kerry visited before September 12, the first day of the survey. (A respondent who lived in a media market that received only one visit from Bush in October would, obviously, not be counted as having received the Bush visit “treatment” in analyses of the second wave of the survey.) Note that these two variables, “Bush visit” and “Kerry visit”, are binary; 1=received a visit, 0=no visit. Though I have the number of times a respondent’s market was visited (it ranges from 0 to 12), I use the binary measure because it is easier to interpret. It also provides a more conservative test. To test the possibility that effects of visits diminish over time, analyses were conducted that include an additional variable: the number of days since the most recent visit by the candidate.

The models include measures of news consumption and political knowledge because I hypothesize that both of these factors conditions the response to candidate appearances. The news consumption variable is constructed from questions that ask the number of days in the past week that the respondent watched the local news at noon, the early local evening news at 5pm or 6pm, and the late local nightly news at 10pm or 11pm. Each of those three questions ranges from 0 day to 7 days in the last week, and added together, the resulting scale runs from zero local news programs watched in the past week to 21 local news programs watched in the past week. The variable is coded as a proportion of news programs watched out of all the news programs per week (i.e. out of 21). The measure of political knowledge is constructed from four standard knowledge questions and thus produces a scale from 0 to 4. The news consumption questions are asked in each of the three surveys so the

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3 The scale asks whether the respondent knows what position the following four people hold: Bill Frist, William Rehnquist, Tony Blair, and John Ashcroft.
analyses conducted use the most recent responses. The political knowledge questions were only asked in the July survey, so the knowledge measure remains the same in all the analyses.

My third hypothesis is that people are affected by candidate visits if they are exposed to information about the visit. News consumption itself may have separate effects, but the important point is knowing whether the respondent watched the news when the candidate visited. To test this, I include an interaction term between the candidate visit variables and news consumption (i.e. Bush Visit X News, Kerry Visit X News). Models are run with and without these interaction terms.

To separate groups by partisanship, I use the question that asks, “are you a Democrat, Republican or Independent?” The questions following that are the standard branches, asking if the respondent is a strong or weak partisan or if the independent leans towards one candidate are the other, so it is possible to create a seven-point scale. However, conceptually it makes sense that partisans respond differently to visits from their candidate and visits from the opposing party’s candidate and that independents respond differently than either Democrats or Republicans, so I split the samples using the first question.

The dependent variable for most of the results presented here is vote choice, with 1=Kerry and 0=Bush. In the July and September waves of the survey, that preference is elicited by the question, “if the election were held today, for whom would you vote?” In the November survey, the question is, “for whom did you vote?” Any person who mentioned a third candidate was dropped from the analysis, though fewer than ten people preferred a

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4 The partisanship questions were asked in each survey, so that it is possible to measure the change in partisanship over the course of the campaign.
candidate other than Bush or Kerry. In the first two waves of the survey, if a respondent replied that they were not sure, they were asked if the “lean towards” either of the candidates. Leaners were counted as preferring that candidate. All analyses conducted on this vote choice variable were done with logistic regression. Coefficients are presented and they are supplemented by information about the marginal changes in probabilities and graphs.

Two analyses use different dependent variables. First, Table 2 shows models with a preference scale that incorporates the certainty of that preference in the first two waves of the survey. When people said that they supported Kerry (Bush), they were then asked if they were very certain that they would vote for Kerry (Bush) or not very certain that they would vote for Kerry (Bush). Those questions were combined with the “lean toward” questions to created a scale ranging from 0 (Certain to vote for Bush) to 6 (Certain to vote for Kerry), with 3 signifying undecided (i.e. respondent does not lean towards either candidate).

Second, Table 6 shows the difference in favorability ratings between Kerry and Bush. People were asked, “is your opinion of Bush (Kerry) very favorable, somewhat favorable, somewhat unfavorable, or very unfavorable?” Those two questions were combined to make a scale from -3 (Completely favorable towards Bush) to 0 (Neutral) to +3 (Completely favorable to Kerry).

Again, the analysis was conducted on each partisan group separately (i.e. one regression each for independents, Republicans, and Democrats) and in each survey. Thus for any dependent variable, there are nine models. The nine models for the vote choice variable are shown in tables 3 and 4. For the sake of presentation, all of the regressions for
the other two dependent variables not all are included, but they are all available from the author.

2.6 Results

2.6.1 Who is affected by candidate visits?

The first question is, “who is affected by visits?” The expectation is that people with some, but not much, knowledge of politics will be most affected because the marginal gain in information from the visit will be large enough to influence their opinions. Because partisanship is such a strong predictor of vote, it does not seem a fair test of the effect of visits to look at partisans. That is, because a Democrat is overwhelmingly likely to vote for John Kerry regardless of the campaign or any new information, there is no reason to expect that an appearance by Kerry in that Democrat’s city would have any impact. Put somewhat differently, there is no possibility for an effect because of a “ceiling” of support—whether a Democrat goes from surely voting for Kerry to absolutely voting for Kerry is not of much interest. In contrast, because (by definition) an independent voter does not identify with one of the parties, there is much more of chance that new information about a candidate (or a party) could sway the person from neutral to a supporter. Thus theoretically, if there is any effect of candidate visits, we are more likely to find it among independents.

To test this hypothesis, I regressed the likelihood of voting for Kerry on visits by both candidates, a person’s news consumption, a person’s prior political knowledge, and an interaction between news consumption and candidates’ visits. In addition, I control for the number of days since the candidate’s appearance. Table 1 shows results from these logistic
regressions run on independents, Democrats, and Republicans separately in the September survey. Both visits from Kerry and Bush significantly impacted independents’ likelihood of voting for Kerry, i.e. increased their likelihood of supporting the candidate who visited their media market. In contrast, neither visits from Bush nor Kerry had any impact on Republicans. Democrats were only somewhat influenced by a visit from Kerry to their media market before the fall.

The substantive effects of candidate appearances on voters are significant. Figure 1 shows the magnitude of the marginal effects of a visit on voting for Kerry on each group. These effects are calculated with knowledge and news consumption at their group medians. Without a visit by either candidate, an independent is slightly more likely to vote for John Kerry—the probability is 54%. For an independent voter with some, but not much, knowledge about politics who watches approximately four television programs each week, a visit by John Kerry to his media market makes him 13.9% more likely to vote for him. The effect of a public appearance by George Bush on an independent is similar. If the president visits a media market, an independent voter living there is 16% less likely to vote for the challenger. Those effects are quite remarkable and certainly justify the time candidates spend ‘going local,’ at least in areas with a significant proportion of undecided or independent voters.
Table 1: Effects of Candidate Visits on Vote, in September by Partisanship

<table>
<thead>
<tr>
<th></th>
<th>Independents</th>
<th>Democrats</th>
<th>Republicans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bush Visit</td>
<td>0.159</td>
<td>-0.191</td>
<td>-0.336</td>
</tr>
<tr>
<td></td>
<td>(0.57)</td>
<td>(0.59)</td>
<td>(0.67)</td>
</tr>
<tr>
<td>Kerry Visit</td>
<td>-0.288</td>
<td>1.191**</td>
<td>-0.699</td>
</tr>
<tr>
<td></td>
<td>(0.57)</td>
<td>(0.6)</td>
<td>(0.62)</td>
</tr>
<tr>
<td>News</td>
<td>0.205</td>
<td>0.972</td>
<td>-1.185</td>
</tr>
<tr>
<td></td>
<td>(1.28)</td>
<td>(1.33)</td>
<td>(1.79)</td>
</tr>
<tr>
<td>News X Bush Visit</td>
<td>-3.403*</td>
<td>-1.009</td>
<td>-0.289</td>
</tr>
<tr>
<td></td>
<td>(1.87)</td>
<td>(1.75)</td>
<td>(1.92)</td>
</tr>
<tr>
<td>News X Kerry Visit</td>
<td>3.708**</td>
<td>-0.519</td>
<td>2.29</td>
</tr>
<tr>
<td></td>
<td>(1.84)</td>
<td>(1.7)</td>
<td>(1.81)</td>
</tr>
<tr>
<td>Knowledge</td>
<td>0.0591</td>
<td>0.181</td>
<td>0.352*</td>
</tr>
<tr>
<td></td>
<td>(0.13)</td>
<td>(0.13)</td>
<td>(0.2)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.0236</td>
<td>1.126**</td>
<td>-3.136***</td>
</tr>
<tr>
<td></td>
<td>(0.45)</td>
<td>(0.47)</td>
<td>(0.64)</td>
</tr>
<tr>
<td>N</td>
<td>304</td>
<td>500</td>
<td>532</td>
</tr>
<tr>
<td>Log Likelihood</td>
<td>-204.172</td>
<td>-183.658</td>
<td>-104.272</td>
</tr>
<tr>
<td>Chi Square</td>
<td>7.37</td>
<td>8.62</td>
<td>0.508</td>
</tr>
<tr>
<td>Pseudo R-squared</td>
<td>0.0279</td>
<td>0.0385</td>
<td>0.044</td>
</tr>
</tbody>
</table>

Logistic Regression Coefficients. Standard errors in parentheses. Dependent Variable: Vote for Kerry (1=Kerry; 0=Bush). *** p <.01 ; ** p <.05 ; * p <.10.

There is no effect of a visit by John Kerry or George Bush for Republicans. Without a visit, the likelihood of a self-identified Republican with some knowledge of politics who watches some television news voting for Kerry is about 6%. There is not much room for a Republican to become more pro-Bush, so it is not surprising that an effect of a visit by either candidate is essentially non-existent. However, a visit by John Kerry to a media market before the fall does have an impact on Democrats in that area. A Democrat with no candidate appearances is still clearly predisposed to vote for Kerry, with a probability of
82%. With a visit by Kerry, a Democrat with an average level of political knowledge and news consumption is 11% more likely to vote for Kerry. Substantively speaking, a likelihood of voting for Kerry of 82% or 93% does not make much difference.

Figure 1: Marginal Effects of Visits on Independents, Democrats, and Republicans in September

Table 2 presents evidence of the same substantive findings in Table 1 with a different dependent variable. Instead of a binary option of vote for Bush or vote for Kerry, the variable is a scale of certainty or preference for a candidate, and ranges from 0 (certain to vote for Bush) to 6 (certain to vote for Kerry); 3 indicates that a person is undecided between the candidates. The OLS coefficients reported in Table 2 are more straightforward to interpret than the logistics coefficients in Table 1. They show that independents with no
visits lean slightly towards Kerry, but a visit from Kerry can increase the certainty of that vote significantly. A visit by George Bush to the media market before the fall makes an independent voter more likely to support Bush than Kerry.

**Table 2: Effects of Candidate Visits on Preference Scale in, September by Partisanship**

<table>
<thead>
<tr>
<th></th>
<th>Independents</th>
<th>Democrats</th>
<th>Republicans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bush Visit</td>
<td>-0.131</td>
<td>-0.143</td>
<td>-0.156</td>
</tr>
<tr>
<td></td>
<td>(0.68)</td>
<td>(0.35)</td>
<td>(0.26)</td>
</tr>
<tr>
<td>Kerry Visit</td>
<td>-0.249</td>
<td>0.699*</td>
<td>-0.157</td>
</tr>
<tr>
<td></td>
<td>(0.68)</td>
<td>(0.39)</td>
<td>(0.2)</td>
</tr>
<tr>
<td>News Consumption</td>
<td>-0.405</td>
<td>0.662</td>
<td>-0.572</td>
</tr>
<tr>
<td></td>
<td>(1.6)</td>
<td>(0.87)</td>
<td>(0.6)</td>
</tr>
<tr>
<td>Bush Visit X News</td>
<td>-2.487*</td>
<td>-0.595</td>
<td>0.0215</td>
</tr>
<tr>
<td></td>
<td>(1.46)</td>
<td>(1.23)</td>
<td>(0.66)</td>
</tr>
<tr>
<td>Kerry Visit X News</td>
<td>3.631**</td>
<td>-0.338</td>
<td>0.831</td>
</tr>
<tr>
<td></td>
<td>(1.51)</td>
<td>(1.35)</td>
<td>(0.55)</td>
</tr>
<tr>
<td>Knowledge</td>
<td>0.0848</td>
<td>0.184***</td>
<td>0.0834</td>
</tr>
<tr>
<td></td>
<td>(0.16)</td>
<td>(0.071)</td>
<td>(0.07)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.142***</td>
<td>4.435***</td>
<td>0.500**</td>
</tr>
<tr>
<td></td>
<td>(0.59)</td>
<td>(0.36)</td>
<td>(0.23)</td>
</tr>
<tr>
<td>N</td>
<td>339</td>
<td>520</td>
<td>551</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.03</td>
<td>0.04</td>
<td>0.01</td>
</tr>
</tbody>
</table>

*OLS Regression Coefficients. Standard Errors are in parentheses.
Dependent Variable ranges from 0 (Certain Bush Vote) to 6 (Certain Kerry Vote)
*** p <.01 ; ** p <.05 ; * p <.10.

The first hypothesis, that voters without strong partisan predispositions and some but not much knowledge about politics are most likely to be affected by a candidate appearance in their media market, is strongly supported using both a binary and seven-point measure of candidate preference.
2.6.2 When are people affected by candidate visits?

When studying campaigns, it is important to keep in mind that campaigns have different effects at different times. Many of the findings in the “minimal effects” literature can be explained by this inattention to timing (Holbrook 1996). Research that does not consider this factor misestimates the effects of candidate visits. As discussed above, new information (i.e. a candidate visit) is likely to have an impact after people are paying enough attention to receive it but before they have made up their mind. Thus the second hypothesis is that people will be affected by candidate visits after they have started thinking about the campaign in the summer but before they have made up their minds. This survey was conducted at three points in time: July, September, and November. Prior to July, not many people are paying attention to the campaign. After the election, whether or not they have returned to their “enlightened preferences” (Gelman and King 1993) or simply decided, the effects of a candidate visit will not be evident. That leaves the September wave of the survey most likely to document the effects of candidate visits.

Table 3 presents the results of three logistic regressions, one for independents in each of the three waves of the survey. The effects of candidate appearances are non-existent in July, when people are not paying much attention to politics, and in November, after the election (and thus after they have decided). However, the effect of a candidate visit to a media market in the late summer or early fall is significant; independents are much more likely to support a candidate if the candidate makes an appearance in the area. For a self-identified independent with the median levels of knowledge and news consumption, a visit by Bush and Kerry in September has a significant impact. An independent is 16% more
likely to vote for Bush after a visit by the president and 13.9% more likely to vote for Kerry after he has visited.

**Table 3: Effects of Candidate Visits on Independents Over Time**

<table>
<thead>
<tr>
<th></th>
<th>July</th>
<th>September</th>
<th>November</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bush Visit</td>
<td>0.0503</td>
<td>0.159</td>
<td>0.0353</td>
</tr>
<tr>
<td></td>
<td>(0.41)</td>
<td>(0.57)</td>
<td>(0.68)</td>
</tr>
<tr>
<td>Kerry Visit</td>
<td>0.59</td>
<td>-0.288</td>
<td>-0.249</td>
</tr>
<tr>
<td></td>
<td>(0.37)</td>
<td>(0.57)</td>
<td>(0.65)</td>
</tr>
<tr>
<td>News Consumption</td>
<td>-0.17</td>
<td>0.205</td>
<td>-0.191</td>
</tr>
<tr>
<td></td>
<td>(0.52)</td>
<td>(1.28)</td>
<td>(1.22)</td>
</tr>
<tr>
<td>Bush Visit X News</td>
<td>0.321</td>
<td>-3.403*</td>
<td>0.265</td>
</tr>
<tr>
<td></td>
<td>(1.19)</td>
<td>(1.87)</td>
<td>(1.9)</td>
</tr>
<tr>
<td>Kerry Visit X News</td>
<td>-0.995</td>
<td>3.708**</td>
<td>0.826</td>
</tr>
<tr>
<td></td>
<td>(1.12)</td>
<td>(1.84)</td>
<td>(1.74)</td>
</tr>
<tr>
<td>Knowledge</td>
<td>0.0522</td>
<td>0.0591</td>
<td>0.227</td>
</tr>
<tr>
<td></td>
<td>(0.077)</td>
<td>(0.13)</td>
<td>(0.14)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.138</td>
<td>0.0236</td>
<td>-0.0265</td>
</tr>
<tr>
<td></td>
<td>(0.21)</td>
<td>(0.45)</td>
<td>(0.56)</td>
</tr>
<tr>
<td>N</td>
<td>640</td>
<td>304</td>
<td>276</td>
</tr>
<tr>
<td>Log likelihood</td>
<td>-435.12747</td>
<td>-204.17234</td>
<td>-183.49092</td>
</tr>
<tr>
<td>Chi2</td>
<td>4.92</td>
<td>7.37</td>
<td>4.2</td>
</tr>
<tr>
<td>Pseudo R2</td>
<td>0.0078</td>
<td>0.0279</td>
<td>0.0195</td>
</tr>
</tbody>
</table>

Logistic Regression Coefficients. Standard Errors are in parentheses. Dependent Variable: Vote for Kerry (1=Kerry; 0=Bush). *** p <.01 ; ** p <.05 ; * p <.10.

Figure 2 shows the marginal effects of candidate visits over time for independents with knowledge and news consumption held at their medians. The unshaded bars represent statistical insignificance. Clearly, the impact of candidate visits occurs in the late summer and early fall. The hypothesis that timing plays a role in conditioning the effects of the ‘going local’ campaign strategy is strongly supported.
Figure 2: Marginal Effect of Visits on Independents Over Time

B= Bush Visit; K= Kerry Visit. Unshaded bars indicate that marginal changes are not statistically significant. Probabilities calculated with news consumption and political knowledge at the median in each time period.

As noted in the previous section, partisans are impacted differently than are independents. Table 4 demonstrates that a visit to a media market serves as information about the candidate. Because partisans’ preferences are essentially swamped by partisanship, new information will not change the overwhelming likelihood that the partisan will vote for her party’s nominee. However, early in the campaign, partisans can learn information about their candidate, or at least become somewhat more certain.
Table 4: Effects of Candidate Visits on Partisans Over Time

<table>
<thead>
<tr>
<th></th>
<th>Democrats</th>
<th></th>
<th></th>
<th>Republicans</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>July</td>
<td>September</td>
<td>November</td>
<td>July</td>
<td>September</td>
<td>November</td>
</tr>
<tr>
<td>Bush Visit</td>
<td>-0.475</td>
<td>-0.191</td>
<td>-0.0317</td>
<td>-2.129***</td>
<td>-0.336</td>
<td>-1.358*</td>
</tr>
<tr>
<td></td>
<td>(0.52)</td>
<td>(0.59)</td>
<td>(0.81)</td>
<td>(0.74)</td>
<td>(0.67)</td>
<td>(0.77)</td>
</tr>
<tr>
<td>Kerry Visit</td>
<td>1.379**</td>
<td>1.191**</td>
<td>0.995</td>
<td>-0.105</td>
<td>-0.699</td>
<td>-0.764</td>
</tr>
<tr>
<td></td>
<td>(0.67)</td>
<td>(0.6)</td>
<td>(0.82)</td>
<td>(0.65)</td>
<td>(0.62)</td>
<td>(0.68)</td>
</tr>
<tr>
<td>News Consumption</td>
<td>0.883</td>
<td>0.972</td>
<td>0.719</td>
<td>-0.527</td>
<td>-1.185</td>
<td>-1.759</td>
</tr>
<tr>
<td></td>
<td>(0.65)</td>
<td>(1.33)</td>
<td>(1.13)</td>
<td>(0.77)</td>
<td>(1.79)</td>
<td>(2.24)</td>
</tr>
<tr>
<td>Bush Visit X News</td>
<td>1.857</td>
<td>-1.009</td>
<td>-0.542</td>
<td>5.903***</td>
<td>-0.289</td>
<td>1.682</td>
</tr>
<tr>
<td></td>
<td>(1.51)</td>
<td>(1.75)</td>
<td>(1.5)</td>
<td>(1.49)</td>
<td>(1.92)</td>
<td>(2.13)</td>
</tr>
<tr>
<td>Kerry Visit X News</td>
<td>-1.943</td>
<td>-0.519</td>
<td>-0.24</td>
<td>-2.693</td>
<td>2.29</td>
<td>0.959</td>
</tr>
<tr>
<td></td>
<td>(1.79)</td>
<td>(1.7)</td>
<td>(1.49)</td>
<td>(1.81)</td>
<td>(1.81)</td>
<td>(1.61)</td>
</tr>
<tr>
<td>Knowledge</td>
<td>0.184*</td>
<td>0.181</td>
<td>0.472***</td>
<td>0.157</td>
<td>0.352*</td>
<td>0.426</td>
</tr>
<tr>
<td></td>
<td>(0.1)</td>
<td>(0.13)</td>
<td>(0.16)</td>
<td>(0.13)</td>
<td>(0.2)</td>
<td>(0.29)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.510***</td>
<td>1.126**</td>
<td>0.782</td>
<td>-2.643***</td>
<td>-3.136***</td>
<td>-2.776***</td>
</tr>
<tr>
<td></td>
<td>(0.29)</td>
<td>(0.47)</td>
<td>(0.52)</td>
<td>(0.31)</td>
<td>(0.64)</td>
<td>(0.68)</td>
</tr>
<tr>
<td>N</td>
<td>825</td>
<td>500</td>
<td>432</td>
<td>857</td>
<td>532</td>
<td>469</td>
</tr>
<tr>
<td>Log likelihood</td>
<td>-280.13023</td>
<td>-183.65788</td>
<td>-140.6065</td>
<td>-207.98299</td>
<td>-104.27203</td>
<td>-83.420783</td>
</tr>
<tr>
<td>Chi2</td>
<td>9.63</td>
<td>8.62</td>
<td>12.56</td>
<td>22.3</td>
<td>5.28</td>
<td>5.18</td>
</tr>
<tr>
<td>Pseudo R2</td>
<td>0.0255</td>
<td>0.0385</td>
<td>0.0787</td>
<td>0.0393</td>
<td>0.0435</td>
<td>0.0955</td>
</tr>
</tbody>
</table>

Logistic Regression Coefficients. Standard Errors are in parentheses. Dependent Variable: Vote for Kerry (1=Kerry; 0=Bush). *** p < .01; ** p < .05; * p < .10.

Figure 3 summarizes the evidence supporting hypotheses one and two. Because there are three partisan groups (Democrats, independents, and Republicans), three surveys (July, September, and November), and two candidates, tables of regression coefficients are dense. Figure 3 makes it clear that independents are most affected by visits and these effects are strongest in the early fall. The graph on the left shows the marginal effects of a visit by George Bush to a media market for each of three groups at each point in time. The graph on the right shows the marginal effects of a Kerry visit. (These effects are calculated with knowledge and news consumption levels at the median for the group in that wave of the
survey.) While Figure 3 shows the marginal effects of visits, Table 5 has the predicted probabilities of voting for Kerry with and without candidate visits for each group in each time period. Concluding that candidate appearances have no impact on voters is clearly wrong—basing empirical tests on theories about who is affected and when they are affected leads to a more complete picture of the effect of ‘going local’.

Figure 3: Effects of Candidate Visits over time, by Partisanship
Table 5: Predicted Likelihood of Voting for John Kerry

<table>
<thead>
<tr>
<th>Partisanship</th>
<th>No Visit</th>
<th>Bush Visit</th>
<th>Kerry Visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>July</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Democrats</td>
<td>0.8703</td>
<td>0.8666</td>
<td>0.9437*</td>
</tr>
<tr>
<td>Independents</td>
<td>0.5383</td>
<td>0.5677</td>
<td>0.6295*</td>
</tr>
<tr>
<td>Republicans</td>
<td>0.07</td>
<td>0.0268*</td>
<td>0.039</td>
</tr>
<tr>
<td>September</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Democrats</td>
<td>0.8232</td>
<td>0.7516</td>
<td>0.9312*</td>
</tr>
<tr>
<td>Independents</td>
<td>0.5475</td>
<td>0.3868*</td>
<td>0.6868*</td>
</tr>
<tr>
<td>Republicans</td>
<td>0.0621</td>
<td>0.0423</td>
<td>0.0537</td>
</tr>
<tr>
<td>November</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Democrats</td>
<td>0.8772</td>
<td>0.8524</td>
<td>0.9469*</td>
</tr>
<tr>
<td>Independents</td>
<td>0.5943</td>
<td>0.6178</td>
<td>0.5816</td>
</tr>
<tr>
<td>Republicans</td>
<td>0.0812</td>
<td>0.0354</td>
<td>0.0513</td>
</tr>
</tbody>
</table>

Probabilities calculated with news consumption and knowledge at group medians. *p<.05

2.6.3. How are people affected by candidate visits?

The number of people who actually come in contact with a candidate when he visits a media market is small. Even in New Hampshire or Iowa during primary season, only a small percentage of people meet a candidate or attend a rally. During the general election, the number is much lower. Despite this fact, voters in a media market visited by a candidate are more likely to vote for the candidate than voters in districts without such campaign attention. What is the causal mechanism?

Hypothesis three posits that local news consumption is the mediating factor between candidate visits and their resulting impact. Obviously, a person cannot be affected by a piece of information if they never receive that information in the first place, and people receive information about a candidate’s visit through the local media.
The kind of coverage that candidates receive from the local media is less negative and less focused on strategy. Importantly, it is less critical than national media. I am not arguing that local news coverage of presidential candidates is particularly substantive—it does not usually include detailed issue positions of the candidates. However, reporting that a candidate did visit the area and showing footage of the candidate standing in front of a tractor or wall with the day’s message is a kind of “information,” even if it is only affective. This analysis does not assume that there are no direct effects of visits or effects of social networks—people likely garner information about the visit by talking to their friends, who may have gone to a candidate rally or simply may have heard about it on the radio. However, this does not negate the argument that local media is the key cause of candidate visits’ effects.

In previous research on candidate appearances, the total number of visits made by a candidate was used. This is appropriate for an aggregate level analysis, but it also explains why effects of candidate visits are often weak and findings often conflict. If a tree falls in the forest and no one hears it—or a candidate yells at a rally that no one attends and is not covered in the media—there is no effect. That is, it is not whether or not a candidate visits a media market, it is whether a voter knows that the candidate visited the media market. Because I am using individual-level data with measures of media consumption, I am able to test what we actually think is happening.

Table 6 presents two models of independents’ vote choice in September. Model 1 suggests that there is no impact of a visit by Bush or Kerry—if we only considered that evidence, we would conclude that visits are not an important part of campaign strategy. A more careful, theoretically-based investigation illustrates the problem with that naïve model.
Model 2 includes the interactions between a candidate visit and an individual’s news consumption. Basing this analysis on the rather obvious, but less-often considered, fact that people need to be exposed to information in order to be affected by it, the true effects of visits become clear. The coefficients for candidate visits are still not statistically significant, but the coefficients on the interaction terms are significant and large. Candidate visits have an impact if, and only if, people hear about them.

Table 6: Effects of Candidate Visits on Independents in September

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bush Visit</td>
<td>-0.455 (0.41)</td>
<td>0.159 (0.57)</td>
</tr>
<tr>
<td>Kerry Visit</td>
<td>0.402 (0.41)</td>
<td>-0.288 (0.57)</td>
</tr>
<tr>
<td>News Consumption</td>
<td>0.354 (0.65)</td>
<td>0.205 (1.28)</td>
</tr>
<tr>
<td>Bush Visit X News</td>
<td>-3.403* (1.87)</td>
<td></td>
</tr>
<tr>
<td>Kerry Visit X News</td>
<td></td>
<td>3.708** (1.84)</td>
</tr>
<tr>
<td>Knowledge</td>
<td>0.0587 (0.13)</td>
<td>0.0591 (0.13)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.00818 (0.37)</td>
<td>0.0236 (0.45)</td>
</tr>
<tr>
<td>N</td>
<td>304</td>
<td>304</td>
</tr>
<tr>
<td>Log likelihood</td>
<td>-207.92896</td>
<td>-204.17234</td>
</tr>
<tr>
<td>Chi2</td>
<td>2.39</td>
<td>7.37</td>
</tr>
<tr>
<td>Pseudo R2</td>
<td>0.01</td>
<td>0.0279</td>
</tr>
</tbody>
</table>

Logistic Regression Coefficients. Standard Errors are in parentheses. Dependent Variable: Vote for Kerry (1=Kerry; 0=Bush). *** p <.01 ; ** p <.05 ; * p <.10.

5 The previous analyses demonstrating who and when were done using the correct model—they include the interaction terms.
Figures 4 and 5 are representations of Models 1 and 2. They show the likelihood of independents voting for Kerry in September over levels of news consumption, with and without visits. (These probabilities are calculated using median levels of knowledge.) The naïve model pictured in Figure 4 hides the true impact of visits. Figure 5 dramatically shows that it is the interaction of a visit with news consumption that influences voters. Very few people watch 3 news programs per day (at the very right of the graph), but even at the median level of news consumption, the effects are significant. Half the people watch more than the median level of news and thus are even more affected by those visits.

![Figure 4: Effects of Visits on Independents in September, across levels of news consumption—Model 1 (Naïve)](image-url)
Tables 1 through 4 illustrate who is affected and when they are affected by candidate appearances. This part of the analysis illustrates how those effects occur and suggests a reason why previous findings done at the aggregate level are misleading.

2.6.4. Do the effects of candidate visits persist?

Previously, I have shown that people with some, but not much, knowledge about politics and weak partisan predispositions are affected by candidate visits; people are affected after they have considered the campaign and before they have made up their minds; and
local news consumption is the mediating factor between the visit and individual’s opinions. This analysis asks whether or not the effect of visit decays. The answer to this question implies very different things: if an individual is impacted but it wears off by the election, the campaign had essentially no effect—or at least much less. However, if the effect is maintained, we would conclude the candidate activities such as visits can, in fact, play a role in election outcomes or at least individual’s voting decisions.

To test whether or not the effects documented above decay, the same models were run with the number days since the candidates’ last visits included. Table 7 shows regressions for each partisan group in September on the difference in favorability ratings between the two candidates. First, the results on this dependent variable are similar to the results presented using vote choice. Independents are affected by Kerry’s visits, but only if they watch television news (Model 1). Model 2 includes the number of days since the candidates’ last visit. In the September survey, it ranges from 2 to 196 for both candidates with 56% of the weighted sample receiving visits from Bush and 55% receiving a visit from Kerry. The median number of days since Bush’s last visit among people with a Bush visit is 37 and 31 since Kerry’s last visit among people with a Kerry visit.

The number of days since Bush’s visit is statistically significant for independents in September, but it is extremely small. For an independent with the median number of days since Bush’s visit (37), the difference in favorability ratings increases by .3 on a seven-point scale. At the 75 percentile of days since visit, the difference increases by .76 on a seven-point scale. The maximum effect for this variable is 1.64 for independents who were visited by Bush in early March, which is still less than the standard deviation of the difference of
Table 7: Effects of Candidate Visits on Difference in Candidates’ Favorability Ratings, in September by Partisanship, with and without days since candidates’ most recent visit

<table>
<thead>
<tr>
<th></th>
<th>Independents</th>
<th>Democrats</th>
<th>Republicans</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bush Visit</strong></td>
<td>-0.305 (.57)</td>
<td>-0.809 (.61)</td>
<td>-0.357 (.35)</td>
</tr>
<tr>
<td></td>
<td>-0.00762 (.57)</td>
<td>0.123 (.61)</td>
<td>0.478 (.36)</td>
</tr>
<tr>
<td><strong>News Consumption</strong></td>
<td>-1.124 (1.17)</td>
<td>-1.144 (1.16)</td>
<td>-0.464 (0.59)</td>
</tr>
<tr>
<td><strong>Bush Visit X News</strong></td>
<td>-1.098 (1.17)</td>
<td>-1.105 (1.13)</td>
<td>0.0873 (0.99)</td>
</tr>
<tr>
<td><strong>Kerry Visit X News</strong></td>
<td>3.173*** (1.22)</td>
<td>3.124*** (1.18)</td>
<td>0.325 (1.03)</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
<td>0.112 (0.11)</td>
<td>0.123 (0.11)</td>
<td>0.323*** (0.067)</td>
</tr>
<tr>
<td><strong>Days since Bush Visit</strong></td>
<td>0.00859*** (0.0028)</td>
<td>-0.00301 (0.0037)</td>
<td>-0.00031 (0.0023)</td>
</tr>
<tr>
<td><strong>Days since Kerry Visit</strong></td>
<td>-0.00262 (0.0034)</td>
<td>0.00825 (0.37)</td>
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</tr>
<tr>
<td><strong>Constant</strong></td>
<td>0.00873 (0.37)</td>
<td>0.00825 (0.37)</td>
<td>0.898*** (0.26)</td>
</tr>
</tbody>
</table>

N 305 305 488 488 525 525
R2 0.06 0.09 0.11 0.11 0.01 0.02

OLS Regression Coefficients. Standard Errors are in parentheses. Dependent Variable ranges from -3 (Pro-Bush) to +3 (Pro-Kerry); 0 is neutral between candidates. *** p < .01; ** p < .05; * p < .10.
favorability ratings for independents in September (std. dev=2). These findings hold with other dependent variables and follow the same patterns as described above.

This result suggests that people are incorporating the information provided by the candidate visit in accordance with the online-processing model (Lodge et al. 1995). That is, people learn some new information provided by a candidate visit to their media market and then incorporate it into their “online tally,” their opinion of the candidate. It does not decay because their opinions have been changed. A memory-based model (e.g. Zaller 1992) implies that a visit would increase the salience of the opinion of the candidate or make it easier to remember the opinion later. Though the person may have “stored” the new information, once the salience of the candidate wears off, that information would be less likely to have an impact because it is less likely to be retrieved from memory. The fact that the effects of a candidate visit do not decay provides some evidence that the online-processing model is a better description of how visits impact voters in the longer-term than is a memory-based model.

2.7 Discussion

Candidates regularly do and say things that attempt to influence people’s perceptions of them and their opponents. The question here is: does where they do and say those things matter? Does a person in Kansas learn just as much (or just as little) if a candidate visits Kansas City or Salt Lake City? Do candidates get any localized effects of their rallies and appearances, or is it just the national campaign that impacts voters? This paper examines local, as opposed to national, campaign effects. I find that candidate visits do provide information to voters and ultimately affect their candidate preferences.
The effect of visits is not constant across people or across time. First, voters will be influenced by candidate visits when they do not have much information or do not have strong partisan predispositions. Second, the time period in which people are making up their minds is when effects of candidate appearances will be strongest. Third, watching local news greatly increases the effects of appearances in areas that a candidate visited. I also present evidence that the effects of visits do not decay, which suggests people incorporate information from a candidate visit in accordance with an on-line processing model.

A number of questions about the effects of candidate visits still need to be addressed. For example, does it matter what the candidates talk about, or just that they are covered on the local news? Do candidate speeches impact voters’ issue concerns more when the candidate is speaking in their town? In addition, this project presented cross-section analyses. I will take advantage of the panel data from the survey so that I can look at the rate of learning of people in areas that candidates did as compared with did not visit.

Presidential candidates began traveling back-and-forth across the country more than a year before the 2008 election. This project finds that those kinds of campaign appearances do impact voters by imparting information about the candidates through the local media and helps us to understand the conditions in which people can and do learn about politics and candidates. Though many observers complain about the extended campaign season, it appears that more visits by candidates improves voter learning.
3. Incidental Information Acquisition: College Students, Electronic Social Network, and Political Learning

Do electronic social networks, an emerging communication medium among college students, increase political learning among the youngest and most inexperienced voters? What are the political effects of these popular online social networks such as Facebook.com? Students spend enormous amounts of time browsing these sites, which now have large amounts of political content such as the political preferences of individual users and groups supporting candidates, issues, and parties. This project builds on Lazarsfeld and colleagues’ theory of opinion leaders (Lazarsfeld et al. 1948; Berelson et al. 1954) and the ‘strength of weak ties’ hypothesis (Granovetter 1973) from sociology, which argues that there is more information diffusion due to weak ties to other people than there is due to strong ties to close friends. Electronic networks’ ‘weak ties’ combine with clear markers of political ideology, opinions, and partisanship on opinion leader’s online profiles and thus result in more political information for users, whether or not that information was sought out in the first place. Thus a person without much knowledge about or interest in a candidate or an issue who stumbles into political content in a Facebook profile could be influenced, especially if the person who posted it is viewed as political expert. Knowledge about political events and political participation can thus be drastically increased among a population of semi-interested students.

Because so little research currently exists, this project will first provide descriptive analysis of this emerging phenomenon and then make some limited causal inferences. I conducted a survey of college students, which contained an embedded experiment,
immediately following the November 2006 election. The survey documents the correlation between people’s Facebook exposure (time online, number of friends and groups, and number of profiles viewed regularly) and their knowledge of current political events (e.g. election outcomes) and their past and intended future political participation. The experiment tests whether people are affected by the opinions of other students in their electronic network.

Findings suggest that exposure to Facebook can increase students’ political learning and rates of participation. After controlling for prior political knowledge and interest, Facebook exposure was a predictor of students’ knowledge about current political events such as the candidates running for president and of the likelihood of participating. In addition, students are more likely to report that they will participate in future civic activities such as voting when they know that members of their electronic social network are interested in politics. Interestingly, students who are at least occasionally electronic opinion leaders are affected differently than are students who are not. Opinion leaders learned more and non-opinion leaders were more likely to increase their political participation. These findings support the need for additional research in this area and provide some hope for the increased political engagement of young people.

3.1 Theory and Previous Literature

The theoretical background of this project is that the number of weak ties in electronic social networks combined with political content in those networks increases the impact of opinion leaders. Because students spend a significant amount of time on
Facebook, they can incidentally acquire political information through these opinion leaders and become more likely to care about politics and participate in politics.

3.1.1 Opinion Leaders and Weak Ties

Lazarsfeld and his colleagues (Lazarsfeld et al. 1948; Berelson et al. 1954) hypothesized about opinion leaders and two-stage flows of information. In their study of the 1940 presidential election in Erie County, Ohio (Lazarsfeld et al. 1948), they expected to find extensive media influence in the presidential campaign. They did not find it, in that first study or in the second study in Elmira, New York. However, they did identify “opinion leaders”—people who paid attention to political news and the campaign and then told friends about it. This “two-stage flow” explained the mediated relationship between the media and people’s opinions. Today, the Internet has magnified the power of opinion leaders—and it allows more people to encounter opinion leaders in shorter spans of time.

Granovetter (1973) developed the theory of the ‘strength of weak ties’. He finds that people with larger social networks, i.e. people who had more connections to people that they did not know well, were better able to find employment. His conclusion is that more information flows from people we do not know well as opposed to from close friends. Much research has supported this conclusion. Bridging social capital, ties to people outside your close group, gives more access to resources of all kinds. This is also true for electronic social networks (Donath and Boyd 2004). Because sites like Facebook allow for so many weak connections and because there are so many ways to gain information about and from those connections with direct interaction, regular users are likely to learn new information while on Facebook.
3.1.2 College Students as ‘Middlers’

The amazing growth of electronic social networks makes the phenomenon worthy of study, and young people are the ones more likely to frequent them. College students in particular are the most likely people to use Facebook. Second, to better understand patterns of political learning, it is helpful to look at people who are most likely to be affected by information—people with some, but not much, knowledge of politics. Third, though a relatively small proportion of the total population, college students’ engagement can have consequences in the longer term.

College students are the appropriate group to study is because they are likely to be affected by political information. Two groups of people are not likely to be affected by information (Converse 1966). People with high levels of knowledge of and interest in politics are not likely to change their minds. People with no interest in politics are not likely to notice political information and thus are not susceptible to opinion change by new information. In contrast, people who are “in the middle” (Zaller 1992), who have a basic knowledge of politics but do not have fixed opinions and political attitudes, are able to receive new information, incorporate it, and then use it in the future. This is an accurate description of college students. They have less political knowledge and less political experience than their elders so they are not entirely committed to their beliefs. Due to

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1 Facebook.com was originally just for college students—in order to sign up for the site, you needed to have a valid .edu email address. That has since changed; anyone can join. However, that early policy has resulted in more use of Facebook among people in higher socioeconomic classes (i.e. people with at least some college education). In contrast, MySpace, which was always open to all, tends to have a higher concentration of people of lower socioeconomic classes. See dana boyd’s work for more details (2007).
regular exposure to political messages on campus, there are more likely to be somewhat interested in politics.

Lastly, despite the relatively small number of college students, increased knowledge and participation among students can have longer term political impact. This is because political viewpoints and behavior tend to crystallize while people are in their twenties (Sears and Levy 2003). Though college students are a small percentage of the US population, changes in this group can change election outcomes in close contests as well as the contours of interest group politics.

3.1.3 Electronic Social Networks and New Media

Electronic social networks are worth studying because they are hugely popular and becoming more so over time. MySpace has 72 million U.S. users\(^2\), with more worldwide. In particular, Facebook.com has grown dramatically in the years since its inception in 2004. A few years ago, few college students had accounts. Now, nearly all college students have a Facebook page and the site has more than 115 million users worldwide each month.\(^3\) Though Mark Zuckerberg started the company in his dorm room at Harvard, it is now valued at $15 billion\(^4\)—a sure sign of the site’s growth and potential advertising power.


\(^3\) Ibid.

There is debate as to how much the Internet has changed social interaction and communication (e.g., see Borgida and Stark 2004). Some have concluded that the Internet is simply “a new way of doing old things” (Tyler 2002), but it is possible for new media to elicit new behavior. At the very least, it is making it easier to do things that people would do anyway. Most Facebook users find friends that they know from offline instead of making friends online (Lampe et al. 2006). However, because Facebook contains information that students would not discuss otherwise—for example, political preferences or home towns—peers can influence each other in more ways.

3.2 Hypotheses

The central hypothesis driving this project is that incidental exposure to political information on electronic social networks like Facebook can increase students’ knowledge about and interest in the political world. When political scientists use the term “political knowledge,” we are usually referring to the kind of factual questions about the political system that Delli Carpini and Keeter (1996) recommend, such as “how many votes does it take to overturn a presidential veto?” I want to be clear that that is not the kind of knowledge I am referring to in this research. Because people do not post such information in electronic social networks, there is no way that exposure to Facebook would affect a student’s knowledge about the American political system. However, students do post information about their beliefs about certain issues (e.g. global warming, the war in Sudan), the candidates that they support, and about election results. This project investigates whether Facebook usage increases this kind of knowledge about current political events.
I examine three specific hypotheses in this paper:

1. Increased exposure to Facebook increases students’ knowledge of current political events such as election outcomes.

2. Increased exposure to Facebook increases the likelihood that students will participate in politically-related behaviors like voting, trying to persuade someone about political issues, posting information on political opinions on Facebook or instant-messaging profile, or volunteering for a campaign.

3. Students’ intentions to participate will be influenced by the behavior and opinions of peers in their larger electronic social network.

3.3 Methodology

Testing these hypotheses requires survey data that contains questions about students’ use of Facebook and also includes questions about their knowledge of current events and their political behavior. No such data set exists, in part because there is as-yet not much academic work looking specifically at electronic social networks or Facebook.\(^5\) In order to investigate the political effects of Facebook exposure, I conducted a survey of college students at Duke University, a mid-sized university in the South, in November 2006.

Because my first hypothesis investigates students’ knowledge of current political events, I conducted the survey just after the 2006 congressional election for two reasons. First, the election was relatively salient and talked about on campus, and some students posted information about the election on their Facebook profiles. Second, it was possible to

\(^5\) However, this is rapidly changing. For example, see work by dana boyd (2007).
ask about a number of events that had just recently occurred in a brief period of time (i.e. election results and Secretary of Defense Donald Rumsfeld’s resignation). The survey began on November 12, several days after the election\textsuperscript{6}, and stayed active for seven days, until November 20.

The survey was conducted entirely online. It took between 15 and 20 minutes to complete. The link to the website with the survey was advertised on posters and flyers on campus and on Facebook itself.\textsuperscript{7} If students completed the survey, they were given the chance to enter into a raffle to win a $50 gift certificate to iTunes. The survey included modules about Facebook use, including the amount of time spent on Facebook, the student’s number of friends and groups; political knowledge, both of current events and factual questions about the political system; past and future political behavior; media use; and demographics.\textsuperscript{8} (See Appendix B.) The survey included open-ended questions as well as questions with multiple choices or scales. For the exact wording of all questions used in this paper, please see Appendix A.

The survey also contained an embedded experiment to test the third hypothesis, that students will be influenced by members of their electronic social network. When they began the survey, students were randomly assigned to one of three conditions. The survey presented students with information from Facebook’s ‘Pulse’ feature, which highlights the

\begin{itemize}
  \item The election was held on Tuesday, November 7.
  \item Members of a particular network, in this case Duke, can purchase ‘flyers’ on Facebook to be viewed by people in that network. These flyers appear as advertisements on the left-hand side of the Facebook page and state that the ad was posted by a member of the Duke community and was shown only to Duke members. I purchased 200,000 page views, which was relatively few and inexpensive.
  \item Though not used in this paper, the survey also asked students questions about their use of instant-messenger software and the Duke Lacrosse case, which had occurred in the spring of 2006.
\end{itemize}
aggregated opinions of network members on such topics as favorite movies, music, and
religious and political views, and candidates and issues that network members support. In
addition to two statements taken directly from Facebook about television and movie
preferences, there was a third statement that purportedly described students’ political views.
In the first condition (the “involved” condition), students were told that the majority of
students in the social network supported a candidate on their Facebook page. In the second
condition (the “apathetic” condition), students were told that the majority of Duke students
reported that they were apathetic about politics in their Facebook profile.9 The control
condition used a filler statement also taken directly from Facebook. For the exact wording,
see the appendix C.

Nearly 400 people began the survey and 360 of those completed the survey.

Students from a wide range of majors completed the survey: 40% of students majored in one
of the ‘hard’ sciences; 40% majored in one of the social sciences, and 20% majored in one of
the humanities. Just 13% of the sample reported being a political science or public policy
major. These percentages are roughly in line with the population. In contrast, women were
significantly overrepresented; just 30% of respondents were male. 50% of respondents were
first or second year students, with upperclassman making up about 30% of the population.
The remaining 20% were graduate students.

9 In the standard format of Facebook profiles, there is a space to include political views. You can choose to
identify your partisanship or ideology. In 2006, the ‘drop down’ menu included ‘apathetic’ as a choice.
3.4 Findings

Because so little research currently exists, I will first provide some descriptive analysis of students’ Facebook use, media consumption, and political behavior. I will then present some regression analyses, suggesting links between Facebook exposure and political knowledge and behavior. Lastly, I will present findings from the embedded experiment.

3.4.1 Descriptive Analysis

Though the sample is not random and Duke students are not representative of the U.S. population, the information about Facebook use is nonetheless useful. Nearly all college students use Facebook, and by looking at Facebook profiles (i.e. in different social networks, academic and otherwise), it appears that people use Facebook in similar ways. The descriptive statistics about Duke students’ political behavior cannot be applied to all college students, but they are probably not vastly different than the statistics from similarly-elite universities.

As is often noted, students spend a significant amount of time on Facebook. In this survey, the average student reported spending an average of 30 minutes per day on Facebook. 50% of the sample spends between 10 and 40 minutes per day. Nearly three quarters of students report logging into Facebook six or seven days per week. The median amount of time spent on Facebook per week is 140 minutes, with the top quartile spending over 300 minutes, or five hours per week, on Facebook. When logged into Facebook, only 10% of students report that they are completely focused on it. 45% report “usually” multi-tasking while on Facebook, though it is unclear what else they are doing. Instant-messaging
with friends, sending emails, and perhaps reading news or entertainment websites are likely candidates.

Students report having a remarkable number of friends. One lonely person in the sample reports having zero friends, though the median number is 300 friends. The top quartile has more than 400 friends. The bottom decile has fewer than 100. The most ‘popular’ person in the sample reported having 2000 friends (perhaps a basketball player? or aspiring politician?), but 95% of students have fewer than 750 friends. Importantly, despite having 300 friends, the average number of profiles that students look at regularly is only ten. The highest quartile views twenty or more profiles regularly. However, because Facebook’s ‘news feed’, students presumably know more about what is going on with friends, especially friends to whom they have weak ties. The news feed reports the changes and additions of a made by a student’s friend on the Facebook page that automatically opens when you first log on to the site. Nonetheless, even the exposure through the news feed is much less than is implied by the number of friends that students have.

Facebook profiles have a number of standard sections available to fill in. Nearly every student includes her music preferences, favorite quotes, and information in the ‘about me’ section of her profile. Many students change information in those categories at least one a week (16%, 24%, and 17%, respectively). More than 50% of students report updating pictures in their profile at least weekly (which is surely a sign of a very healthy digital camera market), with 10% changing their pictures daily.

A significant feature of Facebook is the groups to which people can choose to belong. This is a way that students are likely to encounter political information because joining, or leaving, any kind of group is published in the news feed. The average number of
total groups belonged to by a student is 20, with 95% of students belonging to 60 or fewer. Groups can be politically-related, school-related, or interest-related. 45% of students belong to no politics-related groups—which means that 55% of students do. However, it should be noted that a “political” group is loosely defined. A campaign for a student government representative often includes a Facebook group and is counted as a political group, as are groups supporting presidential candidates and calls for international intervention. An example of a political group is “Stephen Colbert in 2008!”, to which 43,000 people belong. More seriously, 75,000 people belong to a group called “No mas Chavez!!!” There are many partisan groups on Facebook, such as “College Democrats” and “College Republicans of New York.” The arguably more interesting partisan groups have names like, “Democrats are sexy: no one ever says, ‘That’s a nice piece of elephant!’” or “Republicans are Better-Looking (and More Fun) Than Democrats.”

The groups feature of Facebook is an area where students are likely to see information about political events. More to the point of this paper, a number of Facebook groups formed immediately after the 2006 election. An example is, “The Democrats have taken the House AND the Senate. &^*% you, Republicans!” A student who did not pay attention to the news that week could thus encounter the information via Facebook—and when that student went to Facebook for some other reason entirely. There is a factual element in the statement, but the other key point is the affect included in the statement. Though many students are likely to have a basic opinion of the two political parties, a group

\[10\] All group names are quoted exactly, including punctuation. The one exception is when an inappropriate word is in the title; in that case, I leave it up to the reader to infer it.
with a similarly negative group name about Nancy Pelosi may influence students’ opinions of the new Speaker of House if they do not know much, or anything, about her.

There are a number of students who include political information of some sort in their profiles in addition to joining political groups. The ones who do can be considered opinion leaders. 28% of students report posting a political message at some point. Almost one fifth of students supported a candidate in their profile (which simply requires clicking on a candidate’s picture). 17% of students listed an ‘issue I support,’ a standard feature in Facebook profiles. Another way to include information about political preferences is via the ‘Causes’ application.\(^{11}\) It allows you to support different issues and groups, ranging from Amnesty International to the ending the war in Sudan to helping victims of floods in the United States and earthquakes in China. The cause itself can send messages and requests to its members, such as requests to contact a politician or to donate money. Facebook reports that 69,000 people use the application each day, with many more belonging to at least one cause. The ‘Save Darfur’ cause has 900,000 members. When a student joins a cause, it is reported in his friends’ news feeds so that other people may become aware of the importance of an issue about which they know little.

Though only 28% of students report posting political information in their profile\(^{12}\), 86% of people report seeing political information. This is incredibly important. The survey asked whether students discuss politics with the close friend that they had previously

\(^{11}\) Applications are made and distributed by third-parties, though they are incredibly popular and, in the case of some applications like Superwall, nearly required.

\(^{12}\) Again, this is different than supporting a cause or candidate, which simply requires a ‘click.’
named\textsuperscript{13}. Nearly 80\% of students report that they have not talked about politics in months with that friend and nearly 90\% report that they have not talked about politics in months with the acquaintance they had previously listed. Clearly, students are not talking about politics—but they are receiving political cues and learning about friends’ political attitudes via Facebook. Thus this new form of media allows political information to spread in a way it could not, or would not, spread otherwise.

The survey also asked questions about whether or not students were influenced by information in their friends’ profiles. 40\% of students listened to music because they saw it listed in a friend’s ‘Favorite Music’ section. Remarkably, nearly as many report learning something about a candidate on Facebook. ‘Learning’ is likely very broadly defined in this context, but it is nonetheless surprising. Fewer students watched a movie that a friend recommended on Facebook than learned about a candidate from a friend’s profile. Students also report regularly receiving information from their friends—nearly 50\% reported that they got information from friends, which is a higher percentage than reported getting news from either network or cable television.

\textbf{3.4.2 Regression Analysis}

The central hypothesis is that the use of electronic social networks has political consequences. I investigate two areas in which students could be affected politically by Facebook: in their knowledge of current political events and in their political participation. I

\textsuperscript{13} In the survey, respondents were asked to give the first name of a close friend who had the most recent birthday (in order to randomize and not simply get the closest friend or most recently talked-to friend) and the name of the last person they added to their ‘Friends’ list on Facebook, who is presumably just an acquaintance because a close friend would already be in that list.
analyze the effects of Facebook on a number of measures of knowledge and I examine both past and intended future participation.

The knowledge and participation dependent variables (fully described below) are regressed on measures of Facebook exposure and control variables including general political knowledge and interest. In addition to time spent on Facebook per week (in particular, the analyses use the log of the time per week), I also include measures that tap into the probability of seeing political information on Facebook: the (log of the) number of friends and the number of groups to which students belong. Lastly, I include the number of pages that the student looks at regularly. Though a student may have 500 friends, if they only look at 25 profiles regularly, we would expect that the likelihood of being exposed to information is less than the total number of friends suggests. For the control variables, I include standard measures of political sophistication (i.e. knowledge about factual information about the government and the positions held by political figures; see Appendix A for the list of five questions), political interest, and whether or not the student is a political science or public policy major and whether or not she is a graduate student.

In the analyses that follow, I will run models on the entire sample as well as two subsets: opinion leaders and non-opinion leaders. This division is based on the question that asks, “do you ever post political information on your Facebook page?” Students who answered yes, approximately 28% of the sample, are called opinion leaders. This measure is rather crude, but it does tap into how much students know about politics and how interested they are in politics.
Broadly speaking, Facebook usage does have political implications for college students. However, the effects are small. Exposure also impacts opinion leaders and non-opinion leaders differently. Most notably, the behavior of opinion leaders is not at all affected by Facebook, whereas non-opinion leaders are more likely to participate if they have more exposure to Facebook, and thus presumably to more political information in their networks.

Effects on Knowledge

I first investigate whether or not students learn about current political events through electronic social networks. To reiterate, the hypothesis is not that students learn civics information through Facebook—no students are posting information about the length of a US senator’s term. However, students do post information complaining about, e.g., the bill that banned online betting (a big concern among poker-addicted undergraduates) or the continuing costs of the Iraq war. Because of that, I expect that increased exposure to Facebook—and the corresponding increased likelihood of incidentally ‘bumping into’ politically-related material—will increase students’ levels of knowledge of current political events. Overall, knowledge was increased, though not particularly systematically. This suggests that there are specific kinds of things that people learn about, and highlights the fact that opinion leaders and non-opinion leaders are affected differently.

The analyses of the effects on knowledge include three different dependent variables. The first is an index of eight questions, including questions about the war in Sudan and the

14 Of course, I do not mean to equate the importance of these two issues.
Internet gambling ban (see appendix A for the full list of questions). The second variable is the number of presidential candidates that a person is able to list. This is an open-ended question. When the survey was administered, there were at least a dozen declared candidates.\textsuperscript{15} Answers such as “that guy from Illinois” were not counted as valid answers, but misspellings of candidate names and first names only (such as Hillary or Rudy) were counted as valid. The last variable investigated here is whether or not the student knew how many congressional seats the Democrats had won in the 2006 election. The correct answer (at the time of the survey) was 29\textsuperscript{16}, but students were counted as answering the open-ended question correctly if they gave 25 to 35 as the answer. Because this variable is binary (i.e. correct or not correct), the analysis conducted is a logistic regression.

Tables 8-10 show the results of the regressions on the knowledge variables. Models with the full sample as well as the split sample are included for each dependent variable. Not surprisingly, political sophistication (i.e. questions about the government system) and political interest\textsuperscript{17} are strong predictors of all measures of knowledge of current events. In contrast, measures of Facebook exposure vary in predictive power across the dependent variables.

In Table 8, the regression models of the knowledge index models have high R-squared values—the measures of political sophistication and interest explain about 50% of the variance. The only Facebook measure that is statistically significant is the number of

\textsuperscript{15} Had I not recognized a name, I would have searched the internet to see if the person was, in fact, running. However, no one listed someone that was not mentioned regularly in major news sources.

\textsuperscript{16} The ultimate number of seats gained by Democrats in the House of Representatives is 31.

\textsuperscript{17} Note that because the variable is coded 1=A lot to 5=None, the negative coefficient in the regression analysis shows that more interest leads to higher levels of knowledge.
groups that opinion leaders belong to, though the size of the coefficient is relatively small. There is nearly no substantive impact for people who belong to few groups, and at the maximum value of 89, the increase in number of knowledge questions answered correctly is just .86 additional questions.

Table 8: Effects of Facebook Exposure on Knowledge Index

<table>
<thead>
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<th></th>
<th>All</th>
<th>Non-Opinion Leaders</th>
<th>Opinion Leaders</th>
</tr>
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<td>-0.0809</td>
<td>0.161</td>
</tr>
<tr>
<td></td>
<td>(0.078)</td>
<td>(0.093)</td>
<td>(0.16)</td>
</tr>
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<td>Friends</td>
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<td></td>
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<td>(0.18)</td>
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<td>(0.0058)</td>
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<td>Pages Viewed</td>
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<td>0.573***</td>
<td>0.675***</td>
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<td>(0.067)</td>
<td>(0.18)</td>
</tr>
<tr>
<td>Political Interest</td>
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<td>-0.746***</td>
<td>-1.047***</td>
</tr>
<tr>
<td></td>
<td>(0.084)</td>
<td>(0.1)</td>
<td>(0.18)</td>
</tr>
<tr>
<td>Political Science Major</td>
<td>0.337</td>
<td>0.123</td>
<td>0.524</td>
</tr>
<tr>
<td></td>
<td>(0.24)</td>
<td>(0.32)</td>
<td>(0.36)</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>0.355*</td>
<td>0.295</td>
<td>0.494</td>
</tr>
<tr>
<td></td>
<td>(0.2)</td>
<td>(0.24)</td>
<td>(0.37)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.115***</td>
<td>3.381***</td>
<td>1.591</td>
</tr>
<tr>
<td></td>
<td>(0.67)</td>
<td>(0.8)</td>
<td>(1.38)</td>
</tr>
<tr>
<td>Observations</td>
<td>348</td>
<td>244</td>
<td>104</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.5</td>
<td>0.48</td>
<td>0.47</td>
</tr>
</tbody>
</table>

OLS regression coefficients. Standard errors in parentheses. *** p <.01 ; ** p <.05 ; * p <.10.

Table 9 shows analyses on the number of candidates for president that a student is able to list. There are statistically significant effects of Facebook usage on the number of candidates that a non-opinion leader is able to name, but no effect for opinion leaders. Note that the number of friends that a non-opinion leader reports decreases the number of
knowledge questions that that student answers correctly. I do not think that friends make you less knowledgeable, but rather that the kind of person with many friends tends to be less interested in politics in the first place. However, the number of pages that a non-opinion leader views regularly does increase knowledge. As that number expands, students look not only at close friends’ pages, but at the pages of people to which they have weaker ties. Though the coefficient is not large, this finding does support the idea that information flows more from weak ties than from close friends.

Table 9: Effects of Facebook Exposure on Knowledge of Presidential Candidates

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Non-Opinion Leaders</th>
<th>Opinion Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log(Time on FB/week)</td>
<td>0.0402</td>
<td>0.102</td>
<td>-0.0486</td>
</tr>
<tr>
<td></td>
<td>(0.091)</td>
<td>(0.11)</td>
<td>(0.2)</td>
</tr>
<tr>
<td>Friends</td>
<td>-0.145</td>
<td>-0.265*</td>
<td>0.187</td>
</tr>
<tr>
<td></td>
<td>(0.12)</td>
<td>(0.14)</td>
<td>(0.23)</td>
</tr>
<tr>
<td>Groups</td>
<td>0.00578</td>
<td>0.00384</td>
<td>0.00738</td>
</tr>
<tr>
<td></td>
<td>(0.0049)</td>
<td>(0.0072)</td>
<td>(0.0075)</td>
</tr>
<tr>
<td>Pages Viewed</td>
<td>0.00543**</td>
<td>0.00544**</td>
<td>-0.00143</td>
</tr>
<tr>
<td></td>
<td>(0.0024)</td>
<td>(0.0024)</td>
<td>(0.0092)</td>
</tr>
<tr>
<td>Political Sophistication</td>
<td>0.358***</td>
<td>0.354***</td>
<td>0.483**</td>
</tr>
<tr>
<td></td>
<td>(0.073)</td>
<td>(0.076)</td>
<td>(0.24)</td>
</tr>
<tr>
<td>Political Interest</td>
<td>-0.719***</td>
<td>-0.679***</td>
<td>-0.915***</td>
</tr>
<tr>
<td></td>
<td>(0.098)</td>
<td>(0.12)</td>
<td>(0.23)</td>
</tr>
<tr>
<td>Political Science Major</td>
<td>0.757***</td>
<td>0.696*</td>
<td>0.784*</td>
</tr>
<tr>
<td></td>
<td>(0.28)</td>
<td>(0.37)</td>
<td>(0.46)</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>0.191</td>
<td>0.113</td>
<td>0.495</td>
</tr>
<tr>
<td></td>
<td>(0.24)</td>
<td>(0.28)</td>
<td>(0.47)</td>
</tr>
<tr>
<td>Constant</td>
<td>2.936***</td>
<td>3.289***</td>
<td>1.361</td>
</tr>
<tr>
<td></td>
<td>(0.79)</td>
<td>(0.91)</td>
<td>(1.77)</td>
</tr>
<tr>
<td>Observations</td>
<td>348</td>
<td>244</td>
<td>104</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.33</td>
<td>0.32</td>
<td>0.29</td>
</tr>
</tbody>
</table>

OLS regression coefficients. Standard errors in parentheses. *** p < .01 ; ** p < .05 ; * p < .10.
Table 10 shows the results of the logistic regression analyses conducted on whether or not respondents know the number of congressional seats won by the Democrats in 2006. In some sense, it is a harder question than ones about, e.g., Darfur. Students took the survey from between five and thirteen days after the election, so if a student did not pay much attention to news or to Facebook that particular week, then they were not likely to hear about it. The questions on the survey ask about the average amount of time spent on Facebook, not the amount of time in the last week. The survey coincided with mid-terms and was just before the Thanksgiving break, so it is likely that students spent more time on Facebook at other times of the semester.

Though non-opinion leaders were not impacted by Facebook on this measure, opinion leaders were. In particular, the number of groups that an opinion leader belongs to is predictive of whether or not the student knows how many seats the Democrats won. Another model (not shown; available from author) was run with the number of political groups that a student belongs to included, and the significance of the number of groups remains the same. Again, the effect of the variable is small. Nonetheless, this finding does support the hypothesis.

These results suggest that electronic social networks do teach students about current political events. However, these effects are not particularly large. This may be because the measures of knowledge are flawed, or at least incomplete. The questions were pre-tested on students at a different college, but there could have been better ones. Future work on this topic should include more, and some different, measures of knowledge of current events.
Table 10: Effects of Facebook Exposure on Knowledge of Democrats’ Seat Pick-Ups

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Non-Opinion Leaders</th>
<th>Opinion Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log(Time on FB/week)</td>
<td>0.26</td>
<td>0.281</td>
<td>0.399</td>
</tr>
<tr>
<td></td>
<td>(0.17)</td>
<td>(0.21)</td>
<td>(0.32)</td>
</tr>
<tr>
<td>Friends</td>
<td>0.141</td>
<td>0.0406</td>
<td>0.255</td>
</tr>
<tr>
<td></td>
<td>(0.22)</td>
<td>(0.3)</td>
<td>(0.34)</td>
</tr>
<tr>
<td>Groups</td>
<td>0.0149*</td>
<td>0.0069</td>
<td>0.0261**</td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.014)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Pages Viewed</td>
<td>-0.00285</td>
<td>-0.00534</td>
<td>0.00344</td>
</tr>
<tr>
<td></td>
<td>(0.0069)</td>
<td>(0.01)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Political Sophistication</td>
<td>0.837***</td>
<td>0.885***</td>
<td>0.678*</td>
</tr>
<tr>
<td></td>
<td>(0.2)</td>
<td>(0.24)</td>
<td>(0.38)</td>
</tr>
<tr>
<td>Political Interest</td>
<td>-1.291***</td>
<td>-1.233***</td>
<td>-1.832***</td>
</tr>
<tr>
<td></td>
<td>(0.2)</td>
<td>(0.25)</td>
<td>(0.46)</td>
</tr>
<tr>
<td>Political Science Major</td>
<td>0.0553</td>
<td>0.0117</td>
<td>0.232</td>
</tr>
<tr>
<td></td>
<td>(0.43)</td>
<td>(0.63)</td>
<td>(0.65)</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>0.977**</td>
<td>0.811</td>
<td>1.385**</td>
</tr>
<tr>
<td></td>
<td>(.4)</td>
<td>(0.5)</td>
<td>(0.69)</td>
</tr>
<tr>
<td>Constant</td>
<td>-4.374***</td>
<td>-3.849*</td>
<td>-4.848*</td>
</tr>
<tr>
<td></td>
<td>(1.57)</td>
<td>(1.98)</td>
<td>(2.79)</td>
</tr>
<tr>
<td>Observations</td>
<td>348</td>
<td>244</td>
<td>104</td>
</tr>
<tr>
<td>Log Likelihood</td>
<td>-137.416</td>
<td>-87.252</td>
<td>-47.611</td>
</tr>
<tr>
<td>Pseudo R-squared</td>
<td>0.3</td>
<td>0.29</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Logistic Regression Coefficients. Standard errors in parentheses. *** p <.01 ; ** p <.05 ; * p <.10.

Effects on Political Participation

Next, I investigate the effects of electronic social networks on students’ political participation. The results of these analyses demonstrate that Facebook has a more significant and consistent effect on behavior than on knowledge. However, the effects of Facebook are only evident among non-opinion leaders. In addition, Facebook measures (or any measures) do not predict whether or not a student voted in the 2006 election.
To test for effects, I analyze three dependent variables. First, I regress whether or not a student voted in 2006 on measures of Facebook exposure and control variables. Second, I investigate the effects of Facebook on participation more broadly conceived. (Some research suggests that young people in particular tend to participate in different ways. See Dalton (2007) and Bullert (2000) for evidence.) This dependent variable is a scale of five questions, including questions about persuading a friend and volunteering for a campaign. Lastly, I analyze a relatively new form of participation: sending emails about political issues, candidates, or parties. This is also scale of five questions. (See appendix A for exact working of both the broader participation measure and the email participation measure.)

Table 11 shows the models of voter turnout in 2006. Political interest and political sophistication impact the likelihood of a student voting in 2006, but no other variables are significant. This is in part due to the fact that few students are registered to vote locally; most are still registered in the state where their parents live. In order to vote absentee, students would have had to apply for a ballot weeks (or longer) before the election. It may not have been high-enough salience that far before the election to remind students to request a ballot. It is likely that more students would have voted in a presidential election because the salience is higher much sooner.

Table 12 shows that kinds of participation that have lower ‘costs,’ i.e. do not require planning far ahead of time like voting absentee, are more affected by Facebook exposure. This does not hold for opinion leaders; perhaps their participation rate reaches a certain ceiling. In contrast, non-opinion leaders are affected by political interest as well as by exposure to Facebook. Three measures of Facebook exposure are predictive of participation in the 2006 for non-opinion leaders. The number of friends that a student has, the number
of groups that he belongs to, and the number of Facebook profiles that the student views
regularly all increase the number of ways that a student participates. The coefficients of
these variables are all in the positive direction. Though increased knowledge of politics is
desirable, it is arguably more desirable to increase participation of young people in the
political process. These findings suggest that the key to increasing participation is the
salience of politics.

Table 11: Effects of Facebook Exposure on Likelihood of Voting in 2006

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Non-Opinion Leaders</th>
<th>Opinion Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log(Time on FB/week)</td>
<td>-0.105</td>
<td>-0.0464</td>
<td>-0.543**</td>
</tr>
<tr>
<td></td>
<td>(0.12)</td>
<td>(0.15)</td>
<td>(0.26)</td>
</tr>
<tr>
<td>Log(Friends)</td>
<td>0.0547</td>
<td>0.0587</td>
<td>0.0222</td>
</tr>
<tr>
<td></td>
<td>(0.16)</td>
<td>(0.2)</td>
<td>(0.31)</td>
</tr>
<tr>
<td>Groups</td>
<td>-0.00193</td>
<td>-0.00055</td>
<td>-0.00659</td>
</tr>
<tr>
<td></td>
<td>(0.0065)</td>
<td>(0.01)</td>
<td>(0.0094)</td>
</tr>
<tr>
<td>Pages Viewed</td>
<td>0.000271</td>
<td>-0.00158</td>
<td>0.0182</td>
</tr>
<tr>
<td></td>
<td>(0.0033)</td>
<td>(0.0043)</td>
<td>(0.012)</td>
</tr>
<tr>
<td>Political Sophistication</td>
<td>0.220**</td>
<td>0.165</td>
<td>0.404</td>
</tr>
<tr>
<td></td>
<td>(0.11)</td>
<td>(0.12)</td>
<td>(0.3)</td>
</tr>
<tr>
<td>Political Interest</td>
<td>-0.558***</td>
<td>-0.689***</td>
<td>0.00498</td>
</tr>
<tr>
<td></td>
<td>(0.14)</td>
<td>(0.17)</td>
<td>(0.29)</td>
</tr>
<tr>
<td>Political Science Major</td>
<td>0.0604</td>
<td>-0.254</td>
<td>0.48</td>
</tr>
<tr>
<td></td>
<td>(0.36)</td>
<td>(0.51)</td>
<td>(0.58)</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>0.429</td>
<td>0.000849</td>
<td>1.389**</td>
</tr>
<tr>
<td></td>
<td>(0.32)</td>
<td>(0.39)</td>
<td>(0.67)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.387</td>
<td>0.646</td>
<td>0.662</td>
</tr>
<tr>
<td></td>
<td>(1.07)</td>
<td>(1.32)</td>
<td>(2.26)</td>
</tr>
<tr>
<td>Observations</td>
<td>347</td>
<td>243</td>
<td>104</td>
</tr>
<tr>
<td>Log Likelihood</td>
<td>-215.845</td>
<td>-144.81864</td>
<td>-62.942</td>
</tr>
<tr>
<td>Pseudo R-squared</td>
<td>0.09</td>
<td>0.09</td>
<td>0.11</td>
</tr>
</tbody>
</table>

Logistic Regression. Standard errors in parentheses. *** p <.01 ; ** p <.05 ; * p <.10.
Table 12: Effects of Facebook Exposure on Political Participation in 2006

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Non-Opinion Leaders</th>
<th>Opinion Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log(Time on FB/week)</td>
<td>0.0373</td>
<td>-0.0114</td>
<td>0.00852</td>
</tr>
<tr>
<td></td>
<td>(0.051)</td>
<td>(0.054)</td>
<td>(0.11)</td>
</tr>
<tr>
<td>Log(Friends)</td>
<td>0.125*</td>
<td>0.158**</td>
<td>0.171</td>
</tr>
<tr>
<td></td>
<td>(0.065)</td>
<td>(0.071)</td>
<td>(0.13)</td>
</tr>
<tr>
<td>Groups</td>
<td>0.00693**</td>
<td>0.00638*</td>
<td>0.00194</td>
</tr>
<tr>
<td></td>
<td>(0.0027)</td>
<td>(0.0037)</td>
<td>(0.0043)</td>
</tr>
<tr>
<td>Pages Viewed</td>
<td>0.00354***</td>
<td>0.00360***</td>
<td>0.0036</td>
</tr>
<tr>
<td></td>
<td>(0.0013)</td>
<td>(0.0012)</td>
<td>(0.0053)</td>
</tr>
<tr>
<td>Political Sophistication</td>
<td>0.0648</td>
<td>0.0452</td>
<td>0.0448</td>
</tr>
<tr>
<td></td>
<td>(0.041)</td>
<td>(0.039)</td>
<td>(0.14)</td>
</tr>
<tr>
<td>Political Interest</td>
<td>-0.408***</td>
<td>-0.289***</td>
<td>-0.362***</td>
</tr>
<tr>
<td></td>
<td>(0.055)</td>
<td>(0.06)</td>
<td>(0.13)</td>
</tr>
<tr>
<td>Political Science Major</td>
<td>0.0369</td>
<td>-0.0911</td>
<td>0.075</td>
</tr>
<tr>
<td></td>
<td>(0.16)</td>
<td>(0.19)</td>
<td>(0.27)</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>0.249*</td>
<td>0.0311</td>
<td>0.674**</td>
</tr>
<tr>
<td></td>
<td>(0.13)</td>
<td>(0.14)</td>
<td>(0.27)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.564</td>
<td>0.27</td>
<td>0.869</td>
</tr>
<tr>
<td></td>
<td>(0.44)</td>
<td>(0.47)</td>
<td>(1.02)</td>
</tr>
<tr>
<td>Observations</td>
<td>348</td>
<td>244</td>
<td>104</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.24</td>
<td>0.17</td>
<td>0.15</td>
</tr>
</tbody>
</table>

OLS regression coefficients. Standard errors in parentheses. *** p < .01; ** p < .05; * p < .10.

Table 13 shows the results of the analysis conducted on a different and even lower cost form of participation: emailing friends, acquaintances, and family members about political issues and candidates. Many students receive emails from interest groups, such as MoveOn.org, NARAL Pro-Choice America, or the political parties. It is relatively costless to forward these messages. In addition, nearly three quarters students report at least some use of the internet to get news and news sites make it extremely easy to find them, so presumably it is easy to forward links to articles. The expectation, then, is that increased exposure to Facebook increases this kind of costless participation. However, the analysis
suggests that the effects of Facebook are relatively small. They are non-existent for opinion leaders. Non-opinion leaders are more likely to send emails about politics if they regularly look at more Facebook profiles.

Table 13: Effects of Facebook Exposure on Email Participation in 2006

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Non-Opinion Leaders</th>
<th>Opinion Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log(Time on FB/week)</td>
<td>0.0147</td>
<td>-0.0467</td>
<td>-0.00998</td>
</tr>
<tr>
<td></td>
<td>(0.068)</td>
<td>(0.069)</td>
<td>(0.17)</td>
</tr>
<tr>
<td>Log(Friends)</td>
<td>0.0558</td>
<td>0.0954</td>
<td>0.0562</td>
</tr>
<tr>
<td></td>
<td>(0.087)</td>
<td>(0.091)</td>
<td>(0.2)</td>
</tr>
<tr>
<td>Groups</td>
<td>0.00111</td>
<td>0.00302</td>
<td>-0.00488</td>
</tr>
<tr>
<td></td>
<td>(0.0037)</td>
<td>(0.0047)</td>
<td>(0.0064)</td>
</tr>
<tr>
<td>Pages Viewed</td>
<td>0.00326*</td>
<td>0.00326**</td>
<td>0.00531</td>
</tr>
<tr>
<td></td>
<td>(0.0018)</td>
<td>(0.0016)</td>
<td>(0.0079)</td>
</tr>
<tr>
<td>Political Sophistication</td>
<td>0.0311</td>
<td>0.0299</td>
<td>-0.0838</td>
</tr>
<tr>
<td></td>
<td>(0.054)</td>
<td>(0.05)</td>
<td>(0.2)</td>
</tr>
<tr>
<td>Political Interest</td>
<td>-0.537***</td>
<td>-0.384***</td>
<td>-0.648***</td>
</tr>
<tr>
<td></td>
<td>(0.074)</td>
<td>(0.077)</td>
<td>(0.19)</td>
</tr>
<tr>
<td>Political Science Major</td>
<td>-0.172</td>
<td>0.0641</td>
<td>-0.541</td>
</tr>
<tr>
<td></td>
<td>(0.21)</td>
<td>(0.24)</td>
<td>(0.39)</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>0.345*</td>
<td>0.119</td>
<td>0.780*</td>
</tr>
<tr>
<td></td>
<td>(0.18)</td>
<td>(0.18)</td>
<td>(0.4)</td>
</tr>
<tr>
<td>Constant</td>
<td>1.686***</td>
<td>1.184**</td>
<td>2.966*</td>
</tr>
<tr>
<td></td>
<td>(0.59)</td>
<td>(0.6)</td>
<td>(1.5)</td>
</tr>
<tr>
<td>Observations</td>
<td>348</td>
<td>244</td>
<td>104</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.18</td>
<td>0.14</td>
<td>0.17</td>
</tr>
</tbody>
</table>

OLS regression coefficients. Standard errors in parentheses. *** p < .01; ** p < .05; * p < .10.
Effects of Experiment on Future Participation

As described above, the survey I conducted included an embedded experiment. It included two experimental conditions in addition to a control condition (see Appendix C for exact wording). Some students were told that the majority of peers in their electronic social network supported a candidate; some were told that most students in their networks were apathetic towards politics, and the control groups were given information about their peers’ movie preferences. Approximately 120 students received each condition. This experiment was included after the Facebook and instant-messaging questions but before both the participation questions about 2006 and intended participation in 2008.

The hypothesized effect is that students who hear information about the students in their electronic social network will be more likely to emulate that kind of behavior. Students may be affected politically by ties to others, both strong and weak ones, and they may also be impacted by the attributes of the network as a whole. That is, students who received the ‘involved’ condition (i.e. that most students supported a candidate in their Facebook profiles) should be more likely to report that they will participate in future elections than students in the control group. Students who received the ‘apathetic’ condition should be less likely to report that they will participate than students in the control group.

Two dependent variables were used to investigate this hypothesis. They are very similar to the measures used to analyze participation in 2006. The first asks how likely students are to vote in the 2008 presidential election. This variable ranges from Very likely (1) to Not at all likely (4), so I conduct an OLS regression. Note that if Facebook usage impacts future participation, the coefficient on the Facebook variables will be negative.
because of the coding of the dependent variable. The second analysis is conducted on a broader index of political participation. It is constructed with five questions about behavior in 2008, each of which ranges from 1 to 4. Thus the index itself ranges from 5 to 20.

Tables 14 and 15 show that information about the opinions of the network as a whole did have an impact. (Note that negative coefficients indicate that the variable increased likelihood of participating.) However, these effects are only visible among opinion leaders. Though the experimental conditions did not influence the non-opinion leaders, the non-opinion leaders were influenced by Facebook exposure. This replicates the findings from the previous analysis; students with more friends and who view more profiles, thus viewing the pages of weaker ties, are more likely to participate.

Interestingly, both the involved and apathetic conditions made opinion leaders more likely to report that they would participate in 2008. This is in contrast to expectations. I hypothesized that students would be less likely to participate if they knew that their peers were not interested in politics, but that did not happen. One explanation is that opinion leaders counter-argued when they read that others were not interested, reinforcing their own intentions to participate. This implies that it is simply a mention of politics that increases participation, and not the message itself. The policy implications of this finding suggest that civic campaigns that simply make students think about politics are useful—it is not important to convince students that others participate or that it is ‘cool’ to participate.
Table 14: Effects of Facebook Exposure & Experimental Treatment on Future Voting

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Non-Opinion Leaders</th>
<th>Opinion Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log(Time on FB/week)</td>
<td>0.0429</td>
<td>0.0646</td>
<td>-0.0299</td>
</tr>
<tr>
<td></td>
<td>(0.059)</td>
<td>(0.075)</td>
<td>(0.099)</td>
</tr>
<tr>
<td>Log(Friends)</td>
<td>-0.173**</td>
<td>-0.190*</td>
<td>-0.196*</td>
</tr>
<tr>
<td></td>
<td>(0.075)</td>
<td>(0.098)</td>
<td>(0.11)</td>
</tr>
<tr>
<td>Groups</td>
<td>0.00338</td>
<td>0.00965*</td>
<td>0.000795</td>
</tr>
<tr>
<td></td>
<td>(0.0032)</td>
<td>(0.0051)</td>
<td>(0.0037)</td>
</tr>
<tr>
<td>Pages Viewed</td>
<td>-0.0016</td>
<td>-0.00205</td>
<td>0.00291</td>
</tr>
<tr>
<td></td>
<td>(0.0015)</td>
<td>(0.0017)</td>
<td>(0.0044)</td>
</tr>
<tr>
<td>Political Sophistication</td>
<td>-0.216***</td>
<td>-0.175***</td>
<td>-0.360***</td>
</tr>
<tr>
<td></td>
<td>(0.047)</td>
<td>(0.054)</td>
<td>(0.11)</td>
</tr>
<tr>
<td>Political Interest</td>
<td>0.0413</td>
<td>0.0902</td>
<td>-0.184*</td>
</tr>
<tr>
<td></td>
<td>(0.064)</td>
<td>(0.083)</td>
<td>(0.11)</td>
</tr>
<tr>
<td>Political Science Major</td>
<td>-0.044</td>
<td>-0.0763</td>
<td>-0.0742</td>
</tr>
<tr>
<td></td>
<td>(0.18)</td>
<td>(0.26)</td>
<td>(0.22)</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>-0.102</td>
<td>0.102</td>
<td>-0.445*</td>
</tr>
<tr>
<td></td>
<td>(0.15)</td>
<td>(0.2)</td>
<td>(0.23)</td>
</tr>
<tr>
<td>Apathy Condition</td>
<td>-0.249*</td>
<td>-0.121</td>
<td>-0.504**</td>
</tr>
<tr>
<td></td>
<td>(0.14)</td>
<td>(0.18)</td>
<td>(0.21)</td>
</tr>
<tr>
<td>Involved Condition</td>
<td>-0.236*</td>
<td>-0.156</td>
<td>-0.407**</td>
</tr>
<tr>
<td></td>
<td>(0.13)</td>
<td>(0.17)</td>
<td>(0.2)</td>
</tr>
<tr>
<td>Constant</td>
<td>2.994***</td>
<td>2.489***</td>
<td>4.720***</td>
</tr>
<tr>
<td></td>
<td>(0.52)</td>
<td>(0.67)</td>
<td>(0.86)</td>
</tr>
<tr>
<td>Observations</td>
<td>347</td>
<td>243</td>
<td>104</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.1</td>
<td>0.1</td>
<td>0.21</td>
</tr>
</tbody>
</table>

OLS regression. Standard errors in parentheses. *** p < .01 ; ** p < .05 ; * p < .10.
Table 15: Effects of Facebook Exposure & Experimental Treatment on Future Participation

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Non-Opinion Leaders</th>
<th>Opinion Leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log(Time on FB/week)</td>
<td>-0.22</td>
<td>-0.0592</td>
<td>0.0835</td>
</tr>
<tr>
<td>(0.18)</td>
<td></td>
<td>(0.21)</td>
<td>(0.36)</td>
</tr>
<tr>
<td>Log(Friends)</td>
<td>-0.383</td>
<td>-0.607**</td>
<td>-0.384</td>
</tr>
<tr>
<td>(0.24)</td>
<td></td>
<td>(0.28)</td>
<td>(0.4)</td>
</tr>
<tr>
<td>Groups</td>
<td>-0.00679</td>
<td>0.0116</td>
<td>-0.00816</td>
</tr>
<tr>
<td>(0.01)</td>
<td></td>
<td>(0.014)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Pages Viewed</td>
<td>-0.00885*</td>
<td>-0.00916*</td>
<td>-0.0194</td>
</tr>
<tr>
<td>(0.0048)</td>
<td></td>
<td>(0.0049)</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Political Sophistication</td>
<td>-0.242</td>
<td>-0.17</td>
<td>0.0483</td>
</tr>
<tr>
<td>(0.15)</td>
<td></td>
<td>(0.15)</td>
<td>(0.41)</td>
</tr>
<tr>
<td>Political Interest</td>
<td>1.835***</td>
<td>1.540***</td>
<td>1.313***</td>
</tr>
<tr>
<td>(0.2)</td>
<td></td>
<td>(0.24)</td>
<td>(0.39)</td>
</tr>
<tr>
<td>Political Science Major</td>
<td>-0.328</td>
<td>-0.34</td>
<td>-0.223</td>
</tr>
<tr>
<td>(0.56)</td>
<td></td>
<td>(0.73)</td>
<td>(0.8)</td>
</tr>
<tr>
<td>Graduate Student</td>
<td>-0.202</td>
<td>0.595</td>
<td>-1.655**</td>
</tr>
<tr>
<td>(0.48)</td>
<td></td>
<td>(0.55)</td>
<td>(0.81)</td>
</tr>
<tr>
<td>Apathy Condition</td>
<td>-0.628</td>
<td>-0.488</td>
<td>-0.734</td>
</tr>
<tr>
<td>(0.44)</td>
<td></td>
<td>(0.51)</td>
<td>(0.74)</td>
</tr>
<tr>
<td>Involved Condition</td>
<td>-0.745*</td>
<td>-0.212</td>
<td>-2.580***</td>
</tr>
<tr>
<td>(0.42)</td>
<td></td>
<td>(0.48)</td>
<td>(0.73)</td>
</tr>
<tr>
<td>Constant</td>
<td>14.55***</td>
<td>15.29***</td>
<td>12.64***</td>
</tr>
<tr>
<td>(1.66)</td>
<td></td>
<td>(1.93)</td>
<td>(3.1)</td>
</tr>
<tr>
<td>Observations</td>
<td>346</td>
<td>242</td>
<td>104</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.28</td>
<td>0.22</td>
<td>0.23</td>
</tr>
</tbody>
</table>

**OLS regression. Standard errors in parentheses. *** p < .01; ** p < .05; * p < .10.**

This research suggests that these dire predictions may be premature. In the world of Web 2.0\(^{18}\), electronic social networks that include many weak ties, some of which are connections to opinion leaders, may in fact increase political engagement, participation, and

\(^{18}\) This refers to the newly interactive way people use the Internet—content is added and developed by many people, which increases network effects. This kind of collaboration is evidenced in social networking sites, wikis, and blogs.
even knowledge. It may be true that there a number of negative effects of Facebook and MySpace, but it is equally true that social interactions through online networks and politically-related emails can have positive effects.

There is some evidence that students learn about politics through the modern-day equivalent of word of mouth from friends. As the *New York Times*\(^{19}\) notes, students report that they receive links to YouTube videos about political figures, segments from ‘infotainment’ programs like *The Daily Show*, and news items. In 2008, Barack Obama’s considerable fundraising machine made extensive use of the internet, with a resulting increase in small donations. His campaign strategy included heavy presences on electronic social networks as well as text-messaging.

Though the findings I present are mixed, they clearly suggest that exposure to Facebook can have political implications. A number of measures, including number of friends, number of groups, and number of profiles viewed regularly, are statistically significant in the analyses presented here. As might be expected, opinion leaders, broadly construed, react differently to that exposure than do students who do not post political information. These effects hold in analysis of knowledge of current political events as well as in the analyses of past and future political participation.

There are, of course, caveats to the conclusions. First, the survey I conducted is not random. Students took the survey online, and it could be argued that the students who took the survey were systematically different than those who did not take the survey. That is an empirical question and unanswerable with the data, but the questions asked and logic suggest

that the sample is not more likely to be concerned with politics. That is, students who procrastinate by taking an online survey (to which they linked from Facebook directly) are not likely to be more studious and more likely to pay attention to news than ones who did not opt-in to the survey. In addition, because respondents were from a variety of majors (i.e. not only social science or political science majors), the effects do not seem to be driven by generally higher levels of political engagement. It may be that female students respond to Facebook differently than male students, in which case results from the heavily-female sample may be more problematic.

At the very least, these findings suggest that more research into the political implications of electronic social networks is needed. First, the survey sample itself is relatively small. Second, students at a prestigious private university are likely different than students at large public schools in a number of ways. In particular, students at a place like Duke may have higher levels of knowledge of and interest in politics, so the percentage of students who are opinion leaders or very politically sophisticated may be significantly higher than in a different population. Research in colleges with very different contexts would help to uncover the larger effects of this phenomenon. Third, some of the survey questions are likely to be flawed; the measures of knowledge of current political situations in this survey may be particularly problematic. Different questions, in periods with a higher salience of politics (e.g. a presidential election) or a lower salience, could lead to alternate conclusions. Because electronic social networks and new forms of media are becoming more popular and because politicians are becoming more adept at harnessing them, the political effects are likely to strengthen over time.
The findings presented here suggest that students do, in fact, learn about politics through electronic social networks and are also more likely to participate in politics with increased exposure to electronic social networks. Though this work is preliminary and the results are somewhat mixed, it certainly justifies further study. And if the findings here hold true, then it is very good news for the health of our political system.

*with Carlos M. Carvalho*

When asked to describe the pivotal moments of the 2004 campaign, Mark Mellman, senior strategist for John Kerry’s campaign, first noted that analysts should be careful to:

Avoid what psychologists call fundamental attribution error. Fundamental attribution error consists, as some of you know, of overweighting the significance, the importance of individuals, of personalities, of events, and underweighting the significance, the salience of the structure of the situation of the underlying circumstances. (Jamieson 2006, 91)

He went on to outline the factors he believed to have been the most important in determining the vote in the 2004 election: the decline of the Democratic plurality among voters, culture as the primary division in American politics as opposed to class, and Bush’s incumbency advantage. While he did list a number of events that the Kerry campaign viewed as important, his central message was that the campaign did the best it could and very well given the political situation in 2004. Matthew Dowd, a Bush strategist, also viewed the campaign as a series of relatively minor ups and downs with a largely expected outcome (Jamieson 2006). Yet when most people think back to the 2004 campaign, some events seem pivotal, such as the Swift Boat Veterans for Truth (SBVT) ads in August and Kerry’s comment that he voted for spending $87 billion before he voted against spending $87 billion for emergency funds for troops and reconstruction in Iraq. Did those two events matter much in the final vote tally, or did they not really change the campaign as much as we might think? Analysts look back at campaigns and identify defining moments but, as Popkin (1991) notes, those anecdotes can be simply the story that “fits” our overall impression of the campaign as opposed to the events that actually affected the election outcome. How can
we tell the difference between anecdotal explanations and the events that were actually important? By identifying which campaign events did, in fact, provide new information in a given election year, we can better understand the “normal” dynamics of campaigns.

In order to investigate what kind of information and events have which kinds of effects on expectations of a candidate’s success, we need a measure that reacts quickly to new information. Opinion polls give us a somewhat nuanced view of public opinion during campaigns, but there is a practical problem with surveys: they are taken over several days. A poll taken the day before, the day of, and the day after a presidential debate does measure the effect of a candidate’s performance in the debate on vote choice but it also registers the effects of events (e.g. candidate visits or speeches) that occur before and after the debate. If something shocking happened in a debate (would that debate-watchers could be so lucky!), the results from that standard three-day poll would partially reflect it, but we could only surmise what change in candidate preference occurred because of that gaffe and what change was caused by other events.

Prediction markets, like the Iowa Electronic Markets (IEM) and Intrade (previously called Tradesports), offer an attractive alternative to polls or academic panel studies to answer this kind of question because they allow us to clearly analyze people’s expectations of political outcomes and the fluctuation in those expectations given new information. The pricing of futures contracts in these markets provides a continuous measure of the probability of a candidate winning the election. The immediacy of online futures markets lets us see exactly how information is incorporated, how quickly, and how expectations about political events stabilize.
This paper uses data from futures contracts on ‘Bush wins the popular vote in 2004’, or the traded probability, of Bush winning the election, to build a measure of information flow. Our approach builds on theoretical developments in the economics literature, especially the market microstructure literature, that view the variation of asset prices as being driven by the arrival of new information and the process that incorporates that information into market prices. We extend a theoretically justified model that combines returns and volume in creating a measure of information flow to include two regimes of variation. This provides a novel approach to differentiate between the “normal” campaign occurrences and the noteworthy, important events of particular campaigns.

While the Swift Boat ads have become central to popular accounts of the 2004 presidential race, it appears that Kerry’s nomination speech and the debates, particularly the third one, imparted much more information. Other events that were especially important in the campaign were the CBS story about Bush’s National Guard service and the subsequent retraction, the report in late October that explosives went missing in Iraq earlier in the year, and the release of the bin Laden tape a few days before the election.

### 4.1 Political Prediction Markets

Prediction markets, which are also called “information markets,” “idea futures,” or “event futures,” pay out returns based on whether or not a specified event occurs. Winner-take-all futures pay $1 if event X occurs and $0 if it does not. At one point during the 2004 campaign, a person could buy a ‘Bush wins the popular vote’ contract for $0.55. If that person held onto that contract until November 2, then she would receive $1, making a profit of $0.45 cents per contract. Investors can resell or buy contracts at any point. For example,
she could buy a Bush contract at $0.55 and then sell it at $0.58, for a profit of $0.03 per contract. This paper examines winner-take-all futures markets, though there are several other types of contracts in prediction markets.¹

The Iowa Electronic Markets (IEM), run by the Tippie College of Business at the University of Iowa, are the most famous prediction markets. The IEM has had markets for each U.S. presidential election (including primaries) since 1988 as well as for elections in other countries. The IEM has also run futures markets on economic events. Other markets such as the Hollywood Stock Exchange run contracts based on box office sales or the winners at awards ceremonies. Intrade, previously Tradesports², has futures markets on many kinds of events, including political and financial ones from around the world. The IEM has been used extensively for research on prediction markets and in classrooms and are not for profit. Other markets like Intrade, the current version of Tradesports, and Newsfutures are run as for-profit businesses.

Before proceeding to a discussion of information flow in political prediction markets and the evidence about campaign effects in the 2004 election, a few theoretical points about these kinds of markets must be reviewed. In particular, we discuss why prediction markets are able to aggregate information such that the prices of future contracts are reflective of the event’s actual probability of occurring.

¹For example, vote share contracts pay $1 * a candidate’s share of the votes. Another of futures contract is based on a combination of two events, such as the vote share of the Republican candidate given that a specific Democrat wins the party’s nomination.
²The political prediction market part of Tradesports split from the sports-related markets after the U.S. law banning on Internet gambling went into effect. It became Intrade, though the remaining parts of Tradesports are still in operation. In 2004, the name was still Tradesports.
How do markets aggregate information? When a group of people is asked how many marbles are in a given large jar, very few of them will choose the correct answer. However, the average of the guesses is always a close estimate of the actual number. Similarly, few people can estimate the number of yards between point A and point B, but together the group “finds” the answer. This occurs even without discussion; opinions are polled privately and then aggregated to determine the distance. This is an intuitive explanation of how a prediction market works. The theoretical explanation rests on the efficient market hypothesis and no arbitrage arguments (Wolfers and Zitzewitz).

Prediction markets are likely to produce quality information because they provide: (i) incentives to seek information; (ii) incentives for truthful information revelation and (iii) an algorithm for aggregating diverse opinions (Wolfers and Zitzewitz 2007). These markets force people to “put their money where their mouths are,” so their expressed beliefs about a candidate’s chances of success are not just cheap talk. It is important to note that the average belief of traders exhibited in the futures price is actually a weighted average, where people with more confidence in their assessment of a candidate’s success trade more so that their opinions count more in the price equilibrium. This can be viewed as an advantage over traditional polls: equilibrium prices take into account the strength of people’s beliefs about the candidate’s chance of electoral success.

Without discussing a candidate’s chances, the information held by people all over the country will be combined so that the market estimate of the candidate’s probability of winning is accurate. That is, a person who lives in Ohio might trade based on his impression of voters in his town and a person in North Carolina might trade on her impression of the local newspaper coverage. When added together with traders from around the country (and
around the world), all the information is combined to produce the accurate value of the contract.

### 4.1.1 Bounded Rationality

The economic theory behind prediction markets suggests that the prices of assets are accurate because people rationally and correctly understand and incorporate information into the market prices. In contrast, behavioral research shows that people are limited information processors and are subject to biases due to their preferences. However, this is not a major problem because “all agents need not be informed for a market to be efficient... survey evidence documenting biased expectations does not necessarily imply that market prices will be similar biased” (Sauer 1998, 2027). A market is efficient in the sense that it fully reflects all public information because of marginal traders or market makers. In a market of sufficient size and with large enough payoffs to counter transaction costs, arbitrage in prices will occur until all traders, specialists as well as informed and uninformed investors, agree on the appropriate price (Andersen 1996). By 2004, Intrade was the largest political prediction market and had enough participation to alleviate the bias problem.

It is hard to deny that most traders are biased much of the time. Berg et al. (2005) note that “traders are biased and mistake prone” and Forsythe et al. (1999) concur that “traders frequently leave money on the table through violations of arbitrage restrictions” (103). These conclusions are documented by surveys administered by the Iowa Electronic Market to its traders. The surveys have consistently shown that traders are not in any way representative of the voting population. In particular, traders on the IEM are younger, more educated, more wealthy, and “more male” than the U.S. population and the voting
population. Due to the incentives to seek information when trading, they are also probably more informed than the voting population.

Traders in the IEM tend to hold portfolios that are biased towards their preferred candidates (Forsythe et al. 1992). Forsythe et al. (1998) show that investors in the 1993 Canadian elections futures markets held unbalanced portfolios in ways consistent with their preferences. That is, supporters of a party were much more likely to hold more futures of that party than was the market as a whole. In a subsequent paper (1999), they demonstrate that this bias also exists in the U.S. presidential prediction markets. The trading population of Intrade is likely somewhat different than the trading population of the IEM due to its larger size and commercial aspect. However, there is still reason to suspect that many individual bettors in Intrade markets are also biased.

These types of biases have been described as “wish fulfillment” in both the political science literature and the psychological literature. Granberg and Brent (1983) and Ulahner and Grofman (1986) document the persistence and ubiquity of this phenomenon. Supporters of Carter in 1980 were much more likely to predict that Carter would win than were Reagan supporters (though a few of each candidate’s supporters were less biased in their predictions). Whether due to the “false consensus effect,” where supporters of a particular candidate see themselves as more representative of other voters than they actually are, or the “assimilation-contrast effect,” where supporters of a candidate interpret news about that candidate much more positively (Uhlner and Grofman 1986), most traders in the IEM exhibit this wishful thinking as evidenced in their portfolio holdings.
4.1.2 Prediction Market Efficiency

Demonstrations of these biases does not necessarily mean that the prices of candidate futures are incorrect. While there is some evidence that most traders in the IEM are biased in their trading decisions (or at least likely to make mistakes) and it is likely that many of the traders in Intrade markets behave similarly, markets are nonetheless accurate because of marginal traders. Though this paper specifically focuses on the effects of information on futures prices as opposed to the markets’ predictive power, this section will briefly review the evidence of the accuracy of prices in prediction markets in order to show that analysis of prediction markets’ prices is worthwhile.

Many studies of the IEM show that prediction markets are as accurate as or more accurate than opinion polls, both in the week or days before the election and at longer time horizons. Berg et al. (2003) note that since 1988, the IEM political prediction markets (conducted in U.S. elections as well as in other countries such as Canada, Austria, and Turkey) have consistently outperformed polls and “in a few cases (the 1988 and 1992 U.S. Presidential Elections) the market dramatically outperformed polls.” Not surprisingly, markets with a higher volume of contracts traded and markets with fewer candidates or parties are more successful. U.S. presidential election markets are the most accurate, though the overall market accuracy is also impressive: the average market error in vote-share contracts\(^3\) was 1.49% or 1.58% (depending on the exact measure used) whereas the average poll error was 1.91%. It is more difficult to judge the true probability of an event occurring, but in markets where a winner-take-all contract and a vote-share contract are both traded,

\(^3\) A vote-share contract pays out $1* the percent of the vote won by the candidate or party.
evidence suggests that the prices of the two contracts move together such that the probability expressed in the winner-take-all contract is similarly accurate.

The ability to predict the winner is intellectually interesting though the accuracy of the election markets has been studied so extensively in part because other applications of idea futures markets rely on the markets’ ability to accurately forecast events. Many people are investigating the predictive power of futures markets so that they can be used for decision-making in businesses (Wolfers and Zitzewitz 2007; Hanson 2003). Contracts based on future earnings of companies on the IEM and contracts predicting box-office sales of movies on the Hollywood Stock Exchange have both proved effective at determining the actual outcome, providing additional evidence that futures markets do aggregate information effectively.

If surveys of traders and findings from political science and psychology all show that people invested in the market are biased, how are market predictions themselves accurate? The apparent paradox is resolved by the “marginal trader” (Forsythe et al. 1992; Forsythe et al. 1999). As Forsythe et al. (1998) explain, “as long as there are some traders relatively free of such wish fulfillment biases and with deep enough pockets, they will take advantage of the biases of other traders and in the process bring prices to levels consistent with unbiased expectations.” These less-biased investors serve as “market makers,” which is to say that they will continue to trade until the price of each futures contract is correct.

---

4 It is also potentially financially rewarding to predict the outcome of elections. For example, see Den Hartog and Monroe’s (2008) analysis of the financial effects of the majority status of political parties in Congress.

5 Hanson suggests an interesting political application of prediction markets. He argues they could be used to determine the benefits of proposed public policies prior to their implementation, so that policy makers could choose only policies that are effective.
Oliven and Rietz (2004) show that the average trader leaves money on the table, either due to bias or mistakes, but that the marginal trader takes advantage of those arbitrage opportunities and adjusts the prices. Other work has shown that the market makers, the marginal traders, whose portfolios and trades exhibit no bias, invest much more money than the average trader and are more active in trading. As a result, marginal traders are able to drive prices to efficient levels while profiting from the mistakes of more error-prone traders (Forsythe et al. 1999).

Marginal traders’ behavior explains the accuracy of prediction markets, so our starting premise is correct: these markets are worth studying especially in regards to campaign and information effects. While it is true that the equilibrium price in a market with positive information and transaction costs does not summarize some small amount of the information, that fraction is negligible (Grossman and Stiglitz 1980). These findings all suggest that prices of futures are, in fact, reasonable assessment of the true probabilities of a candidate’s success because all known information is rationally incorporated into prices, even if individual traders are not always (or even usually) rational.

4.2 Volatility, Trading Volume and Information Flow

Studying the changes in the probability of a candidate winning an election is as important as studying the probability itself. In the context of prediction markets, this means that price movements and trading volume must also be considered in order to understand the dynamics of the campaign. In their study of presidential approval, Gronke and Brehm
No one would argue that a statistical distribution can be described solely by its central tendency; nor should our exploration of the patterns and causes of presidential approval look only at the mean. As important in many circumstances is the frequency and sharpness of shifts in public sentiment—volatility. (445)

Similarly, if we are interested in the question of what information during campaigns is seen as important or consequential (or at least potentially consequential), the movement of futures prices matters. There may be a significant amount of action in a futures price when new information is acquired, though ultimately the price may settle back to the original equilibrium. An analysis of the mean price over one or several days would hide that effect of political information. Therefore, such an analysis would underestimate the perceived news content of specific campaign events.

In financial markets, volatility can be categorized as “price jiggling” (Working 1958), where the price moves up and down slightly producing a negative first order serial correlation (Patell and Wolfson 1984). It is used to appropriately price a given asset and indicates the uncertainty, or risk, associated with the asset. Volatility, the standard deviation of the asset return, must be entered into asset pricing equations like the Black-Scholes model. It often enters into the equation as the average variance of the returns during some previous time period. However, this kind of measure is unsatisfactory because volatility varies over time. Economists, statisticians, and traders have developed extensive models to better describe it. ARCH (autoregressive conditional heteroskedasticity) models and its extensions (e.g. GARCH, EGARCH) have been relatively successful, though better approaches take into account the stochastic nature of the volatility with more complex estimation procedures.
4.2.1 Previous Literature

Prices remain relatively stable when investors learn no new information about the underlying asset. However, when new information such as earnings reports does become public, stock and futures prices can move more dramatically as traders incorporate the arrival of information. This results in prices revealing the full information content through a sequence of trades. Though “the influence of information arrival is one of the most challenging problems in modeling market behavior” (Patell and Wolfson 1984), researchers have found that information is incorporated into the market very quickly, that the level of informativeness of an announcement affects the characteristics of the volatility of the stock price, and that people respond differently to new information depending on whether it is negative or positive. This phenomenon is well studied, with a vast literature in economists and finance focusing on the effects of earnings reports and news releases on volatility and volume (e.g., Patell and Wolfson 1984; Jennings and Starks 1985; Brown and Hartzell 2001; Chan 2003; Dubinsky and Johannes 2006).

The idea of volatility has also been explored in political science, though often not with that terminology. When developing a better ARCH model for volatility in political science, Maestas and Preuhs (2000) point out that Jacobson (1987) and Schlesinger (1991) both:

see volatility, the degree to which the aggregate vote is predictable from one election to the next, as a function of changing political conditions. Likewise, they believe that vote volatility has important effects on the behavior of candidates and parties. (96)

Gronke and Brehm (2002) explicitly discuss the need to study the volatility of public opinion for similar reasons. They argue that studying the ways the public has responded to presidents over time has changed, so high levels of support in the present period no longer
mean that he will enjoy high support in the future. This can impact the ways that other politicians react to the president’s initiatives and informs our understanding of the effects of declining partisanship.

In analyzing the effects of politics on financial markets, Bernhard and Leblang (2006) pay careful attention to the volatility of asset prices as a measure of uncertainty about a political outcome. Their particular contribution is to highlight the fact that information affects markets conditional on prior expectations, so simple dummy variables in a time period in which some event occurs can miss the actual impact of the event. When they control for expectations about the 2000 presidential election (as measured by poll numbers), they find that exit poll results from battleground states did affect the Standard and Poors and NASDAQ futures and the US dollar-Japanese yen exchange rate. Similarly, this paper tries to identify unexpected events that affected the electoral chances of the candidates in 2004, above and beyond the long-term, underlying electoral landscape.

4.2.2 Volatility as Information Flow

Volatility can be conceptualized as a measure of the information flow into a market. In the market microstructure literature in economics, the mixture of distributions hypothesis “posits a joint dependence of returns and volume on an underlying latent event or information flow variable” (Andersen 1996, 170). While the theory describes the “informativeness of market prices, the presence of liquidity traders in the market and the manner in which news is disseminated” as factors influencing both volatility and volume, it “points to the rate of information arrival to the market as the primary variable of interest” (Fleming et al. 2006, 1555). The volatility, or the variance of the prices, is “primarily [caused]
by the arrival of new information and the process that incorporates this information into market prices” (Andersen 1996, 170).

Information flows into the market and affects both the prices of the assets and the volume of the assets that are traded. When this trading occurs, the price of the asset reaches a new equilibrium state. Andersen (1996) explains:

An important finding is that over the course of a (short) period, the sequence of trades reveals the pricing implications of the private signals and subsequently—until new private information arrives—all market participants agree on the value of the traded asset. Thus, private information arrivals induce a dynamic learning process that results in prices fully revealing the content of the private information through the sequence of trades and transaction prices. (172)

It is new information that starts this process. In the context of political prediction markets, when new information about the campaign—whether polling numbers, a larger ad buy in a battleground state, or an endorsement—becomes known, the price of the candidate’s futures contract adjusts accordingly through the increased participation of market makers. Volatility is low despite some new information when rational anticipation of that event was already incorporated into the price. In contrast, high volatility occurs when unexpected information enters the market.

This price adjustment process, as evidenced in the estimated volatility, can be used to characterize information and events. While event studies are common in economics, most take an approach similar to Jennings and Starks (1985)—a list of events and their importance is specified a priori and then their effects are tested. They study the effects of high-content earnings announcements as compared with low-content announcements and find that high-content ones induce more volatility for longer periods of time.

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6 For a particularly straightforward and insightful description of the idea of volatility as information flow, see Bernhard and Leblang (2006), chapter seven.
In contrast, this paper looks at the effects on the market and attempts to make statements about the information content contained in different campaign events. This is done by first estimating a measure of information flow (or volatility) using returns and volume. This measure is then used to evaluate the informativeness of a campaign event. Some studies do take the approach of this paper, looking at market prices to determine what which were deemed important by contemporaries. Willard et al. (1996) apply this method to the Greenback market during the Civil War and identify several events that historians do not usually count as important in Civil War histories, including Jubal Early’s Army’s retreat from Washington, D.C. While this kind of approach presents some hurdles to making assertions about causality, it provides a novel and theoretically sound way to identify consequential events, therefore enhancing our understanding of the role of information, campaign events, and other factors on election outcomes.

4.3 The Model

In this paper we work with a extended version of Andersen (1996), where the underlying information flow process is determined by a Markov-switching stochastic volatility model (Carvalho and Lopes 2007; So et al. 1998) that allows for occasional shifts in the parameter determining its level. The incorporation of structural changes in the model solves the problem of overestimation of the persistency of volatility in high-frequency data (Lamoureux and Lastrapes 1990) while providing a straightforward way to identify clusters of high and low information flow in the market. In Andersen’s model, returns and trading volume follow a mutually and serially independent bivariate distribution, conditional on the number of information arrivals, where information arrivals are modeled as a stochastic
process. This is an empirical representation of a well defined market microstructure model in which both informed and liquidity traders (traders that do not react to news) participate in determining prices in the market and where the volatility, or information flow, process is inferred simultaneously from returns and trading volume.

In detail, let $R_t$ represent the logarithm of returns, $V_t$ a measure of trading volume and $I_t$ the flow of information at time $t$. The model takes the following form:

$$R_t \sim N(0, I_t) \quad (1)$$

$$V_t \sim Po(m_0 + m_1 I_t) \quad (2)$$

$$\log(I_t) = \alpha s_t + \beta \log(I_{t-1}) + \epsilon_t \quad (3)$$

$$S_t \sim MS(P) \quad (4)$$

Where $\epsilon_t \sim N(0, \tau^2)$ and $MS(P)$ denotes a two-stage first order Markov-switching process with transition probabilities defined by $Pr(S_t = i | S_{t-1} = j) = p_{ij}$ for $(i,j)=1,2$.

In the model, returns are conditionally normal with variances that reflect the intensity of information arrivals and also characterize how strongly volume fluctuates in response to news. In this context, $m_0$ represents the participation of liquidity traders in the market. The proportion of trades by “informed” traders (the market makers) is defined by $m_1$. Moreover, the information flow $I_t$ (i.e. the volatility) follows a conditionally stationary ($|\beta| < 1$) log AR(1) process where the level $\alpha_{S_t}$ is determined through a two-stage Markovian process. We will refer to $S_t$ as the level of information (or information state), meaning that when $S_t$ equals 1 there is a reduced level of news arrival. This implies that $\alpha_1 < \alpha_2$ as these parameters define the unconditional mean of the information flow process. It is important to point out that the choice of two stages for $S_t$ is both practically and theoretically motivated.
First, we are looking for a way to discriminate between periods of low and high information. This device is used by Carvalho and Lopes (2007) in flagging currency crises in emerging markets. Second, evidence in the literature suggests that at least two stages are necessary to properly characterize the volatility of assets (Eraker et al. 2003; So et al. 1998; Lopes and Carvalho 2007). We did assess the performance of a model with 3 regimes. Due to the similarity between the levels (α) of two states, we are confident that the model with 2 regimes is sufficient and appropriate for our aims here.

Equations (1-4) represent a complex, bivariate dynamic non-linear system with two latent (non-observable) states, the information flow $I_t$ and the information state $S_t$. Using standard priors, posterior estimation of this model is carried out with a customized Markov chain Monte Carlo algorithm described in Appendix D.

### 4.3.1 Data

We implement this model and construct a measure of information flow for the 2004 presidential race. The data were acquired from Intrade. They include all transactions made on the Tradesports ‘Bush wins the popular vote’ contract from July 1 to Election Day. The transactions were grouped into 3 hour time periods. This choice reflects our hope to work with the finest level of resolution while guaranteeing that enough transactions occurred in the period. Observations of the price of the contract at the close of the three hour period and the volume traded in that period were recorded at 3am, 6am, 9am, noon, 3pm, 6pm, 9pm, and 11:59pm. Following the standard in the literature (Andersen 1996), volume was transformed to the log scale and rounded to the closest integer due to the Poisson model specification. Futures prices, returns and volume are presented in Figure 1 and 2.
Figure 6: Closing price for ‘Bush wins the popular vote’ contract in each 3-hour period

Figure 7: Returns & Trading Volume
To determine campaign events, we catalog events from the Drudge Report (www.drudgereport.com) in the same 3 hour time period. We use the Drudge Report for several reasons. First, to investigate whether the market reacts to campaign events, we need a “time-stamp” on a news story. Traditionally, media studies have “timed” events by using the day that the story was on the front page of a major newspaper such as the New York Times. Theoretically, we expect the market will react much more quickly, so we need a more fine-grained measure than a daily one. The Drudge Report provides that; it is constantly updated and is archived every 15 minutes. Second, the Drudge Report is a widely-read political gossip source. In a recent book (Halperin and Harris 2006), two influential political reporters write:

It is a guarantee that most of the reporters, editors, producers, and talk show bookers who serve up the daily national buffet of news recently have checked out his eponymous website, and that www.drudgereport.com is bookmarked on their computers. That is one reason Drudge is the single most influential purveyor of information about American politics.

People do use this as a source of information, and that information is on the “early” side—Drudge routinely reports stories that the major media news outlets have not yet reported or vetted. The most famous example is the Monica Lewinsky story; the Drudge Report was the first place to break most of the news, and covered the story for weeks before the major news outlets did. If people want to trade on as-yet little-known information in order to make money, the Drudge Report is, in some sense, more useful than the New York Times. Because
it is an agenda-setter with early information and has precise time stamps, we feel that this is the best available source.  

4.4 Findings: The 2004 Presidential Election

After fitting our model, we can initially conclude that the flow of information during the campaign was not static. Estimates of the states $I_i$ and $S_i$ are presented in Figure 3 and a posterior summary of all parameters appears in Table 16. Volatility rose significantly at many points during the campaign, though it remained low for much (but not all) of July, August, and September. The duration of increased volatility also varied. Spikes in volatility were often accompanied by longer stretches of a state of high volatility, indicating greater uncertainty about the effect of new information. However, on many occasions, the volatility increased to a high state and then quickly fell back to the normal level, indicating that the effects of some new information were easily understood and incorporated into the probability of Bush’s electoral success. This is also reflected in the estimates $p_{11}$ and $p_{22}$ given $p_{11} > p_{22}$.

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7 To collect the data, we recorded the headlines on the front page of the site at each 3 hour interval. Major stories remained in the headlines for many periods. In theory, smaller stories could appear and disappear in-between our data collection points. However, if that is the case, we find it unlikely that that could be driving the markets.
Table 16: Posterior Summary

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Posterior Mean</th>
<th>95% Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha_1$</td>
<td>-0.369</td>
<td>(-0.395; -0.342)</td>
</tr>
<tr>
<td>$\alpha_2$</td>
<td>-0.306</td>
<td>(-0.327; -0.284)</td>
</tr>
<tr>
<td>$\beta$</td>
<td>0.967</td>
<td>(0.927; 0.983)</td>
</tr>
<tr>
<td>$\tau^2$</td>
<td>0.019</td>
<td>(0.018; 0.020)</td>
</tr>
<tr>
<td>$\mu_0$</td>
<td>3.936</td>
<td>(3.81; 4.03)</td>
</tr>
<tr>
<td>$\mu_1$</td>
<td>28370</td>
<td>(25478; 32005)</td>
</tr>
<tr>
<td>$\rho_{11}$</td>
<td>0.983</td>
<td>(0.932; 0.991)</td>
</tr>
<tr>
<td>$\rho_{22}$</td>
<td>0.853</td>
<td>(0.801; 0.912)</td>
</tr>
</tbody>
</table>

Figure 8: Information Flow in 2004
Posterior estimates of $S_{LT}$ (top) and $\mathcal{V}_{LT}$ (bottom). We define $\hat{S}_t = 2$ if the posterior $\Pr(S_t = 2) > .05$. Lines indicate the key events described in Table 17.
We are able to assess whether the microstructure assumptions underlying the proposed model are justified by looking at the estimates of $m_0$ and $m_1$. If $m_1$ is close to zero that would indicate that the information arrival does not affect “informed traders” and the model would be reduced to a simple stochastic volatility model (Jacquier et al. 1994). From the estimates in Table 1 we can conclude that the participants in this market do react to new information as, on average, 50% of trades are related to the arrival of news when $S_t =2$. When $S_t = 1$ (the low information state), this proportion goes down to 15% with $m_1$ accounting for the remainder in both cases. These numbers are very similar to the findings in the finance literature as reported by Andersen (1996) and Watanabe (2000).

We would like to underscore an important point: the fact that most campaign events, particularly in mid-August to mid-September, had little or no new information does not imply that the campaign did not have any impact. Rather, it is saying that given the cast of characters and the political and economic context, the campaign itself played out predictably. During the month of August, there was an elevated state of information on just seven days, for a total of under 70 hours (or 22 periods with our measure). July had just nine days with elevated information, for a total of just over 70 hours (or 24 periods with our measure). Despite a number of high-profile news stories during August, particularly the Swift Boat Veterans for Truth ads, the investors in the market felt that the underlying context of the election did not change very much. However, information that is not unexpected could, nonetheless, have been crucial to the electoral outcome.

Electoral outcomes can be thought to be composed of three pieces: context (economy, partisanship), standard campaign events, and election year-specific events. First, we will address the events specific to the 2004 presidential election. We will then present
evidence regarding the effects of standard campaign events like the nominating conventions.

A list of major events appears in Table 17 and are marked by vertical lines in Figure 8.

**Table 17: Key Events in the 2004 Campaign**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 6</td>
<td>Kerry picks Edwards as VP</td>
</tr>
<tr>
<td>July 26-29</td>
<td>Democratic Convention held in Boston, Mass.</td>
</tr>
<tr>
<td>July 29</td>
<td>Kerry’s nomination speech</td>
</tr>
<tr>
<td>August 4</td>
<td>News of first Swift Boat Veterans for Truth advertisement (aired August 5)</td>
</tr>
<tr>
<td>August 9-10</td>
<td>SBVT: Evidence that Kerry was not in Cambodia on Christmas 1969</td>
</tr>
<tr>
<td>August 20</td>
<td>Second SBVT ad airs</td>
</tr>
<tr>
<td>August 30-September 2</td>
<td>Republican Convention held in New York City</td>
</tr>
<tr>
<td>September 1</td>
<td>Terrorist incident at Russian school in Beslan</td>
</tr>
<tr>
<td>September 8</td>
<td>Bush’s National Guard service questioned in CBS story</td>
</tr>
<tr>
<td>September 13</td>
<td>Reports that documents in CBS story were fabricated</td>
</tr>
<tr>
<td>September 19</td>
<td>CBS retracts the National Guard in <em>Washington Post</em> opinion piece</td>
</tr>
<tr>
<td>September 20</td>
<td>Dan Rather releases statement saying story was flawed</td>
</tr>
<tr>
<td>September 30</td>
<td>First debate—Bush performs poorly</td>
</tr>
<tr>
<td>October 8</td>
<td>Second debate</td>
</tr>
<tr>
<td>October 13</td>
<td>Third debate—Kerry makes comment about Cheney’s daughter</td>
</tr>
<tr>
<td>October 25</td>
<td>Story about missing explosives in Iraq in 2003</td>
</tr>
<tr>
<td>October 29</td>
<td>Osama bin Laden video released</td>
</tr>
</tbody>
</table>

**4.4.1 National Security and the 2004 Election**

Many people have noted the centrality of the national security issue in the 2004 election. Opinion polls showed that people were highly concerned about the issue—in an ABC News poll\(^8\) taken in early October, nearly half the respondents reported that either terrorism or the war in Iraq were the most important issues for the next president to deal

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with, and more importantly, made their vote choice while thinking about that issue (Newsweek, 10/29; (Institute of Politics 2006)).

Our analysis of the information flow during the campaign corroborates this. A number of national security-related issues significantly influenced the flow of information in the market. We will discuss several of these: the Swift Boat Veterans for Truth advertising campaign, the CBS story about Bush’s National Guard service, the news about missing weapons in Iraq, and Osama bin Laden’s taped message released just before the election.

**Swift Boat Veterans for Truth (SBVT) Ads**

After the 2004 election, a new verb appeared in political discussions: to “swift boat” someone meant to damage his candidacy with unfair and ‘dirty’ campaigning. The term itself may be useful, but is it accurate to apportion so much impact to the Swift Boat Veterans for Truth in the 2004 election? Our analysis suggests that while there was an increase in information flow at two points during the height of the story, the influence of the group was actually much less than is conventionally believed.

Though a book detailing them had been released months before, allegations made by the Swift Boat Veterans for Truth (SBVT) that John Kerry had not earned his medals in the Vietnam War did not become a major news story until August 4, when SBVT first aired an advertisement. Because SBVT did not have much money to buy air time for their first ad, their strategy was to generate free media through the outlandish claims made in that advertisement. Needless to say, the strategy worked. Their first ad buy was for $500K,

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though after they gained notoriety, they significantly increased fundraising. By the end of the campaign, they had spent about $19M on television advertising (Institute of Politics 2006).

News of the first advertisement regarding Kerry’s medals elevated the information state for two days. Several days later, on August 9, the Drudge Report and others began questioning whether John Kerry was in Cambodia on Christmas 1969, as he previously claimed. It was later determined (and Kerry confirmed) that he was in Cambodia, but he was there in January 1970, not on Christmas. In retrospect, a rather unimportant point, but the markets reacted: the volatility increased on August 9 and 10. The SBVT claims remained a major news story for most of August and the name since made it into the political vernacular, but the “information” from the SBVT allegations was apparently fully incorporated in approximately 36 hours (12 of our periods) over four days. There is another spike in the information flow on August 12 and 13, though there does not appear to be specific information about the SBVT allegations during that time. Even if that increase in volatility is attributed to SBVT, the information was incorporated into the market in just about 50 hours. It should be noted that the debates increased the information flow for a longer period of time than did the SBVT story (see below) and that the story regarding Bush’s National Guard service (see below) increased the information flow for about the same amount of time. Additionally, though it is not the point of this paper, it is interesting to note that the likelihood that Bush would win the election did not change much from the beginning of August to the beginning of the Republican convention on August 30; the likelihood went from about 54% to about 56%. At the very least, because the change in the probability of Bush winning reelection was slight and our analysis suggests that the
information was incorporated relatively quickly, it seems incorrect to describe Kerry’s loss as a result of the “swift-boating” that took place in August 2004.

**CBS Story on Bush’s National Guard Service**

John Kerry’s military service was discussed frequently (by his campaign, his supporters, and also his detractors) throughout the primary and general election campaign. However, George W. Bush’s military service had largely been ignored until September 8, when CBS News aired a story on *60 Minutes* that Bush had not properly reported for duty while he was in the National Guard. Dan Rather’s reporting highlighted documents allegedly written by Bush’s commander in the National Guard. The story developed over 12 days, with conservative bloggers immediately questioning the story and the documents and investigating the font and print from 1970s typewriters. It was several days into the story that the information state increased, on September 13, which coincided with the first reports by major news organizations that the papers were forged. The information flow remained high for most of the time between the 13th and the 20th and peaked on Sunday, September 19, when the *60 Minutes* producer wrote an editorial in the *Washington Post* that stated the story was incorrect. It remained high until Dan Rather released a statement on the evening of September 20 admitting that the story was not properly reported and that the evidence was false. As this story developed, the volatility in the market rose and fell several times, indicating that new information was impacting investors and that it took some time for the potential consequences of the story to become clear.
Missing explosives in Iraq

Another national security issue burst into the campaign one week before Election Day. On Monday, October 25, the *New York Times* broke the story that 380 tons of powerful explosives vanished from an Iraq storage depot months earlier while the cache was supposed to be secured by American troops. Early that morning, when the Drudge Report initially reported it (presumably after it had appeared on the *New York Times* website), the information state increased immediately. Because this story supported Senator Kerry’s accusations that President Bush had incompetently handled the Iraq war after the initial invasion and because the news was completely unexpected, it was viewed as informative. This heightened state of information lasted for three days.

Osama bin Laden videotape

The last days of the campaign showed an elevated level of volatility. On the Friday before the election (October 29), Al-Jazeera television showed a taped message from Osama bin Laden. After being authenticated by the FBI, American television stations began showing it. Bin Laden did not directly address the election, but he did say that, “your security is not in the hands of Kerry or Bush or al Qaeda. Your security is in your own hands. Any nation that does not attack us will not be attacked.” 10 When the ad was first played, the information flow increased dramatically; evidently people thought that bin Laden’s discussion of 9-11 could influence the election by raising the salience of the issue. The information state remained high throughout the last three days of the campaign, in part

because of the tape but presumably also because of new polls and reports of frenzied campaigning.

4.4.2 Effects of Standard Campaign Events

Scholars have found that nominating conventions (Campbell et al. 1992; Holbrook 1996) and presidential debates (Lanoue 1992; Benoit et al. 2003; Hillygus and Jackman 2003) regularly impact voters. This is in part due to the fact that these events are highly publicized. Presidential debates are watched by millions of people; in 2004, 62.5 million viewers tuned into the first debate, 46.7 million watched the second, and 51 million people watched the third. Viewership of nominating conventions has declined, but the candidate’s acceptance speeches are still viewed by millions of people. It is debated whether or not the choice of a vice presidential candidate has an influence on the outcome, but at the least we can agree that the selection is a high-volume news event. Our measure of information flow reveals that the John Edwards’ selection as John Kerry’s running mate was viewed as important by investors and that the debates contained a significant amount of information. For the most part and contrary to prior findings, we show that the nominating conventions did not alter expectations about the election’s outcome.

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11 This is in comparison the 15.2 million who watched Fox’s coverage of baseball playoffs during the third debate. Though we find this heartening for democracy, it is nonetheless shocking. We have no idea why anyone would choose a debate over any Red Sox-Yankees game, and especially over a Red Sox-Yankees American League Championship Series game.
Vice Presidential Nomination

Political observers begin discussing possible vice presidential candidates early in the nominating process. Though it is unclear whether or not the vice presidential candidate adds much to the party’s ticket, the conventional wisdom suggests that it can potentially impact election outcomes by winning additional states or bringing the party together after a nomination battle (Mayer 2000). Our estimates of information flow suggest John Kerry’s announcement that he would pick John Edwards, former senator from North Carolina, was considered to have a potential impact on the election’s outcome.

In 2004, after a strong second-place showing in the Iowa caucus, John Edwards was viewed as an affable and a charismatic speaker. More importantly, he could perhaps help Kerry win the support of southern voters. On July 6, the day that the Kerry campaign announced that Edwards would be the vice presidential candidate, the information state was heightened. Investors thought that this could affect the outcome of the election. Interestingly, Edwards’ selection was incorporated into expectations relatively quickly; the information state remained elevated for only 18 hours.

Nominating Conventions

Presidential nominating conventions have become highly choreographed media spectacles, though many people do watch parts of the four day conventions. Prior research suggests that party conventions do move voters (Holbrook 1996). These findings are based on polls taken just before and just after conventions. Because our information flow variable is continuous and responds immediately to new information, we are able to better investigate the dynamics associated with conventions.
In 2004, the Democratic convention was held in Boston, Mass. on July 26-29 and the Republican convention was held in New York City on August 30-September 2. Our findings suggest that only one small part of one convention affected expectations about the ultimate election outcome: Kerry’s acceptance speech on July 29 started an information incorporation period. The information state remained elevated for a full day\textsuperscript{12}. At first, the finding that conventions had little effect seems somewhat surprising, though after further consideration, it makes sense: expected information has previously been incorporated into the market’s prices. After four years, there was little that voters could learn about Bush or his policies and nearly all had opinions of him. The fact that volatility did not increase during the Republican convention demonstrates that it did not contain any unexpected information.

In contrast, John Kerry was relatively unknown before his presidential bid; before the Democratic convention many people did not know much about Kerry, his background, or his policies. His speech was meant as an introduction to the candidate. Evidently, investors thought that that introduction was, in fact, informative. Before the convention, Kerry’s chances to win the popular vote were about even, and they remained around 50% after his speech. An analysis of simply the mean price, or probability, of a futures contract would suggest that the convention was completely irrelevant. This volatility measure suggests that despite the fact that there was not a significant change in price, people did learn about Kerry from the convention. The information acquired in this period likely conditioned the effect of later information and was thus indirectly important.

\textsuperscript{12} We assume that this elevated information flow was due to Kerry’s speech, and not to the failure of the balloons to drop immediately after his speech.
Both campaigns note that a key moment during the campaign occurred during the Republican convention (Institute of Politics 2006). On September 1, Chechen terrorists invaded an elementary school in the Russian town of Beslan; after the Russian government stormed the school several days later, 200 people, mostly children, were killed. The campaigns argued that this reinforced Bush’s message that the world is dangerous. Our analysis finds no such impact. Clearly, this incident could not possibly have been forecast by investors in the market, so what explains this? We can only speculate that because people already placed the issue of terrorism as a high priority for the next president, a certain ceiling effect existed; if the issue was ranked as the most important, it would be hard for the salience to increase very much.

Debates

There is a significant amount of evidence suggesting that televised presidential debates impact elections (Geer 1988; Benoit et al. 2003), though “their impact has fluctuated, from inconsequential to decisive” (Graber 1993). Even if debates do not change the winner of the election, citizens can and do learn from them (Lanoue 1992; Holbrook 1994; Miller and MacKuen 1979). Our research confirms that debates provide a significant amount of information. In 2004, there were three presidential debates: on Thursday, September 30; Friday, October 8; and Wednesday, October 13. Bush was widely viewed as performing poorly in the first debate (e.g., Los Angeles Times, 10/2), though the reviews of the second and third debates were mixed. Each debate increased the volatility of the market. In particular, the first and third debates led to an elevated information state for several days after the
event. This extended length of volatility fits with findings that post-debate news analysis conditions people’s responses to debates (Hwang et al. 2007).

The volatility surrounding the days of the debates highlights the difficulty isolating the cause of that increased information. The information flow increased immediately following the first debate, so it seems reasonable to conclude that that increase was caused by the debate. However, while the debate was the most notable event that occurred from September 30 to October 4 (when the volatility died down), a number of other plausible stories can be told for why the information flow was high three days later, on October 3rd.

Similarly, the level of volatility increased more than a day before the third debate and continued for more than three days after. What information was the market incorporating? In that debate, when asked whether he believed homosexuality was a choice, Kerry replied, “Dick Cheney’s daughter, who is a lesbian, she would tell you that she’s being who she was.” Both liberals and conservatives found the comment awkward and odd and thought he should not have said it. Was it that comment, or the fact that the polls moved only slightly over the course of the three debates, that caused the increased volatility? Or was it some other event? Days after that debate, the popular summary source of political information, ABC’s *The Note*, commented:

> Because the polls moved slightly in Bush’s favor after the debates, there must be a reason, and the only two reasons [the media] have been able to come up with are (i) the Mary Cheney remark; and/or (ii) the nation, having considered the totality of the debate round robin, decided it wanted a steady, likeable leader - rather than a voluble debating champion - to be the honcho of the free world. We have no idea if those are the reasons, but that’s the best anyone has offered that has smacked against our ears.

The problem of pinpointing causality in this kind of case seems, to us, intractable. Our method points to the fact that the debates added information to campaign, but we cannot apportion how much is due to comments during the debate, media analysis
immediately following the debate, or even to separate events that happen the next day. In
July and August, when less is going on in the campaign, it is easier to isolate events. By mid-
October, so many polls are being released, so much money is being spent, and so many
people are paying attention that it is much more difficult to make any kind of causal
statement.

4.5 Discussion

The approach we develop here provides a novel and useful way to investigate the
effects of campaigns. The information flow measure allows us to recognize key moments
and separate the anticipated, normal dynamics of campaigns from the unexpected
occurrences. By using data from prediction markets and a model that attempts to
characterize the reactions of market participants to new information, we are able to address
an as-yet unresolved question in political science. We build on a vast literature in finance and
economics and propose a model with two volatility regimes that simplifies the task of
associating events with periods of high information. The development and estimation of
these models is greatly facilitated by the use of the Bayesian framework.

In 2004, we identify a number of events that increased the information flow in the
campaign. Among the standard campaign events, we find that the selection of the vice
presidential candidate and the televised debates increased volatility in the prediction market.
John Kerry’s acceptance speech at the Democratic nominating convention also increased
volatility though neither the rest of the convention or any of the Republican convention
introduced new information. A number of events specific to the 2004 election were also
viewed as informative by investors. In particular, stories related to national security issues
increased volatility. These include the report that explosives vanished in Iraq under the U.S.’s watch, the CBS story about Bush’s National Guard service and its subsequent retraction, and the release of the bin Laden tape a few days before the election. We find evidence that the Swift Boat Veterans for Truth ads that were critical of John Kerry’s military service record were somewhat informative, but not nearly as central to the outcome of the 2004 campaign as is popularly believed.

We would like to reiterate two important points about this project. First, our goal was to develop a quantitative way to objectively describe the information level over the course of a presidential campaign. The price of the ‘Bush wins the popular vote’ futures contract chronicles the likelihood of Bush winning in 2004. Clearly, whether or not certain events or certain classes of events impact the election outcome is an important question. However, the question of whether an event is informative is related to, but distinct from, the question of what effect a given event has on a particular election. That is, certain events can contain significant information even if they do not alter the outcome in a particular year. For example, if there is an overriding factor in the election—like a bad economy—then a candidate’s acceptance speech at the party convention may not change the likelihood that the incumbent party will lose. Nonetheless, speeches at conventions do contain information, and in a year where the economy was not so salient, that speech could alter the election outcome. Put differently, some information that comes out during the campaign may be trumped by other information or considerations and thus not impact the vote percentage of a candidate. But that event does, in fact, have information in it. In a year with a different underlying political context, that same event may move vote totals significantly. Because our
model focuses on the information level itself, we hope our model can be used to develop a more a general theory of campaign event effects over time.

Second, when we find relatively low levels of information in some given period of time, we are not saying that the campaign itself during those periods is irrelevant. We certainly believe that campaigns matter. The expectations about what will happen on election day are dependent on our prior understanding of how campaigns generally progress. When we find low levels of information, we are only arguing that those are periods where people are not learning anything new about the election.

We believe our model is a promising technique for research on campaigns and elections. We will be able to test it and our theory more explicitly in the future because prediction markets grow in popularity in each election cycle. Intrade has had contracts on the party nominees and the winner of the 2008 general election trading with high volume for months. Going forward with this research, we would like to find ways to make stronger causal claims. The question of causality looms large in the social sciences, and this work is no exception. We want to extend our modeling approach in an attempt to more clearly isolate the effects of different events. Addressing that becomes both more difficult and more important in the last weeks of the campaign. The 2008 Democratic primary season provides a particularly useful testing ground for us; because partisanship cannot be the deciding factor between two candidates in a primary, we are likely to see more dramatic movement in the markets during the campaign as the situation progresses.

There certainly is no shortage of political pundits, campaign strategists, and journalists willing to declare “what the election was about” and highlight the “turning point” in the campaign, the event or story that pushed the campaign towards its ultimate result.
Undoubtedly, pundits and politicos are sometimes correct; but often they are not. When we explain election outcomes with a compact anecdote, we can both overlook events that were actually important and overstate our confidence in our conclusions. Addressing the issue of which events impact elections by combining theoretical insights from other fields with a Bayesian modeling approach gives us greater leverage on a question that is of both academic interest and practical significance—it helps us to understand the dynamics and responsiveness of our democratic institutions.
## Appendix A. Survey Question Wording

<table>
<thead>
<tr>
<th>INDEPENDENT VARIABLES</th>
<th>Responses to the following were multiplied together:</th>
</tr>
</thead>
</table>
| Time per week spent on Facebook             | On average, how many days per week do you go to Facebook?  
|                                              | On days that you do go to Facebook, about how many minutes per day do you spend on it? |
| Friends on Facebook                         | About how many friends do you have on Facebook?     |
| Number of Facebook Groups                   | About how many groups do you belong to on Facebook? |
| Pages viewed regularly                      | About how many people's Facebook pages do you look at regularly? |
| Political Interest                          | Generally speaking, how much attention do you pay to what's going on in government and politics? 1=A great deal; 2=Quite a bit; 3=Some; 4=Very little; 5=None |
| Political Science or Public Policy major    | Open-ended response to “what is your major?”        |
| Graduate student                            | Identified as a graduate student (as opposed to undergraduate). |
| Political Sophistication                    | Five-point scale constructed with the following questions:  
|                                              | • What office does Condoleezza Rice hold?             |
|                                              | • How much of a majority is required for the U.S. Senate and House of Representatives to override a presidential veto? |
|                                              | • Which political party is more conservative at the national level? |
|                                              | • Whose responsibility is it to determine whether a law is constitutional or not—is it the President, the Supreme Court, or the Congress? |
### DEPENDENT VARIABLES

**Knowledge of Current Political Events—Eight questions.**

“Here are a few questions about politics and what’s going on in the world lately. Many people don’t know the answers to these questions, so if there are some you don’t know just leave them blank and move on.”

| Knowledge Index variable is a sum of how many questions the respondent answered correctly. | How many seats did the Democrats gain in the House of Representatives? _____ |
| The other dependent variables are: candidates running for president and seats won by Democrats. | Some people already appear to be running for president in 2008 even though they have not officially declared it. Do you know any of those people? List as many as you can think of. |
| | Do you happen to know which candidate won the Missouri Senate race on November 7? Jim Talent; Anne Northup; Trent Lott; Claire McCaskill. [Correct answer: McCaskill] |
| | Do you happen to know which department secretary resigned from President Bush’s Cabinet this past week? |
| | Recently, the North Korean government has admitted to: Developing a strategic missile defense program; Conducting underwater nuclear tests; Using international funds meant for humanitarian aid to further its weapons program; Kidnapping some South Korean citizens. [Correct answer: kidnapping South Korean citizens.]
| | About how many American soldiers have died in Iraq? |
| | The Unlawful Internet Gambling Enforcement Act was attached to which of the following bills passed by Congress in 2006: The Social Welfare Act; The Safe Port Act; The Highway Safety Act; The Virtues of Responsible Government Act. [Correct answer: Safe Port Act.]
| | The Darfur conflict refers to: The civil war in the Sudan that began in 2003; The massacres executed by the Lord’s Resistance Army in Uganda; The massacre in Bosnia during the Bosnian War charged to Slobodan Milosevic; The border dispute between the United Arab Emirates and Saudi Arabia. [Correct answer: civil war in the Sudan.] |
## DEPENDENT VARIABLES

### Political Participation—Past

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voting in 2006</strong></td>
<td>Did you vote in the 2006 congressional elections? Yes/No [Note: students who were not eligible to vote were removed for analyses.]</td>
</tr>
<tr>
<td><strong>Participation in 2006</strong></td>
<td>Five point scale created from the following five questions:</td>
</tr>
<tr>
<td></td>
<td>During 2006, did you: [Yes/No]</td>
</tr>
<tr>
<td></td>
<td>…try to persuade someone to vote for a particular candidate or party?</td>
</tr>
<tr>
<td></td>
<td>…put a political message in one of your online profiles?</td>
</tr>
<tr>
<td></td>
<td>…volunteer for a campaign?</td>
</tr>
<tr>
<td></td>
<td>…donate money to a campaign?</td>
</tr>
<tr>
<td></td>
<td>…take part in a boycott, protest, march, or demonstration?</td>
</tr>
<tr>
<td><strong>Email participation in 2006</strong></td>
<td>Five point scale created from the following five questions:</td>
</tr>
<tr>
<td></td>
<td>During the 2006 election campaign, did you send an email to a friend or family member: [Yes/No]</td>
</tr>
<tr>
<td></td>
<td>… About a candidate?</td>
</tr>
<tr>
<td></td>
<td>…about an issue? (E.g. abortion, Iraq, the Sudan, same sex marriages?)</td>
</tr>
<tr>
<td></td>
<td>…asking the person to donate money to a political campaign?</td>
</tr>
<tr>
<td></td>
<td>…asking the person to vote for a particular candidate or party?</td>
</tr>
<tr>
<td></td>
<td>…with a news story or link to a news story (e.g. from the New York Times) or a blog post?</td>
</tr>
</tbody>
</table>
**DEPENDENT VARIABLES**

*Political Participation—Intended future*

<table>
<thead>
<tr>
<th><strong>Voting in 2008</strong></th>
<th>Thinking ahead to the 2008 presidential election… How likely are you to vote in the 2008 presidential election? Very likely [1]; Somewhat likely [2]; Not very likely [3]; Not at all likely [4]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participation in 2008</strong></td>
<td>Scale created from the following five questions: In 2008, how likely are you to: …try to persuade someone to vote for a particular candidate or party? …put a political message in one of your online profiles? …volunteer for a campaign? …donate money to a campaign? …take part in a boycott, protest, march, or demonstration? Very likely [1]; Somewhat likely [2]; Not very likely [3]; Not at all likely [4]</td>
</tr>
<tr>
<td></td>
<td>The sum of those answers created an index ranging from 5 (very likely to participate in all activities) to 20 (not at all likely to participate in any of the activities).</td>
</tr>
</tbody>
</table>

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Appendix B. Contents and Order of Survey Modules

Copy of full survey available from author.

Modules included and their order:

1. Facebook use

2. Influence from and characteristics of a close friend and an acquaintance

3. Instant-messaging use

4. Experiment [See Appendix C]

5. Political Behavior

6. Duke Lacrosse reactions

7. Knowledge of current political events

8. Standard measures of political knowledge

9. Media use (news and entertainment)

10. Political opinions and attitudes

11. Psychological measures: need for cognition, individualism, social capital

12. High school behavior—activities, attention to news

13. Demographics, standard and information about Duke
Appendix C. Experiment

One of the features on Facebook is the ‘Pulse.’ According to Facebook, it “uses information provided in Facebook profiles to show the most popular listings and the latest trends on the sites.” It includes lists of the most popular music, movies, television shows, and books at Duke and among all Facebook users. There is also an ‘Election Pulse,’ which lists the issues and candidates that Facebook users are supporting.

The Pulse has quick statistics about Duke students. Examples of these are:

- [EXPERIMENTAL CONDITION OR CONTROL]
- 43% more Duke people listed Coldplay than the Red Hot Chili Peppers.
- 11% more Duke people listed Grey's Anatomy than Family Guy.

Which of those facts do you think is most interesting?

[Listed again, as a method to have students read the prompt carefully.]

**Experimental conditions:**

- **Involved:** 52% of Duke people support a candidate.
- **Apathetic:** 52% of Duke people are apathetic towards politics.
- **Control:** 10% more Duke people listed Crash than Office Space.
Appendix D. Volatility Model and Computation

We complete the model described in (1) with the following priors:

\[ \alpha_i \sim N(m_{\alpha_i}, C_{\alpha_i}) \]
\[ \beta \sim N(m_\beta, C_\beta) I(-1 < \beta < 1) \]
\[ \tau^2 \sim IG(a_\tau, b_\tau) \]
\[ p_{ij} \sim Be(a_i, b_i) \]
\[ m_0 \sim Ga(a_{m_0}, b_{m_0}) \]
\[ m_1 \sim Ga(a_{m_1}, b_{m_1}) \]

Let \( \theta = (m_0, m_1, \alpha_1, \alpha_2, \beta, \tau^2, P) \). Based on the following decomposition of the joint posterior distribution:

\[ p(I_{1:T}, S_{1:T}, \theta | R_{1:T}, V_{1:T}) \propto p(R_{1:T} | I_{1:T}) p(V_{1:T} | I_{1:T}, \theta) p(I_{1:T} | S_{1:T}, \theta) p(S_{1:T} | \theta) p(\theta) \]  

we can generate posterior samples through a MCMC scheme defined by the full conditionals described below.

**Drawing \( \theta \)**

Full conditionals for \( \theta \) can easily be obtained as follows:

\[
(a_1 | \cdot) \sim N \left( \frac{\tau_i}{\tau^2} + \frac{1}{C_{\alpha_1}}, \left( \frac{\tau_i}{\tau^2} + \frac{1}{C_{\alpha_1}} \right)^{-1} \right); \quad (2)
\]

\[
(\beta | \cdot) \sim N \left( \frac{\sum_{t=1}^{T} \lambda_{t-1}}{\tau^2} + \frac{1}{C_\beta}, \left( \frac{\sum_{t=1}^{T} \lambda_{t-1}}{\tau^2} + \frac{1}{C_\beta} \right)^{-1} \right); \quad (3)
\]

\[
(\tau^2 | \cdot) \sim IG \left( a_\tau + \frac{T}{2}, b_\tau + \frac{\lambda_{t-1}}{2} \right); \quad (4)
\]

\[
(p_{11} | \cdot) \sim Be(a_1 + n_{11}, b_1 + n_{12}); \quad (5)
\]

\[
(p_{22} | \cdot) \sim Be(a_2 + n_{22}, b_2 + n_{21}); \quad (6)
\]

\[
p(m_0 | \cdot) \propto \exp \left[ -\left( b_{m_0} + T \right) m_0 + \sum_{t=1}^{T} \log \left\{ m_0^{a_{m_0}-1} (m_0 + m_1 l_t)^{v_t} \right\} \right]; \quad (7)
\]

\[
p(m_1 | \cdot) \propto \exp \left[ -\left( b_{m_1} + \sum_{t=1}^{T} l_t \right) m_1 + \sum_{t=1}^{T} \log \left\{ m_1^{a_{m_1}-1} (m_1 + m_1 l_t)^{v_t} \right\} \right]; \quad (8)
\]

where \( \lambda_t = \log(l_t) \), \( T_i \) represents the number of observations allocated to the \( \lambda_i \) state and \( n_j \) are counts of transitions from \( i \) to \( j \). Sampling from the above distributions is straightforward. The only
minor complication is the Metropolis step necessary for sampling \( m_i \) and \( m_t \). We use a random-walk metropolis with normal proposals. Initial values were defined based on the MLE of both parameters in a Poisson regression where \( I_{1:T} \) was fixed at the posterior mean from a standard two-stage Markov-switching stochastic volatility model where an efficient Gibbs sampler can be implemented. These estimates of the information flow are also used as initial values for \( I_{1:T} \).

**Drawing States \( I_{1:T} \) and \( S_{1:T} \)**

Due to its Markovian property and decomposition in (1), the full conditional for \( S_{1:T} \) can be written as:

\[
p(S_{1:T} \mid \cdot) = p(S_T \mid \lambda_{1:T}, \theta) \prod_{t=T-1}^{1} p(S_t \mid S_{t+1}, \lambda_{1:T}, \theta)
\]

\[
\propto p(S_T \mid \lambda_{1:T}, \theta) \prod_{t=T-1}^{1} p(S_{t+1} \mid S_t) p(S_t, \lambda_t, \theta)
\]

(9)

This allows for a block sampling of \( S_{1:T} \) through a forward filtering backward sampling algorithm as described in Kim and Nelson (1999). This is a simple task as \( S_t \) is a discrete random variable and obtaining the distributions defining (9) is always possible.

Sampling of \( I_t \) is the only “hard” step in the MCMC. The full conditional \( p(I_t \mid I_{-t}, \cdot) \) takes the following form:

\[
p(I_t \mid I_{-t}, \cdot) \propto \exp \left( -\frac{1}{2} R_t^2 \right) \exp(m_0 + m_t I_t)(m_0 + m_t I_t)^{\nu_t} \times
\]

\[
\exp \left\{ -\frac{1}{2\tau^2} (\lambda_t - \alpha S_t - \beta \lambda_{t-1})^2 \right\} \exp \left\{ -\frac{1}{2\tau^2} (\lambda_{t+1} - \alpha S_{t+1} - \beta \lambda_t)^2 \right\}
\]

(10)
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Biography

Jill C. Rickershauser was born in Reading, Massachusetts in 1979. She received her Bachelor of Arts degree from Smith College in Northampton, Massachusetts and graduated *cum laude* with High Honors in Government in 2002. She entered Duke University in the fall of 2002 with a Graduate School fellowship. She received her Masters of Arts degree from Duke University in 2005. She is a member of the American Political Science Association and the Midwest Political Science Association. She was external president of the Duke Political Science Graduate Student Association from 2003-2005. With Anne Boxberger Flaherty, she founded Women Networking in the Social Sciences (WNSS) at Duke.

Jill is a huge Red Sox fan, and, since her marriage to Carlos M. Carvalho, a fan of Fluminense, a soccer club from Rio de Janeiro, Brazil.