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A Thesis Submitted in Partial Fulfillment of the Graduation Requirements for the Degree of Master of Science

Department of Science, Technology and Public Policy

College of Liberal Arts

Rochester Institute of Technology

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Abstract

This thesis explores the relationship between public opinion polls and voter support and asks whether exposure to a public opinion poll creates an unfair advantage for the candidate winning in that poll. The experimental results from this study were used to test the hypothesis that exposure to an opinion poll, with a wide lead for one of two candidates, would cause voter support to increase for the candidate who was leading in the poll (i.e. a bandwagon effect). In 2012, a random sample of 101 registered voters in the NY 25th Congressional District participated in two telephone surveys. In each survey, voters rated their personal support for each of two congressional candidates on a five point scale. After the first telephone survey, respondents were randomly assigned to an experimental group and a control group. The experimental group received polling data that showed one candidate with a large lead over the other (59% to 41%); meanwhile, the control group received no such polling data. After voters in the experimental group received the opinion poll, both groups were called with a second telephone survey and again asked to rate their support for each of the two congressional candidates using a five point scale.

The change in voter support, from the first to the second telephone survey, was compared between the experimental and control groups, with results that failed to establish statistically significant evidence of a bandwagon effect among the voters who received polling data. A multinomial logistic regression analysis was also used to explore the results in more detail but still failed to establish statistically significant evidence of a bandwagon effect that was associated with exposure to polling data alone. Instead, the multinomial logistic regression analysis revealed evidence of a bandwagon effect among some voters who were considered predisposed to support the frontrunner in the poll (i.e. those who shared the same party affiliation and had a lack of other knowledge or information). However, this effect occurred only among a small subset of the final sample and was not statistically significant. In conclusion, this experiment found that exposure to polling data, whether on its own or in conjunction with other variables, did not significantly affect voter support either for the candidate winning or losing in the poll. While these results are limited to the sample of registered voters in this experiment, additional research would be necessary to draw more generalized conclusions about the relationship between exposure to opinion polls and voter support.

I. Introduction

Most people have been exposed to polling data during a political election, whether as survey participants or by simply reading opinion polls, that are published regularly in the news and by other media outlets. There are many different stakeholders, including public opinion researchers, political scientists, media producers, campaign operatives and the general public who have asked whether exposure to public opinion polls during an election has any influence on voter support for the candidates who are running for office. This question has become especially important because existing literature on the topic shows that exposure to public opinion polls, while not necessarily intended to change voter preference, may still affect it.

Some researchers have concluded that exposure to polling data affects the public in a positive way, by serving an educational purpose that allows voters to make more informed decisions on Election Day (Donsbach, 2001). Others disagree, concluding instead that exposure to polling data infringes on democratic principles by placing an undue bias in the minds of voters who are easily persuaded to support the frontrunner in a poll (Donsbach, 2001; Grosser & Schram, 2010). This thesis includes the results of an empirical field experiment involving New York's 25th Congressional District race during the 2012 general election. Its findings contribute to the existing literature after testing the results to determine whether exposure to a public opinion poll does create an unfair advantage for the candidate winning in the poll (i.e. a bandwagon effect).

The experiment exposed registered voters to polling data early in a campaign, nearly three months prior to Election Day, between July-August, 2012. At this time, the candidates (Representative Louise Slaughter and Monroe County Executive Maggie Brooks) had recently been named to the ballot, making it a period during which voters were still being introduced to the candidates and presumably had not yet decided which candidate to support in the general election. Between July and August then, while most voters were undecided in their support for each candidate, exposure to polling data and change in support were more easily analyzed rather than if the experiment were conducted closer to Election Day when more voters would have decided which candidate to support.

This thesis sought to establish a bandwagon effect by releasing an opinion poll, showing one candidate with a large lead over the other, in an attempt to encourage voters to support the candidate who was leading in the poll. A random sample of registered voters was drawn from two townships within the NY 25th Congressional District. The townships represented one Democratic-leaning population (Town of Brighton) and one Republican-leaning population (Town of Greece), in order to reduce the likelihood that voters in the sample would be more likely to support either the Democrat or Republican candidate before

the experiment began. The registered voters in the sample participated in two telephone surveys and were asked to rate their support for each congressional candidate on a five point scale. The first telephone survey created a baseline of support amongst the entire sample of voters. After the first survey, voters were randomly assigned to an experimental group and a control group. The experimental group received polling data that said a majority of voters (59%) support Maggie Brooks ahead of Louise Slaughter (41%). This polling data was released as an anonymous mailing and robo-call, using each individual's home address and listed telephone number. Meanwhile, the control group was sent no additional campaign or political polling information. After the polling data was disseminated to experimental group, the entire sample was called with a second telephone survey and asked to rate each voter to again their support for the two congressional candidates on a five point scale. The difference in support, from the first to the second phone survey, was calculated to determine whether support increased or decreased for both candidates.

The experimental results did not yield statistically significant evidence that voters in the experimental group were more likely to increase their support for the candidate leading in the poll (Maggie Brooks) compared to voters in the control group. A multinomial logistic regression analysis (Section VII) was also used to examine the results in more detail. This analysis did find evidence of a bandwagon effect among a small, sub-population of voters who were already predisposed to support a particular candidate (i.e. those who shared the same party affiliation and had a lack of other knowledge or political information). These results, however, were not statistically significant and suggested that the appearance of a bandwagon effect may be due to random chance and not the result of an actual relationship. The conclusions from this experiment contribute to an extensive body of literature on the bandwagon effect and show that, while the results were not statistically significant, there may be circumstances under which certain sub-populations are more likely to support the candidate leading in an opinion poll.

II. Literature Review

The existing literature on this topic offers theoretical and evidential groundwork to explain how public opinion polls affect voter support and under what circumstances these effects may occur. The field experiment in this study, introduced in Section IV, incorporated these theories to define a number of control variables that were used to test the effect of exposure to public opinion polling data on voter support for each of the two candidates in the NY 25th Congressional District race: Louise Slaughter (Democrat) and Maggie Brooks (Republican).

Prior research on this topic has commonly measured voter support as either voter turnout (e.g. election outcome) or personal preference (e.g. opinion survey). Whereas voter turnout relies on collecting post-election data, personal preference was more closely aligned with the scope of this experiment because data could be collected at any point during the election. Another benefit to using preference, as a measure of voter support, was the ability to capture more subtle changes in voter support using survey questions such as Likert scales (e.g., *on a scale of 1-to-5, how would you rate your support for the candidates running?*) or binary questions (e.g., *if an election were held today, would you vote for Candidate A or Candidate B?*). These question types were useful to determine whether voter support for each candidate increased or decreased after exposure to polling data (Hillygus, 2005; Krosnick & Fabrigar, 1997). Thus, going forward, this thesis defines voter support as personal preference for each of the two congressional candidates using a pre- and post-exposure telephone survey. In both telephone surveys, respondents rated their support for Louise Slaughter and Maggie Brooks with three survey questions, including two Likert scales and one binary question. As other survey research has shown, when the number of scalar points decrease, the variation in response may also decrease (Hillygus, 2005). Therefore, responses between these different question types were also compared to see if respondents exhibited more or less variation in support, depending on the question being asked.

Three common effects associated with exposure to opinion polling data are summarized in Table 1. They include: the bandwagon effect, the underdog effect and a more strategic guillotine effect- that is more common when there three or more candidates are running for office (Simon, 1954; Brown & Zech, 1973; Donsbach, 2001; Grosser & Schram, 2010). Of these three effects, perhaps the most common is the bandwagon effect. Evidence of the bandwagon effect is documented among voters who read an opinion poll and decide to support the candidate who is leading in that poll (Donsbach, 2001). There are a number of circumstances and reasons to explain when and why the bandwagon effect occurs. Two such reasons are: 1) an individual voter's desire to be on the winning team, particularly when (s)he believes they have a lot to gain or lose from the election (social welfare); or, 2) when individual voters lack other campaign

information and therefore rely on the majority opinion to account for their own lack of knowledge (Grosser & Schram, 2010; Goldstein, Cialdini & Griskevicius, 2008; Boudreau & McCubbins, 2010).

The flipside to the bandwagon effect is the underdog effect, which is documented among voters who read an opinion poll and decide to support the candidate who is losing in that poll (Fleitas, 1971; Donsbach, 2001). There is some debate as to whether the underdog effect occurs primarily out of sympathy for the candidate who is losing in the poll, or that it occurs because voters believe the quality of the polling information is questionable (Fleitas, 1971; Brown & Zech, 1973). Finally, evidence of the guillotine effect has been documented among supporters of third party candidates. The guillotine effect occurs when supporters of a third party candidate, after reading an opinion poll, make a strategic decision to no longer support that candidate out of fear their vote will be wasted on a long-shot when there are two (or more) front runners in the poll (Donsbach, 2001; Grosser & Schram, 2010).

Table 1: Summary of Bandwagon, Underdog and Guillotine Effects

Documented Effects	*Definition(s) and Influential Factors*
(1) Bandwagon Effect	Occurs when voters rally their support around a candidate who is leading in an opinion poll. This effect is most pronounced when polling data confirms pre-existing beliefs (Donsbach, 2001) or within a particular reference group (Navazio, 1977; Grosser & Schram, 2010).
(2) Underdog Effect	Occurs when voters sympathize with the candidate losing in a poll and rally their support around this candidate as a result. This effect has been pronounced in campaign settings where minimal information is available, such as on local races (Fleitas, 1971) or in instances where the predictive information may be questionable (Brown & Zech, 1973). This effect also occurs among voters who share a political party affiliation with the candidate losing in a poll (Fleitas, 1971).
(3) Guillotine Effect	A more strategic effect that occurs when voters weigh their support for a candidate against available polling data, in an attempt not to waste their vote. This effect is pronounced in races with three or more candidates and when social welfare issues are most important (Grosser & Schram, 2010; Brown & Zech, 1973).

This thesis asks whether a bandwagon effect occurred among voters in the NY 25th Congressional District race, who received polling data that showed Maggie Brooks with a large lead ahead of Louise Slaughter. While other research has documented occurrences of the bandwagon effect amongst the electorate, it has also shown that several factors may increase the likelihood of a bandwagon effect

occurring in addition to exposure to polling data. These factors include a voter's level of formal education, amount of political knowledge and political party registration.

First, a bandwagon effect has been documented among voters who have low levels of either formal education and/or political knowledge. In these instances, voters have been more likely to follow the majority opinion and support the candidate leading in a poll when compared to voters with higher levels of formal education and/or political knowledge (Eldersveld, 1956; Boudreau & McCubbins, 2010; Zaller, 1992; Donsbach, 2001; Goldstein, Cialdini & Griskevicius, 2008). A predominant reason for this effect occurring is that voters with less education and/or political knowledge assume their peers are more informed and that better information is reflected in the majority opinion (Boudreau & McCubbins, 2010; Goldstein, Cialdini & Griskevicius, 2008). Meanwhile, voters with higher levels of formal education and/or political knowledge have been more critical of polling data and subsequently less likely to change their support for a candidate based on an opinion poll alone (Boudreau & McCubbins, 2010; Zaller, 1992). Notably, other research has not offered one general definition for "high" versus "low" levels of formal education or political knowledge. Instead, high and low levels of formal education and political knowledge are considered relative to individual voters and their respective election districts. In this experiment then, formal education and political knowledge were analyzed on a sliding scale where the net result showed that voters on the low end of these scales were more likely to support the candidate who has the majority support in a poll, regardless of whether that polling data was reliable (Boudreau & McCubbins, 2010). Conversely, individuals on the high end of the formal education and political knowledge scales were more likely to use polling data as a supplement to reinforce their pre-existing opinions and candidate support (Donsbach, 2001).

As a control for each voter's level of formal education, the first telephone survey in this experiment asked each participant for her/his highest level of formal education achieved (Trochim, 2006). Similarly, each voter's level of political knowledge was measured using on a series of four political-fact type questions, so that political knowledge was an interval-level variable ranging from 0 (no correct responses) to 4 (all correct responses). The questions used to measure political knowledge were modeled after a similar survey and intended to cover four aspects of political knowledge including: knowledge of relevant political facts (e.g. *which political party currently holds the majority in the U.S. House of Representatives*); knowledge of elections (e.g. *when is election day?*) and more abstract concepts related to political party positions on relevant topics (e.g. *which political party supports repealing the national health care law?*) (Loewen, Milner & Hicks, 2008).

A third factor that has been linked to the bandwagon effect is party registration. Other researchers have referred to political party membership as a reference group, meaning that some voters strongly identify with the political party they are registered in and, as a result, follow their party leadership when

deciding which candidate(s) to support in an election (Navazio, 1977). Along party lines, polling data has reinforced voters' pre-existing and partisan beliefs, again demonstrating a bandwagon effect among voters who share a party affiliation or a political ideology with the frontrunner in a poll (Hillygus, 2005). This effect is supported by other research that suggests a rallying (i.e. bandwagon) effect occurs among voters who strongly identify with one political party and who read polling data that shows their party's candidate in the lead (Navazio, 1977; Hillygus, 2005; Grosser & Schram, 2010). In this experiment, party registration was controlled using a registered voter file from which a random sample of voters in the 25th Congressional District was selected. In addition to registered Democrats and Republicans, many smaller and third parties also appear on the ballot in New York State. Therefore, party registration was defined in this experiment as a categorical variable that includes: registered *Democrats*, registered *Republicans* and all *Other* party affiliations.

In addition to demographic factors, there are a number of circumstantial factors that also influence voter support and are especially important to control in the context of a live campaign. Several studies have attempted to measure the effect of exposure to polling data on voter turnout (mobilization) when voters directly benefit or lose from an election; a concept that is referred to as social welfare (Grosser & Schram, 2010; Boudreau & McCubbins, 2010; Brown & Zech, 1973; Ansolabehere & Iyengar, 1994). Analysts who use a social welfare framework argue that individuals are more likely to vote when they stand to benefit from the election and when these benefits outweigh any costs (e.g. time, effort) associated with voting. In one social welfare experiment, exposure to polling data was found to increase voter turnout when a candidate was leading with a small margin (e.g., 51% to 49%) because voters believed their vote would have a more significant impact on the election outcome (Grosser & Schram, 2010). Whereas, a small margin between two candidates was found to increase turnout, the same effect did not occur when the polling data showed a wider margin. For instance, when an opinion poll showed a wide margin between two candidates (e.g., 60% to 40%), turnout was largely unaffected while, instead, personal preference increased for the candidate leading in the poll (Grosser & Schram, 2010). In line with this existing evidence, voters in this experiment were therefore given polling data that showed a wide margin of support between Louise Slaughter and Maggie Brooks because this was expected to have a greater effect on the levels of preference being measured.

In addition to social welfare research, a number of political disturbance factors may also influence voter support early in an election and increase the likelihood of a bandwagon effect. These factors are referred to as *disturbance* because they occurred externally to the experiment and were the byproduct of conducting a field experiment within the context of a live campaign. The three variables used to define political disturbance in this thesis are: *media usage*, *political discussion* and *political engagement* (Loewen, Milner & Hicks, 2008). Other research has shown that all three disturbance variables influence

the way in which a voter reads and interprets polling data during the course of an election and, therefore, may play an important role in the relationship between polling data and voter support (Donsbach, 2001; Loewen, Milner & Hicks, 2008). These disturbance factors may also reinforce voter support in a manner similar to a reference group with party registration (Hillygus, 2005). In this experiment, these disturbance variables were controlled during the first telephone survey with a series of questions that measured each voter's level of *political discussion*, *media usage* and *political engagement*. Based on this literature review, a total of six control variables were included in the experiment and are summarized in Table 2.

Table 2: Control Variables

Control Variables (6 Total)[1]	*Scale Type*	*Measurement Scale*
(1) Formal Education	Ordinal	Verbal scale ranging in categories from less than high school degree to graduate degree.
(2) Political Knowledge	Interval	Discrete numerical scale ranging from 0-to-4 for the total number of correct responses to political fact-style questions.
(3) Party Registration	Categorical	No scale or survey question used. Voter registration was identified as Democrat, Republican or Other.
(4) Disturbance Factor: Media Usage	Interval	Continuous numerical scale ranging from 0-to-42 for the number of days a respondent reported using various media sources for political information (e.g. newspaper, radio, t.v.)
(5) Disturbance Factor: Political Discussion	Ordinal	Verbal scale to measure frequency of reported political conversation ranging in categories from very often, some of the time, rarely or never.
(6) Disturbance Factor: Political Involvement	Interval	Discrete numerical scale ranging from 0-to-5 to measure the number of political activities a respondent engaged in where 0 is none and 5 is all.

[1]The data for all six control variables was collected using survey questions during the first telephone survey. The exception is party registration, with data that was obtained from the voter registration file.

III. Research Question

As part of this thesis, an empirical field experiment was conducted to determine whether a bandwagon effect occurred among voters in the NY 25th Congressional District race who received polling data that showed Maggie Brooks with a large lead over Louise Slaughter (59% to 41%). This experiment was completed using two telephone surveys to measure voter support and subsequent change in support. Voter support for each candidate was measured using separate, five point Likert scale questions on which voters rated their support for each candidate before and after the experimental group received polling data. The difference in scalar measures of support between the first and second telephone surveys was used to define the dependent variable in the experiment, *change in voter support*, along with a number of control variables including: *formal education*, *political knowledge*, *party registration* and three external disturbance factors. The research question being answered with this study is: *Are voters more likely to increase their support for the candidate leading in an opinion poll?* The primary hypothesis, based on evidence from the literature review, is as follows:

> Primary Hypothesis [H1]: Voters will increase their support for the candidate leading in an opinion poll when that candidate has a clear majority of support. Those voters who increase their level of support will also have the following characteristics: low levels of formal education, low levels of political knowledge, are registered in the same political party and report low levels of political disturbance (i.e. media usage, political discussion and political involvement).
>
> Voter Support = *f* (exposure to polling data; *formal education*, *political knowledge*, *party registration*, *media usage*, *political discussion* and *political engagement*)

Although the purpose of this experiment was to find evidence of a bandwagon effect, a secondary hypothesis was also tested with experimental results to find evidence of an underdog effect. The secondary hypothesis is introduced here and will be explored further with a multinomial logistic regression analysis in Section VII.

> Secondary Hypothesis [H2]: After receiving polling data, voters in the experimental group will increase support for the candidate losing in the poll (Louise Slaughter) and will also have the following characteristics: high levels of education, high levels of political knowledge, registered Democrat with and report high levels of political disturbance.

Voter Support = *f* (Exposure to polling data; *formal education*, *political knowledge*, *party registration*, *media usage*, *political discussion* and *political engagement*)

This secondary hypothesis was based on the literature review in Section II. Thus, the voters described here were expected to increase their support for the underdog (Louise Slaughter) because they shared a political party affiliation (Democrat). These voters also had access to more information, based on higher levels of formal education, political knowledge, media usage, political discussion and political engagement. Under these particular circumstances, voters were therefore expected to reject the polling data in the experimental group and support their preferred candidate, Louise Slaughter.

IV. Experimental Design

The purpose of this field experiment was to find evidence of a bandwagon effect among voters in the NY 25th Congressional District race. This section presents an overview of the experimental pre-post design method and sampling methodology. The following sub-sections include more detail related to the sample size calculation, variable measurement and the experimental method used.

To begin, a random sample of 1,183 registered voters from the Towns of Brighton and Greece within the NY 25th Congressional District was selected from a list of registered voters maintained by the Monroe County Board of Elections. The starting sample size (n=1,183) was derived, in part, using Equation 1 (pg. 12) that calculated the minimum final sample size needed to achieve statistically significant results at a 90% confidence level. The registered voter file included information such as voter name, gender, age, party registration, phone number, home address, district information and voting history for the previous five years. For those voters who did not have a listed phone number in the voter file, an online telephone directory search was conducted to identify the number. If a phone number could not be located in either the voter file or the online phone directory, that voter record was discarded. Using this method, 36% (421 records) of the starting sample records were dropped, leaving a sample of 762 registered voters with listed phone numbers.

This sample of voters (n=762) were called with a telephone survey that asked each individual to rate their support for the two candidates running for Congress in New York's 25th District, Louise Slaughter and Maggie Brooks. In addition to their support, each voter was asked a series of questions with the intent to measure a variety of control variables: level of formal education, level of political knowledge, media usage, political discussion and political involvement. Two hundred (n=200) respondents completed the first telephone survey and were then randomly assigned to an experimental or control group, with 100 voters in each group.

The experimental group received polling data that showed Maggie Brooks leading Louise Slaughter by an 18-point margin, or 59%-to-41%. Again, a large margin (< 10 percentage points) was used in accordance with existing evidence that this would most likely have an effect on voter support (Grosser & Schram, 2010). The polling data was distributed twice to the experimental group. It was first sent as an anonymous mailing and second, as an anonymous telephone call with a pre-recorded message. Meanwhile, the control group was sent no additional campaign or political polling information. After the polling data was disseminated to voters in the experimental group, all 200 voters were called with a second telephone survey that again asked them to rate their support for both congressional candidates. The difference in scalar measures of support from the first to the second telephone survey was compared between voters in the experimental and control groups, to determine whether a bandwagon effect

occurred among those who were exposed to polling data. A more detailed discussion of the experimental design follows below.

A. Registration-Based Sample (RBS)

An appropriate sample size for this experiment was estimated using Equation 1. This is a standard equation used to calculate the minimum sample size needed to achieve statistically significant results, when describing a change in voter support for population proportions (i.e. with discrete data).

Equation 1: Calculation Used to Derive Minimum Sample Size Needed

$$n = \hat{p}\hat{q}\left(\frac{Z_c}{E}\right)^2 \text{ where } \hat{p} = 0.5 \text{ and } \hat{q} = 0.5 \text{ So that: } n = 0.5^2\left(\frac{1.645}{0.1}\right)^2 = 68$$

According to Equation 1, a minimum sample size of 68 respondents for each of the experimental and control groups would be sufficient to yield statistically significant results at a 90% confidence level within $\pm$ 10%. Most opinion polls, when published, would normally strive for higher significance and a smaller confidence interval.[2] However, this low confidence level and relatively large margin of error was used because a higher confidence level and smaller error margin would have required a larger sample size that was beyond the time and financial constraints of this particular experiment. One downside of this decision is that, while the results may be generalized within the two townships that were sampled, the small sample size restricts the final results from being generalized to all registered voters in the NY 25th Congressional District or even nationally. A second limitation is that a lower confidence level, with a large margin of error, yielded results that are less precise, meaning that any repeated trials of this experiment are less likely to yield consistent results.

A random selection of 1,183 registered voters was selected using registration-based sampling (RBS), a method that is conceptually similar to a simple random sample. Using RBS, respondents were randomly selected from a list of registered voters in the NY 25th Congressional District, with each individual voter having an equal chance of being selected (Green & Gerber, 2006). The primary benefit of using RBS for this experiment was that a majority of pertinent demographic data – age, gender, party affiliation and voting history – were already recorded in voter registration lists. Thus, the RBS method reduced the number of demographic survey questions that were asked during each telephone survey as well as the risk of recall bias that may arise with questions about voting history, as an example. Another benefit of the RBS method was that it established a well-defined sample frame from which a probability sample was drawn.

[2] Most political polls that are reported in the newspaper present results with 95% confidence and a $\pm$ 5% (or less) margin of error.

A large starting sample size was also necessary to account for voters who did not have listed telephone numbers to be used in the experiment as well as response drop-off between the first and second telephone surveys. Any voter in the starting sample (n=1,183) who did not have a listed phone number in the voter file was searched for, using an online telephone directory at whitepages.com. If a phone number could not be located in either the voter file or online directory, that particular voter record was discarded. After 36% of the starting sample (421 records) were removed for voters without listed phone numbers, 762 records remained. Using available demographic information from the voter file, the elimination of voters without listed phone numbers did result is some significant differences. Significance testing indicated that voters with listed phone numbers were more likely to be Republican (32%) and male (47%), whereas voters without listed phone numbers were less likely to be registered Other (28%) and female (53%). These differences therefore could potentially skew the final results among Republican and male voters while having fewer female voters and Other political party registrants.

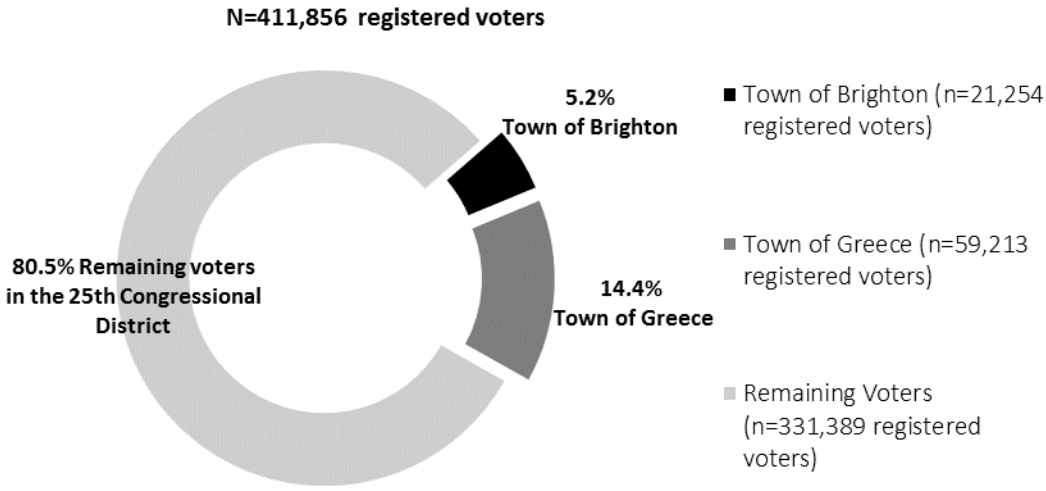
Table 3: Comparative Demographics for Voters with Listed Phone Number vs. Voters Without Listed Phone Numbers

Significance testing, at 95% confidence, showed that voters with listed phone numbers were significantly more likely to be registered Republican and male. Meanwhile, voters without listed phone numbers were more likely to be registered Other and female. Cells with statistically significant differences are highlighted in the table below.

Demographic Data	*No Listed Phone No. n=421*	*Listed Phone No. n=762*
Registered Democrat	37%	40%
Registered Republican	25%	**32%**
Registered Other	**38%**	28%
Average Age	42	49
Male	41%	**47%**
Female	**59%**	53%

One modification to the RBS method, in this experiment, was limiting the sample to registered voters who lived in one of two townships in the 25th Congressional District: the Town of Brighton and the Town of Greece. The registered voting population in the Town of Brighton was nearly a third the size of the Town of Greece with 21,254 registered voters and a voting population that was traditionally more Democratic-leaning with a Democrat-to-Republican registration advantage of 45%-to-25%, respectively**.** The registered voting population in the Town of Greece, on the other hand, was much larger than Brighton with 59,213 registered voters and a voting population that was traditionally more Republican-leaning with a Republican-to-Democrat registration advantage of 36% to 32%, respectively. Together, the registered voting populations of Greece and Brighton constitute 19.5% of the total 25th District that consists of 411,856 registered voters, as summarized in Figure 1 below.

Figure 1: 2012 NY 25th Congressional District Registered Voters by Town



The reason for surveying voters from these two particular townships was to account for the Democratic registration advantage within the NY 25th Congressional District overall. In the NY 25th Congressional District, the proportion of registered Democrats (40%) significantly outnumbered registered Republicans (29%).[3] A random sample from the district-at-large was therefore be expected to yield a disproportionate number of Democratic voters who would likely favor Louise Slaughter based on a shared party identification (please refer to the literature review discussion in Section II). Within the congressional district, however, were the Townships of Brighton and Greece that each had registration advantages for Democrats and Republicans. Drawing a random sample of voters from these two particular towns was completed in an effort to reduce the risk that the sample would be predisposed to increase support for either candidate based on a pre-existing group identity. As Table 4 shows, the final experimental sample (after the second telephone survey) resulted in nearly equivalent proportions of registered Democrats (46%) and Republicans (42%). This final proportion appeared to be the result of sampling from these respective townships. Yet, while the sampling strategy appeared to reduce the risk of a registration advantage, it also limited the results from being generalized beyond the two townships and to the congressional district overall. A detailed discussion of party registration in the final sample is in the experimental results in Section VI.

[3] Significance testing was completed at a 95% significance level.

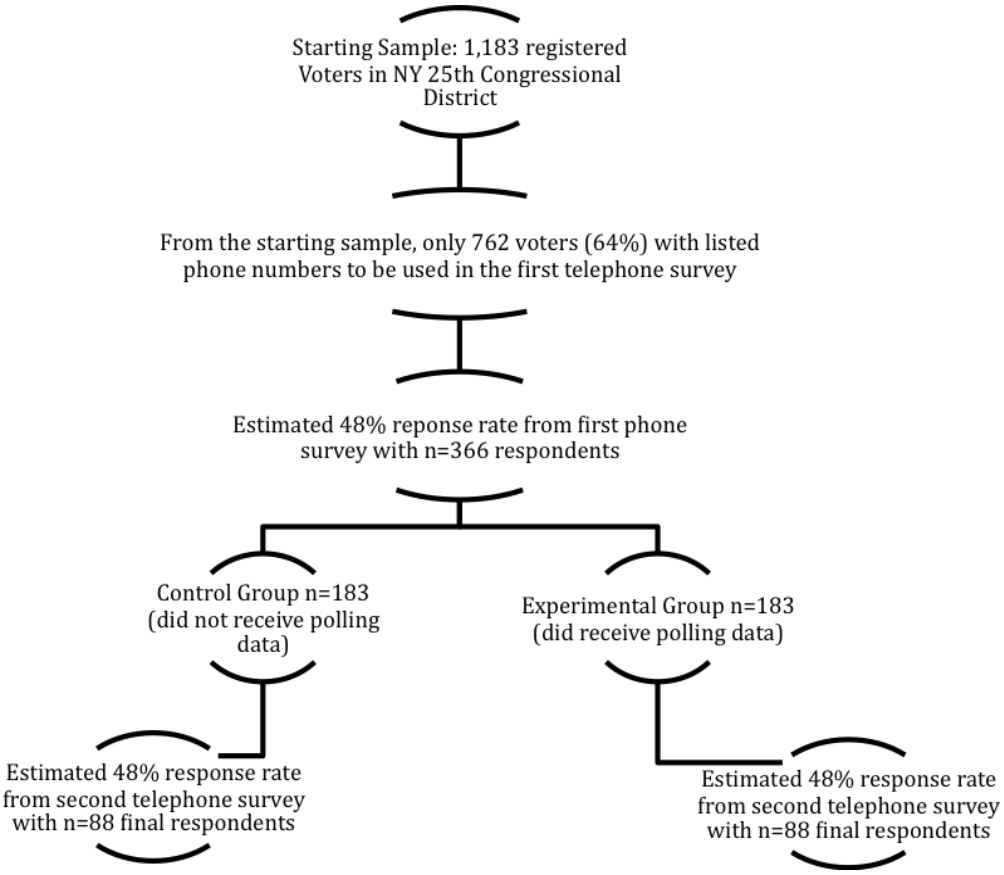
Table 4: Party Registration by Township and NY 25th Congressional District, Final Sample (n=101)

Significance testing, at 95% confidence, indicates the sample of voters from the Town of Brighton were significantly more likely to be registered Democrat whereas voters from the Town of Greece were significantly more likely to be registered Republican. While the final sample (n=101), overall, did not show a significant registration advantage between Democrats and Republicans, this appeared to be the result of sampling from these particular townships. Statistically significant differences are highlighted in the cells below.

	Number of Registered Voters	*% Registered Democrat*	*% Registered Republican*	*% Registered Other*
Final Sample- Town of Brighton	54	**57%**	31%	11%
Final Sample- Town of Greece	47	32%	**53%**	15%
Final Sample- TOTAL	101	46%	42%	13%
TOTAL 25th Congressional District	411,856	**40%**	29%	30%

After a starting sample (n=762) of registered voters with listed phone numbers was created, the numbers were reviewed to estimate whether they would be sufficient to yield a final sample that was large enough to include statistically significant results. This review process is summarized in Figure 2 and relied on an estimated survey response of 48% for each of the two telephone surveys. This estimated response rate (48%) was based on a study that tracked telephone response rates for the University of Michigan's Survey of Consumer Attitudes (SCA). The SCA was considered a reliable baseline because of the survey's consistent design and methodology that have been used since its inception in the late 1940's (Curtin, Presser, & Singer 2005). Assuming a telephone response rate of 48% for each phone survey, the starting sample of 762 voters was expected to result in 366 respondents after the first telephone survey. Splitting that number of respondents from the first survey (n=366) in half would, therefore, leave 183 voters in each the experimental and control groups. Finally, with the assumption of another 48% response rate for the second telephone survey, it was anticipated that the final sample would include 88 respondents in each of the experimental and control group- which was still more respondents than the required, minimum sample for the experiment (see Equation 1).

Figure 2: Experimental Method with Estimated Sample Size(s)



B. Variables

B.1 Dependent (Response) Variable: Change in Voter Support

The dependent variable (i.e. change in voter support) was measured as the difference in voter support between the first and second telephone surveys. The two primary survey questions used to measure the dependent variable asked respondents to rate their support for Louise Slaughter and Maggie Brooks on separate five point Likert scales with the following wording:

> [Question#1: Louise Slaughter Support] *On a scale from 1 to 5, with 1 being very unsupportive and 5 being very supportive, how do you rate your current level of support for Louise Slaughter in the general election this November?*

> [Question#2: Maggie Brooks Support] *On a scale from 1 to 5, with 1 being very unsupportive and 5 being very supportive, how do you rate your current level of support for Maggie Brooks in the general election this November?*

A third, binary question was also included in the first and second telephone survey to measure voter support as a discrete choice between both candidates:

> [Question#3: Slaughter v. Brooks Support] *If an election were held today, would you support Louise Slaughter, Maggie Brooks or are you undecided?*
> [Candidate names were rotated between questions to reduce order bias.]

As stated, the two scalar support questions were used as the primary measure(s) of change in voter support for the final analysis. The reason for this is that scalar questions, as opposed to the binary question, were more effective at capturing subtle changes in voter support for each candidate. Whereas the binary question forced each voter to make a discrete choice between candidates, the scalar questions allowed voters to rate their support for each candidate independently. The use of scalar questions also addressed a common concern within survey research, that offering respondents with too few response options may not provide enough differentiation for a reliable selection; instead, offering a greater number of response categories is thought to increase reliability (Krosnick & Fabrigar, 1997; Hillygus, 2005). Therefore, the use of five point Likert scales allowed voters to self-assess and rate more slight leanings in support for both Maggie Brooks and Louise Slaughter.

A second reason for relying on five point scales to measure change in voter support was that the responses were more easily incorporated into multinomial logistic regression models (Section VII). In this analysis, a change in voter support was calculated as the difference between the first and second telephone survey scalar results. Therefore, a positive value could clearly be viewed as an increase in support and a negative value as a decrease in support. While the scalar questions served as the primary measure for change in voter support, the binary question instead offered a secondary, comparative measure to determine whether subtle changes in support on each five point scale were commensurate with a discrete decision between the candidates.

B.2 Independent Variable: Exposure to Polling Data

The independent variable, or experimental manipulation, in this experiment was exposure to polling data. The two hundred (n=200) voters who completed the first telephone survey, were randomly assigned to either an experimental group (exposed to polling data) or a control group (not exposed to polling data).

The experimental group received polling data twice; first, as an anonymous mailing with polling data that showed Maggie Brooks leading Louise Slaughter in a poll by 59%-to-41%, as second as an anonymous robo-call to their home. In the final analysis, the independent variable was coded as a 0 or 1, with a 0 indicating that a voter was in the control group (not exposed to polling data) and a 1 indicating that a voter was in the experimental group (exposed to polling data). This independent variable, along with a number of control factors (Section B.3), was used to determine the overall impact on voter support for Maggie Brooks and Louise Slaughter and to establish whether a bandwagon effect occurred.

B.3 Control Variables

As discussed during the literature review in Section II, six control variables were identified and included in the experiment. The control variables were summarized on Table 2 and include *formal education*, *political knowledge*, *party registration*, *media usage*, *political discussion* and *political involvement*. With the exception of *party registration*, all control variables were measured during the first telephone survey. For a copy of the survey script, please refer to Appendix A.

C. Survey Delivery Design

Both telephone surveys followed a standard protocol that ensured every voter in the sample had an equal opportunity to participate in each survey. The following call plan was used to increase the opportunity for contact with voters in the sample in the event that phone lines were busy, voters refused or failed to complete the survey and/or there was no answer after multiple call attempts. Similar call plans have been used in academic research and the political polling industry (Sangster, 2003).

- Busy Signal: If a phone line was busy, the call sheet was marked accordingly and a second attempt was made within 30-45 minutes of that call. If the line was still busy after the second attempt, the call sheet was again marked accordingly and put aside for the following night. After the second evening, if the line was still busy, this call sheet was put aside for daytime follow-up calls (i.e. those who were unable to be contacted in the evening). This process was continued with up to and no more than five call attempts. After the fifth attempt, the call sheet was permanently removed from the call cycle.
- Refusal/Hang Up: If a voter refused to participate, the telephone interviewer asked if there was a better time to call back. If the participant continued to refuse or became especially aggressive, the call sheet was marked accordingly and permanently removed from the call/research cycle. If a voter hung up or terminated the call prematurely, the call sheet was marked accordingly and put aside for daytime follow-up calls (i.e. those who were unable to be contacted in the evening).

- No Answer: If there was no answer on a phone call, the call sheet was marked accordingly but the telephone interviewer did not leave a phone message. A second attempt was made at the end of the evening and, if still no answer, the call sheet was put aside for daytime follow-up calls (i.e. those who were unable to be contacted in the evening). This process was continued with up to and no more than five call attempts. After the fifth attempt, the call sheet was permanently removed from the call cycle.

While conducting both telephone surveys, only voters on the call list were asked to participate. Every call began by verifying the name of each voter to ensure every survey participant was on the list of registered voters. If an individual had moved, or for any reason was not associated with the phone number being called, the call sheet was marked accordingly and permanently removed from the call cycle. If a voter was unavailable or unwilling to take the call, an attempt was made to convert the respondent by scheduling a more convenient time to call back. Under no circumstances were telephone messages left for respondents who were otherwise unable to be contacted by phone. After each day of calling, all survey responses and other call data were recorded and saved in an Excel spreadsheet. Other call data included qualitative research notes that captured additional and unsolicited respondent comments that were given in addition to the normally expected survey responses. This method ensured that all call information, including survey responses and additional qualitative research notes, was immediately captured, thus increasing the precision and accuracy of the call data. A copy of both survey scripts can be found in Appendix A.

The first telephone survey had a much lower response rate than originally estimated, with only 26% (n=200) voters who completed the survey. The sample of respondents (n=200) was split into an experimental group (n=100) and a control group (n=100). The experimental group received polling data that showed the Republican candidate (Maggie Brooks) leading the Democratic candidate (Louise Slaughter) by a wide margin 59%-to-41%. This experimental manipulation began the day after the first telephone survey had ended. In the interest of saving time during the experimental manipulation, each voter in the experimental group received one anonymous mailing with the polling data and one anonymous robo-call that merely restated the same information from the mailing. In both instances, the same script (Appendix B) was printed in the mailing and read with the robo-call.

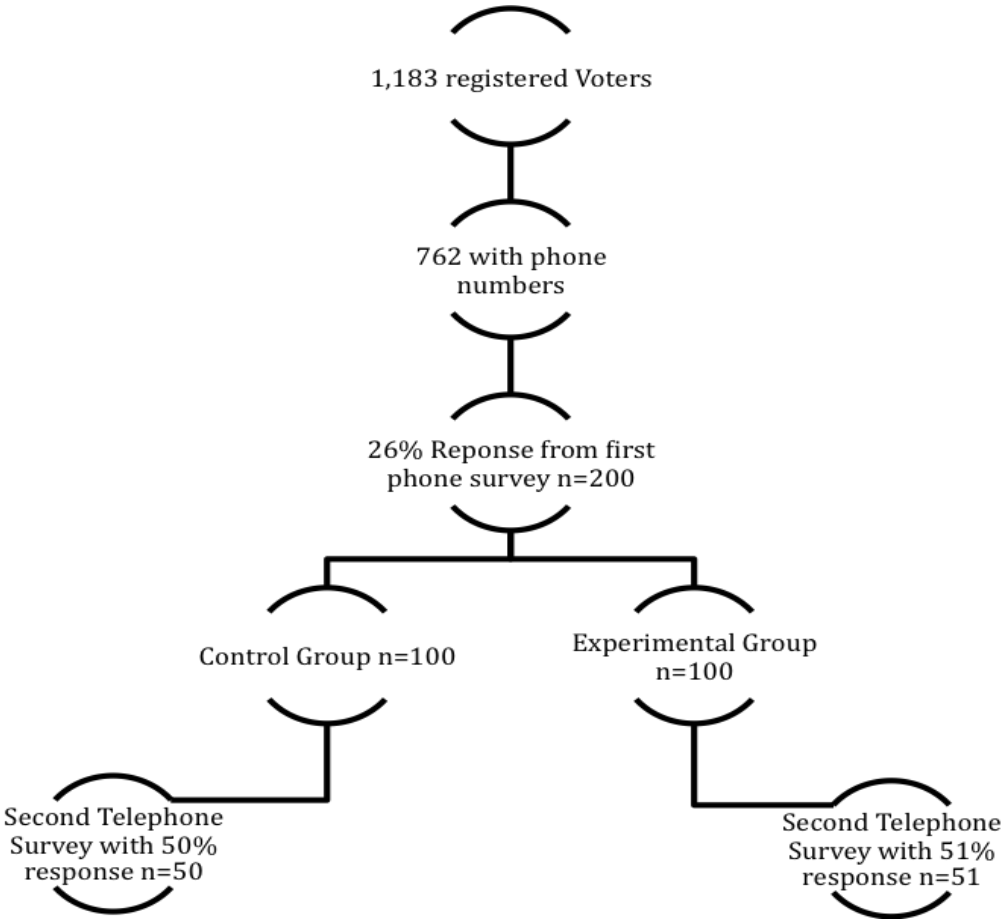
After the experimental group was exposed to the polling data, a second telephone survey was conducted among voters in both the experimental and control groups to establish a post-measurement of support. In order to capture the immediate effects of exposure to polling data, this second telephone survey began within 24 hours of the experimental group receiving both forms of the polling data. The second survey was terminated after 3 days of phone calls, when it was determined that voters in the experimental group were no longer able to accurately recall having received the polling data. The second telephone survey was completed with a final sample of 101 voters, split between 51 voters in the

experimental group and 50 voters in the control group. Not only were the actual survey response rates much lower than the initial estimate of 48% (see Figure 2), the final sample size was also lower than the minimum required of 68 voters in each group. Because the final sample sizes were smaller than the minimum required sample size (see Equation 1), the margin of error increased with the new confidence level decreased to 90% $\pm$ 10.7%. As discussed earlier, a low confidence level, with a large margin of error, yielded results that were less precise. This, in turn, means that any repeated trials of this same experiment will be less likely to yield consistent results.

The data from both telephone surveys were used to determine whether support for the Maggie Brooks increased among voters in the experimental group. Contrary to the original hypothesis, the experimental results (Section VI) and multinomial logistic regression analysis (Section VII) showed that voter support did not significantly increase for Maggie Brooks. These conclusions are discussed in more detail, starting with Section VI. Meanwhile, a summary of each stage in the experimental process can be found in Figure 3.

Figure 3: Experimental Method with Actual Sample Size(s)

***Note the final sample was below the estimated minimum size that caused the overall confidence level to decrease and margin of error to increase to 90% ± 10.7%**



V. Research Context

This field experiment was conducted in the context of New York's 25th Congressional District race between July-August, 2012. This particular race was the first congressional election since re-districting from the 2010 national census that resulted in an overlap of both candidates' existing districts within Monroe County, NY. The candidates running for office in the 25th Congressional District were the incumbent, U.S. Congresswoman Louise Slaughter and Monroe County Executive Maggie Brooks. At the time of this experiment, Rep. Louise Slaughter had served in Congress since 1987 and was a ranking member on the House Committee on Rules. Rep. Slaughter was considered to be well known and popular in her district, as evidenced by the fact that she was re-elected with at least 70% of the vote in the previous four general election cycles (Monroe County Board of Elections, 2012).

Rep. Slaughter's opponent, Monroe County Executive Maggie Brooks, was the first woman elected to serve as County Executive in Monroe County, NY, in 2004 with 65% of the vote. Like Rep. Slaughter, County Executive Brooks was also considered to be well known and popular in her district where she was re-elected in 2007 with 74% of the vote, the largest margin of victory ever won by an incumbent for County Executive (Maggie Brooks, 2012). In June 2012, the Maggie Brooks Campaign was named to the list of top House races by the National Republican Congressional Committee (NRCC); a point which helped to elevate Maggie Brooks' competitive standing against Rep. Louise Slaughter in the 2012 congressional election (Maggie Brooks, 2012). Traditionally, the NRCC has targeted congressional races based on the national Republican Party's perception of competitiveness. The fact that Brooks' race was listed by the NRCC meant that her campaign would receive additional funding and national attention, putting her campaign on a national level with Rep. Slaughter. Having comparable name recognition, an established majority support for both candidates within their respective offices and overlapping districts ensured that this race would be extremely competitive. Additionally, neither candidate appeared to have a clear advantage over the other prior to releasing polling data as part of this field experiment.

VI. Experimental Results

A. Final Sample Descriptive Statistics

The first telephone survey was completed by 200 respondents, with a 21% response rate that was much lower than the initially estimated 48% response rate (see Section IV). Following the experimental manipulation (i.e. exposure to opinion polling data), the second telephone survey was completed by 101 of the 200 respondents from the first telephone survey, with an attrition rate of 51%.

After the first and second telephone surveys, the sample of voters was significantly older, on average, when compared to all voters in the 25th Congressional District. As Table 5 shows, the average voting age continued to increase from the full 25th Congressional District (52 years) to the first telephone survey (62 years) and then the second telephone survey (65 years).

Table 5: Voter Age Comparison from Wave I to Wave II

Significance testing, at 95% confidence, indicated the sample of registered voters in this experiment was, on average, significantly older after the first telephone survey (average age = 63) and the second telephone survey (average age = 66) when compared to the average voter in the 25th Congressional District overall (average age = 52).

	Number of Voters	Mean Age	Median Age	Min. Age	Max. Age
First Telephone Survey	200	63	64	24	97
Second Telephone Survey	101	66	66	32	96
TOTAL 25th Congressional District	411,856	52	52	19	110

The statistically significant differences in average voting age imply that having older voters respond to each telephone survey was unlikely to occur due to chance. There are a few reasons to explain why younger voters were not retained in the first and, particularly, the second telephone survey. One reason is that younger voters are less accessible as a 'cell phone-only' demographic, being less likely to have a landline or, in this experiment, a listed phone number by which they could be contacted. Due to the fact this experiment relied on contacting a sample of voters who had telephone numbers that were either listed in the voter registration file or an online telephone directory, it is understandable why the younger demographic is underrepresented. In fact, after reviewing the voter registration file for all voters in the 25th Congressional District, nearly a quarter (23%) of those without a listed phone number in either of these sources were under the age of 29.

A second reason for the exclusion of younger voters is that both telephone surveys were conducted primarily during weeknights, a time during which many younger voters are typically unreachable because of working at part-time jobs. A third reason to explain the drop-off in younger respondents between the first and second telephone surveys is that participation was voluntary, without additional incentives or mechanisms by which attrition might have been increased. Although the final sample in this experiment was, on average, significantly older than the 25th Congressional District overall, there was no evidence in the existing literature that age alone is an important control factor when studying the effects of exposure to opinion polling data. Still, these and other bias-related concerns will be discussed in Section VIII.

Despite a response drop-off among younger respondents, the final sample did not show any significant differences in gender between the two telephone surveys and the 25th Congressional District overall (Table 6). However, statistically significant differences were found with party registration (Table 7). In both telephone surveys, voters were significantly more likely to be registered Republican and less likely to be registered as Other when compared to the 25th Congressional District overall. As discussed in Section IV, this difference was not surprising due to the deliberate sampling from the Towns of Brighton and Greece that each have significant registration advantages for Democrats and Republicans, respectively. Table 7 compares the party registration between each telephone survey and the entire congressional district, showing that, in this experiment, the final sample (n=101) was split nearly evenly between Democrats (46%) and Republicans (42%) with fewer voters registered with in some other political party (13%).

Table 6: Voter Gender Comparison from Wave I to Wave II

Significance testing, at 95% confidence, resulted in no statistically significant differences in gender between each telephone survey and the 25th Congressional District overall.

	Number of Voters	**%Female**	**%Male**
First Telephone Survey	200	54%	47%
Second Telephone Survey	101	51%	49%
TOTAL 25th Congressional District	411,856	55%	45%

Table 7: Voter Registration Comparison from Wave I to Wave II

Significance testing, at 95% confidence, indicated that voters, after both telephone surveys, were significantly more likely to be registered Republican and less likely to be registered in other political parties when compared to the 25th Congressional District overall. These cells, showing the statistical difference, are highlighted in the table below.

	Number of Voters	%Democrat	%Republican	%Other
First Telephone Survey	200	46%	37%	18%
Second Telephone Survey	101	46%	42%	13%
TOTAL 25th Congressional District	411,856	40%	29%	30%

B. Change in Voter Support Using 5-Point Scale Questions

The two scalar measures of voter support for each candidate became ordinal level variables, with separate scales to reflect the candidate and telephone survey that each corresponded to. Thus, a voter's support for Maggie Brooks and Louise Slaughter from the first telephone survey was coded *MS1* and *LS1*, respectively. Similarly, voter support for Maggie Brooks and Louise Slaughter from the second telephone survey was coded *MS2* and *LS2*, respectively. The difference between these scalar measures was therefore interpreted as an increase (more supportive) or decrease (less supportive) in support for each of the candidates. A summary definition of these variables is included in Table 8.

Table 8: Definition of Dependent Variables, Change in Voter Support

Voter support from the first telephone survey was subtracted from voter support in the second telephone survey. In the survey results, positive values reflected an increase in voter support and a negative values reflected a decrease in voter support.

Voter Support First Phone Survey	Voter Support First Phone Survey	∆ Support
Maggie Brooks Support Scale = *MS1*	Maggie Brooks Support Scale = *MS2*	*MS2-MS1 = MSChange* (Change in support)
Louise Slaughter Support Scale = *LS1*	Louise Slaughter Support Scale = *LS2*	*LS2-LS1 = LSChange* (Change in support)

The distributions for each change in voter support are summarized in Tables 9 and 10, respectively. The results show that, regardless of whether a voter was exposed to opinion polling data, they were most likely to exhibit no change in support for either candidate. In Table 9, voters were most likely to exhibit no change in support for Maggie Brooks regardless of whether they were in the experimental group (75%) or in the control group (68%). This difference between each group was not found to be statistically significant, meaning that there was no apparent relationship between group membership and change in support for Maggie Brooks. However, the results did show that voters in the experimental group who changed support for Maggie Brooks did so with a much wider range between [-4, +3] scalar points from the first to second telephone survey. Meanwhile, voters in the control group changed their support within a much smaller range of [-1, +2] scalar points between the first and second phone survey. Similar to the results for Maggie Brooks, voters were more likely to show no change in support for Louise Slaughter (Table 10) regardless of whether they received the polling data in the experimental group (71%) or did not receive the polling data in the control group (74%). Again, the difference between each group was not found to be statistically significant, meaning that there was no apparent relationship between group membership and change in support for Louise Slaughter.

Table 9: Change in Voter Support for Maggie Brooks

Significance testing, at 95% confidence, resulted in no statistically significant differences between voters in the experimental and control groups who changed support for Maggie Brooks.

Δ Support: Maggie Brooks	**Experimental Group (exposed to polling data)**		**Control Group (not exposed to polling data)**	
	Frequency	Percentage	Frequency	Percentage
-4	1	2%	0	-
-3	1	2%	0	-
-2	1	2%	0	-
-1	4	8%	11	22%
0	38	75%	34	68%
+1	5	10%	3	6%
+2	1	-	2	4%
+3	0	2%	0	-
+4	0	-	0	-
TOTAL:	51	100%	50	100%

Table 10: Change in Voter Support for Louise Slaughter

Significance testing, at 95% confidence, resulted in no statistically significant differences between voters in the experimental and control groups who changed support for Louise Slaughter.

Δ Support: Louise Slaughter	**Experimental Group (exposed to polling data)**		**Control Group (not exposed to polling data)**	
	Frequency	Percentage	Frequency	Percentage
-4	0	-	0	-
-3	0	-	0	-
-2	1	2%	1	2%
-1	7	14%	8	16%
0	36	71%	37	74%
+1	5	10%	3	6%
+2	0	-	0	-
+3	2	4%	1	2%
+4	0	-	0	-
TOTAL:	51	100%	50	100%

The results summarized in Tables 9 and 10 did not offer sufficient evidence of a bandwagon effect when comparing changes in voter support between the experimental and control groups. This conclusion became even more apparent when average voter support and change in support were compared between voters in the experimental and control groups in Table 11. The results showed average support for both candidates centered close to 3, the midpoint on each five point support scale, among voters in the experimental and control groups. Again, these results exhibited a lack of evidence for the bandwagon effect among voters in the experimental group who, after receiving the opinion polling data, showed an average *decrease* in support for Maggie Brooks with a drop of -0.098 scalar points from the first phone survey (2.765) to the second phone survey (2.667). A paired sample t-test was used to determine whether the average changes in voter support (Table 11) was statistically significant. Here, the paired sample t-test yielded p-values that were not statistically significant, meaning that average changes in support between voters in the experimental and control groups were not significantly different for either Maggie Brooks or Louise Slaughter. It should be noted that the extreme p-value of 1.000 in Table 11 indicated that, on average, voters in the experimental group did not change support for Louise Slaughter (average change=0.0) between the first phone survey (3.3) and the second phone survey (3.3).

Table 11: Average Voter Preference and Change in Preference for Maggie Brook and Louise Slaughter Between the First and Second Telephone Surveys (n=101)

Survey results did not show a bandwagon effect among voters, whose average support decreased for the frontrunner in the opinion poll (Brooks). A paired sample t-test conducted with 95% confidence also showed that changes in support were not statistically significant for either the experimental or control groups. Values in parenthesis () indicate standard error.

Voter Support	*Control Group n=50*	*t-test for two paired samples (Control Group)*	*Experimental Group n=51*	*t-test for two paired samples (Experimental Group)*
Voter Support for Maggie Brooks, First phone survey	3.080 (0.234)		2.765 (0.225)	
Voter Support for Maggie Brooks, Second phone survey	3.000 (0.234)		2.667 (0.230)	
Δ *Support: Maggie Brooks*	-0.080 (0.094)	p= 0.3992	-0.098 (0.135)	p= 0.4713
Voter Support for Louise Slaughter, First phone survey	3.060 (0.238)		3.314 (0.232)	
Voter Support for Louise Slaughter, Second phone survey	2.980 (0.245)		3.314 (0.225)	
Δ *Support: Louise Slaughter*	-0.080 (0.098)	p= 0.4197	0.000 (0.097)	p= 1.000

The observations in Table 11 were also summarized using a simple linear regression equation. This equation (below) may make the changes in voter support for Maggie Brooks and Louise Slaughter a bit clearer because any change in support is viewed linearly, with an addition or subtraction to the average voter support when factoring in exposure to polling data. The simple linear regression equation used the following format:

$$\hat{y} = \beta_0 + \beta_1 * Z_1$$

In the linear equation, $\hat{y}$ represents the average predicted change in support for the candidate, β_0 is the intercept, β_1 is the slope or average change in preference and Z_1 is either a 1, signifying the experimental group (i.e. exposure to polling data) or a 0, signifying the control group (i.e. no exposure to polling data). In this model, the slope will only be considered when an individual voter was exposed to the opinion polling data. Since a lack of exposure to polling data is a value of 0, this can therefore be considered a baseline measure for *MSChange*. The simple linear regression models for *MSChange* and *LSChange* are below:

$$\hat{y}_{\Delta Support\ (Brooks)} = -0.08 - 0.018 * Exposure\ (Polling\ \ Data)$$

$$\hat{y}_{\Delta Support\ (Slaughter)} = -0.08 + 0.08 * Exposure\ (Polling\ \ Data)$$

One of the first things that stood out when this information was viewed linearly was the equivalent intercept in both equations, showing an average decrease in support of -0.08 scalar points for Maggie Brooks and Louise Slaughter. Because this was the average change without exposure to polling data, it implied that the voters in this sample were prone to decrease their average support for both candidates without any additional information. This average change in support, without exposure to poling data, is the baseline expected change in voter support for both Maggie Brooks and Louise Slaughter without any experimental manipulation.

When voters were exposed to opinion polling data, the slope was factored in to the above equations. The linear equation for Maggie Brooks reiterated earlier conclusions that, when exposed to polling data, average support for Brooks decreased by an additional -0.018 scalar points from the first to the second telephone survey. When these values are combined, the results show that when voters were exposed to opinion polling data the net effect was equal to: y = -0.08-0.018 = -0.098 scalar points- the same value displayed in Table 11. Similarly, the Louise Slaughter equation showed that when voters were exposed to opinion polling data the net effect was equal to y = -0.08 + 0.08 = 0 change in scalar points that resulted in no net change in support- that is also the same result displayed in Table 11. Again, the relationship between exposure to opinion polling data and voter support for this sample data did not offer evidence of a bandwagon effect. The results were also not statistically significant for either the control or experimental group, meaning that a lack of evidence for the bandwagon effect was merely due to chance rather than an actual lack of relationship. In order to establish a relationship, either a larger sample size or larger changes in voter support would be needed to result in statistically significant evidence.

C. Change in Voter Support Using a Binary Question

In addition to Likert scales, voter support was also measured as a binary survey question that asked voters which candidate they intended to support in the upcoming election. Just as the scalar measures did not offer evidence of a bandwagon effect, the supporting binary question also did not yield evidence of a bandwagon effect. Instead, the results from this question showed voter support increase for the underdog (Slaughter), among voters in the experimental group, and remain the same for the frontrunner (Brooks).

Table 12: Binary Support Measurement

Survey results for the binary support question also did not show evidence of a bandwagon effect. Instead, the binary question results showed support increase for the underdog, among voters in the experimental group. Meanwhile, support for the frontrunner in the poll did not change among voters in the experimental group.

Survey	*Candidate*	*Experimental Group n=51 (exposed to polling data)*		*Control Group n=50 (not exposed to polling data)*	
		Frequency	*Percentage*	*Frequency*	*Percentage*
First Phone Survey (Pre-measurement)	*Maggie Brooks*	16	31%	21	42%
	Louise Slaughter	27	53%	19	38%
	Undecided	7	14%	8	16%
	TOTAL:	50	98%	48	96%
Second Phone Survey (Pre-measurement)	*Maggie Brooks*	16	31%	22	44%
	Louise Slaughter	30	59%	20	40%
	Undecided	5	10%	8	16%
	TOTAL:	51	100%	50	98%

The results of this binary question, used to measure voter support, are summarized in Table 12. Here, voter support for each candidate was split between the experimental and control groups; while voters in the experimental group were more likely to say they would vote for Louise Slaughter in the first survey (53%) and second survey (59%). Meanwhile, voters in the control group were more likely to say they would vote for Maggie Brooks in the first survey (42%) and second survey (44%). It is worth mentioning that these results differ from the scalar results in Table 11, showing voters in the experimental and control groups both centered around a neutral, midpoint on a scale from 1-to-5.

Upon review, the binary question results did not provide enough data for any statistically meaningful analysis of change in voter support between the experimental and control groups. Table 13 compares the proportion of voters who changed support for either Maggie Brooks or Louise Slaughter, based on question type. When comparing the results by question type, more than a quarter of the voters in the experimental group changed support for Maggie Brooks (25.5%) and/or Louise Slaughter (29.4%) using the scalar questions but very few changed support for Louise Slaughter (5.9%) and none changed their support for Maggie Brooks (0.0%) using the binary question. These binary results reinforce the literature review discussion in Section II, with evidence that a five point scale is effective at capturing more subtle changes in voter support while eliciting a greater number of data points as opposed to a binary scale. With a lack of evidence for the bandwagon effect, the binary results did support the conclusions drawn using scalar measures for voter support and yet, without a sufficient number of data points, these results were

not considered in the analysis beyond this section and not included in the final multinomial logistic regression (Section VII).

Table 13: Comparing the Frequency of Change in Voter Support for Question Type

When comparing the results by question type, more than a quarter of voters changed support for each candidate when responding to the scalar questions. Conversely, very few voters changed support for either candidate when responding to the binary question.

Change in Voter Support	*Exposure to Polling Data*	*Likert Scale*		*Binary Measurement*	
		# Obs	*% Obs*	*# Obs*	*% Obs*
Δ Support: Maggie Brooks (dropping observations with no change)	Experimental Group (n=51)	13	25.5%	0	0.0%
	Control Group (n=50)	13	26.0%	1	2.0%
Δ Support: Louise Slaughter (dropping observations with no change)	Experimental Group (n=51)	15	29.4%	3	5.9%
	Control Group (n=50)	13	26.0%	1	2.0%

D. A Qualitative Assessment of Change in Voter Support

Although neither phone survey asked open-ended questions about voter support, a note-taking method was used to capture additional, meaningful comments that were made during the phone interviews. To qualify, meaningful comments were defined as clarification statements or additional information provided by survey respondents and were given in addition to the close-ended survey responses. These statements were recorded by hand, on call sheets and were later transcribed into Excel where they were reviewed for any common trends or themes. Due to the fact that these statements were made by will of the respondent, and without prompting from the interviewer, they are not statistically significant in and of themselves. Yet, these comments do offer additional evidence to help explain why both the scalar and binary support questions failed to reveal evidence of a bandwagon effect.

Upon reviewing these statements, one common trend was among voters in the experimental group who supported Slaughter in the first survey and also increased their support for Slaughter following the second survey. These statements are listed below and show reactions among a subset of voters that varied along political party lines:

[1.] Brighton, Republican Voter: *"I don't know if what I got in the mail was from Louise or Maggie, it's the darndest thing. All it says is that Maggie has 59% of the vote and I couldn't tell if that was meant to rally Louise people ore Maggie people."*

[2.] Brighton, Other-Registered Voter: *"I received some insert that said Maggie's approval rating is 59%. [snip] The mail didn't say who it was from, probably Maggie's campaign."*

[3.] Brighton, Democrat Voter: *"I got an odd letter in the mail and a robo-call where no one took credit but said that a majority supports Maggie. I threw out the mail and hung up on the call."*

[4.] Brighton, Democrat Voter: *"Some idiot sent me some shady-looking lit and the same idiot followed that up with a robo-call saying the same thing. I think it's just the Republicans trying to demoralize the Democrats, not that I would or wouldn't support someone just because of a poll."*

[5.] Brighton, Democrat Voter: *"I got a robo-call with polling data to make me think a certain way."*

[6.] Brighton, Republican Voter: *"I got one of those computer-generated calls but those I hang up on."*

These six statements were a reaction to the polling data that these voters received as part of the experimental group. The statements shared common expressions of concern or annoyance at having received this information; yet, they differ in terms of what each voter found to be the most upsetting factor(s) after having received the polling data. The first four voters (1-4) appeared frustrated by receiving the information and implied that there was something suspicious about the way in which the information was delivered to them; namely that there was no identifiable or thus, reliable source as to who or what organization had sent the information. Interestingly, these voters were concerned about whether the source was reliable but no one directly questioned the reliability of the actual polling numbers themselves. Meanwhile, the last two voters (5-6) seemed to reject the polling data because its purpose was suspicious ("… *to make me think a certain way.*") or because they disliked the medium used to deliver the information ("*I got one of those computer-generated calls but those I hang up on.*").

These statements were recorded from different voters and, notably, without regard to one particular political party affiliation. What was interesting, and presumably based on these statements, is that as these particular voters became upset they seemed more inclined to reject the polling data because they couldn't determine who sent the information and/or because they could not implicitly trust the source or the medium used to deliver this polling information. Still, despite the seemingly strong feelings of mistrust or anger in these statements, none of the voters listed above changed support for either Louise Slaughter or Maggie Brooks between the first and second telephone surveys. Perhaps these notes help to explain why

most voters in the experimental group did not exhibit any change in support for either candidate, using the scalar or binary survey questions, because they were suspicious of the source of the polling data itself.

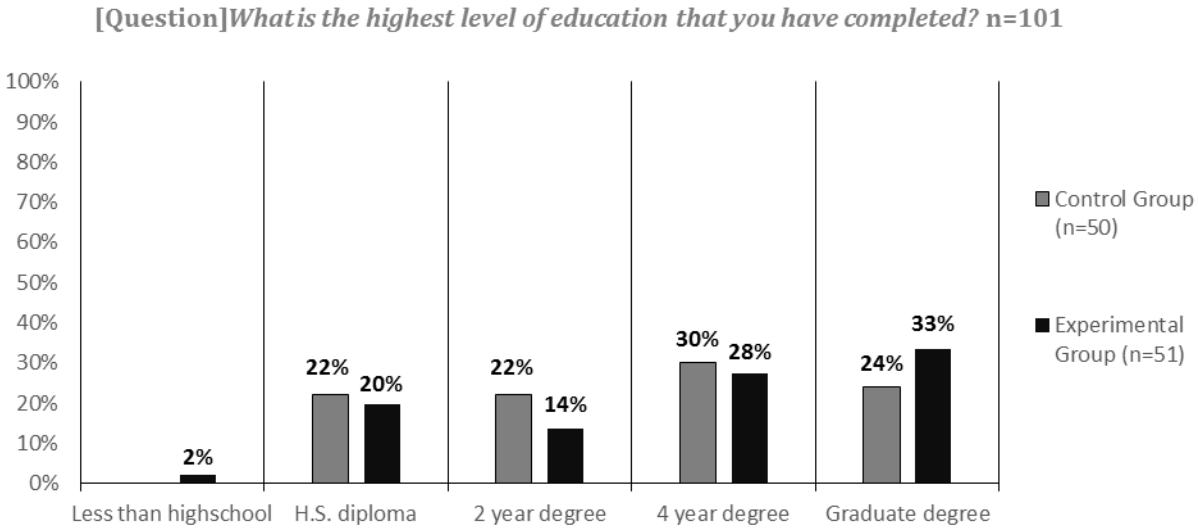
E. Control Variables

Based on the literature review, six control variables were identified as being necessary for inclusion in this experiment: *formal education*, *political knowledge*, *party registration* and political disturbance factors (*media usage*, *political discussion* and *political engagement*). Two of these control variables, *formal education* and *political disturbance*, were measured using scale-based questions in the first telephone survey. The third control variable, *party registration*, was recorded for each survey respondent using data available from the registered voter file. The final set of three control variables (political disturbance), was measured using scale-based questions in the first telephone survey that asked each respondent to rate his(er) amount of *media usage*, *political discussion*, and *political engagement*.

E.1 Formal Education

During the first telephone survey, each voter was asked to report the highest level of *formal education* that (s)he completed using a five point, fully anchored scale with choices that included: less than a high school degree; a high school degree; a 2-year degree; a 4-year degree; or a graduate degree. Figure 4 shows that the response distribution of *formal education* was similar for both the experimental and groups, with voters in the experimental group being only slightly more likely (33**%**) to report having a graduate degree than voters in the control group (24**%**). A significance test did not show this difference to be statistically significant. For the multinomial logistic regression analysis in Section VII, the responses for this variable were coded on an ordinal scale from 1-to-5, where 1 represented a response for those who obtained “less than a high school degree” and a 5 represented a response of “graduate degree”.

Figure 4: Formal Education v. Exposure to Polling Data



E.2 Political Knowledge

A second control variable in the experiment was a voter's level of *political knowledge*. This interval level variable was created using a series of four political fact-type survey questions that were asked of each respondent during the first telephone survey. The reason for using four survey questions to measure *political knowledge* was to assess the breadth of knowledge for every voter in the sample. Therefore, these four questions ranged from asking two typical, common knowledge questions (question #5 and #8) and two less-common questions (question #6 and #7). Each correct response was given one point, so that *political knowledge* was measured for each voter as the total number of correct responses out of four possible points, along a discrete interval from [0, 4]. During the multinomial logistic regression analysis, this variable was found to be statistically significant in the model for Maggie Books. In the model, it was discovered that as an individual voter's level of *political knowledge* increased, (s)he became less likely to demonstrate a bandwagon effect when exposed to opinion polling data. A summary of the four survey questions used to measure an individual's level of *political knowledge* follows in Table 14. The descriptive survey results did not display any significant differences between the respective levels of *political knowledge* between the experimental and control groups. However, there was a significant drop in correct responses for question #7 in both groups.

Table 14: Political Knowledge, Number of Correct Answers versus Exposure to Polling Data

Survey Question	*Response*	*Experimental Group (n=51)*		*Control Group (n=50)*	
		Frequency	*Percentage*	*Frequency*	*Percentage*
Q5: Which party is more conservative	Incorrect	4	8%	9	18%
	Correct	47	92%	41	82%
Q6: Majority in House	Incorrect	18	35%	16	32%
	Correct	33	65%	34	68%
Q7: Number of Reps. In House	Incorrect	28	55%	30	60%
	Correct	23	45%	20	40%
Q8: Which month vote in general election	Incorrect	7	14%	6	12%
	Correct	44	86%	44	88%

- **Survey Question# 5**: *Between Democrats and Republicans, which political party would you say is further to the right or in, other words, more conservative than the other?* (correct answer: Republican)

  Summary: Being a more common question, it was not surprising that a majority of voters in the control group (82%) and the experimental group (92%) answered this question correctly, with 87% of the total sample answering the question correctly.
- **Survey Question# 6:** *Which political party currently holds the majority in the United States House of Representatives?* (correct answer: Republican)

  Summary: As with question #5, a majority of voters in both the control group (68%) and the experimental group (65%) were able to answer this question correctly.
- **Survey Question# 7:** *How many representatives currently serve in the United States House of Representatives?* (correct answer: 435)

  Summary: This question was the most challenging for voters, with fewer in both the control group (40%) and the experimental group (45%) being able to answer this question correctly.
- **Survey Question# 8:** *In which month do you vote in the general election?* (correct answer: November)

  Summary: Similar to questions #5 and #6, a strong majority of voters in the control group (88%) and the experimental group (86%) were able to answer this question correctly.

E.3 Party Registration

Political party registration was also identified in the literature review as an important control factor in this experiment. As discussed previously (Table 7), the final sample after the second telephone survey (n=101) was split almost evenly between the two primary parties (Democrat v. Republican). While the final sample included significantly more Republican voters than the overall congressional district, this was attributed to the sampling strategy of the experiment. As a control variable, *party registration* will be explored further using a final multinomial regression analysis (Section VII) to explain the relationship between exposure to polling data and change in voter support.

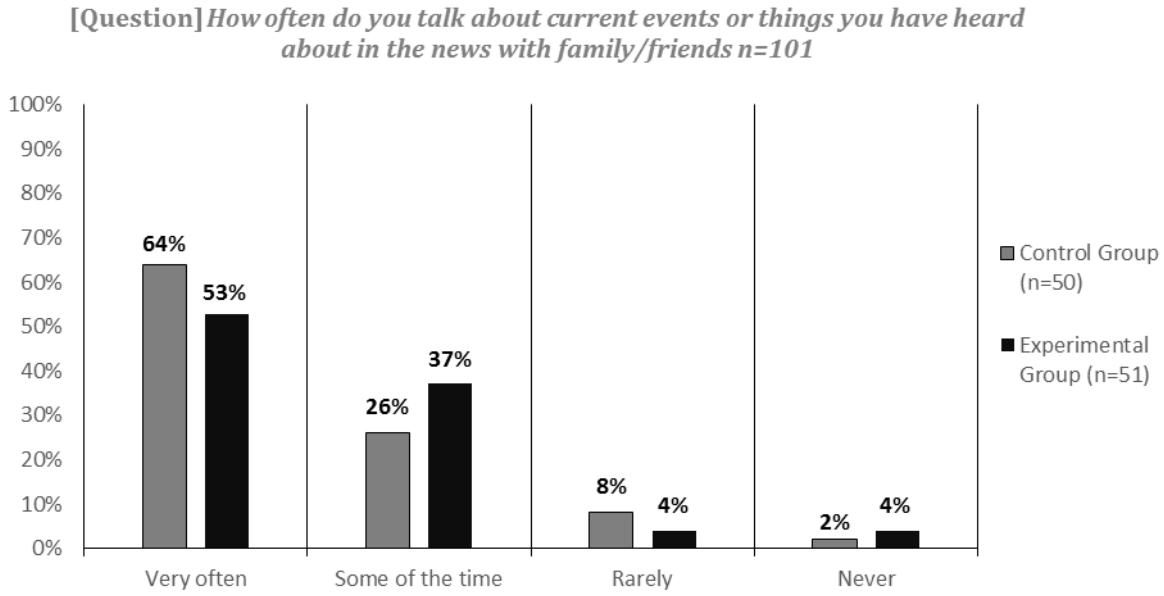
E.4 Political Disturbance

In the literature review, *political disturbance* was used as a catch-all term for factors that were necessary to control in the context of a live political campaign. These influences were expected to provide a lens through which polling data was received, interpreted and the extent to which voter support may have been impacted as a result. In this experiment, *political disturbance* was measured in the first telephone survey with three survey questions to assess each voter's level of *political discussion* with friends or family, each voter's amount of *media usage* (or how often an individual relied on various media sources for political information), and each voter's level of *political engagement* that measured whether an individual was engaged politically on a series of typical actions. The hypothesis was that more engaged voters, along all three scales, would be less likely to exhibit a bandwagon effect when they were exposed to polling data during the course of an election.

The first of these control factors, *political discussion*, was an ordinal level variable and measured during the first telephone survey on a four point scale:

> **Survey Question# 10:** How often do you talk about current events or things you have heard about in the news with your family or friends: very often, some of the time, rarely or never?

Figure 5: Political Discussion



The response distribution for *political discussion* among voters in the experimental and control groups is summarized in Figure 9. These responses showed that a majority of respondents were engaged in *political discussion*, with most voters being likely to say they talk about current events "very often" with family and friends in both the experimental group (59%) and the control group (64%). The second most common response was for voters who reported that they talk about current events "some of the time" with family or friends in both the experimental group (37%) and the control group (26%). As part of the multinomial logistic regression analysis, these responses were coded on an ordinal scale from [0, 4] so that the effect on voter support could be analyzed relative to the level of reported *political discussion*.

The next measure of *political disturbance* was *media usage*, defined as a continuous level variable and measured using question #11 from the first telephone survey on a seven point scale:

> **Survey Question# 11:** Over a period of the last 7 days, please estimate how many days you have [a] read a printed newspaper [b] watched news on t.v. [c] listened to news on the radio [d] read news on the internet [e] read a blog for news [f] read news on a social media website such as Facebook?

Table 15: Media Usage (n=101)

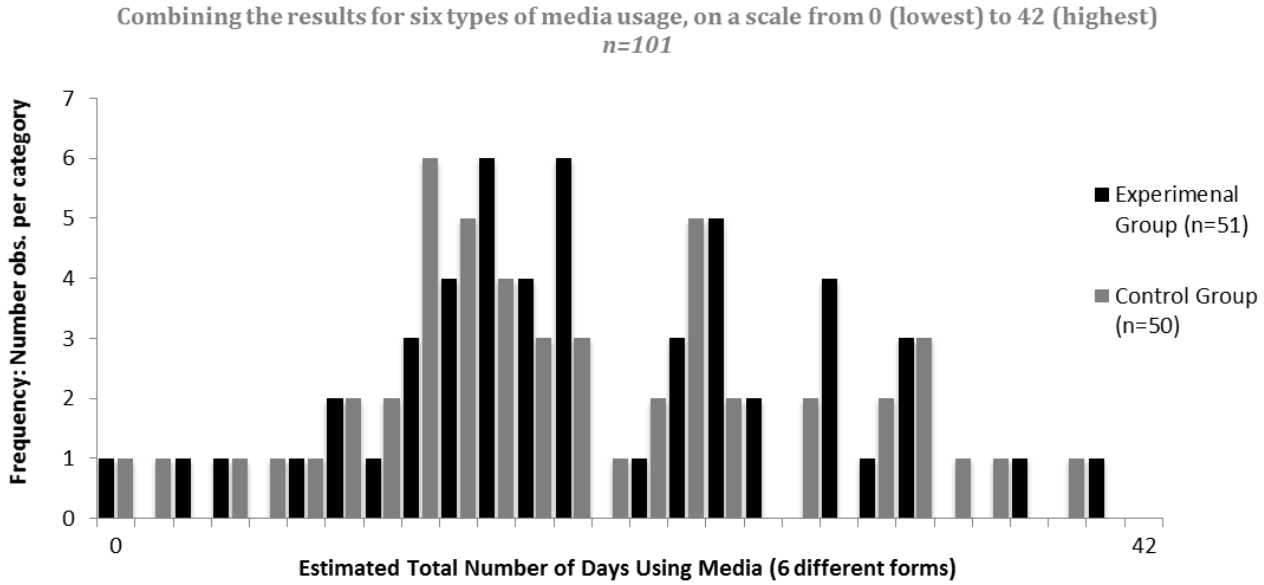
Over a period of the last 7 days, please estimate how many days you have done the following:

Media Source	*Experimental Group (n=51)* *Average No. Days*	*Control Group (n=50)* *Average No. Days*
[a] Read printed newspaper	4.6	4.2
[b] Watched News on Television	5.4	6.1
[c] Listened to News on Radio	2.9	3.2
[d] Read News Online	4.3	3.1
[e] Read News on Social Media/Facebook	0.5	0.7
[f] Read a Blog for News	1.0	0.7

According to Table 15, the most frequently used media sources for political information were the printed newspaper (averaging 4-5 days per week) and watching news on television (averaging 5-6 days per week). The least frequently used media sources were social media sites, such as Facebook, and blogs (each averaging 1 day or less per week). Rather than using six separate scales to measure each voter's level of *media usage* these scales were added together, creating one interval level variable called *media usage* on a continuous scale from (0, 42), where 0 was the lowest possible level of media usage and 42 was the highest possible level of media usage. Whereas the six individual scales were polarized between each media source, the response distribution for this new *media usage* scale approximated a normal distribution and therefore was more appropriate to use in the final multinomial logistic regression analysis. A summary of the *media usage* equation, along with the response distribution follows below:

> ***Media Usage*** *= [a] #days read a printed newspaper + [b] #days watched news on t.v. + [c] #days listened to news on the radio + [d] #days read news on the internet + [e] #days read a blog for news + [f] # days read news on a social media website such as Facebook*

Figure 6: Response Distribution for Media Usage by Group



The third measure of *political disturbance* was *political engagement*. Here, *political engagement* is presented as a nominal level variable and measured using question #12 from the first telephone survey. Similar to the scale used for *media usage*, question #12 asked each voter about his(er) political activity, using five different measures for political involvement:

> **Survey Question# 12:** The following list includes four typical actions that people take to express their personal views. For each option, please indicate yes if you have done it or no if you have not done this [a] contacted a newspaper or magazine [b] written or responded to a blog post on a political topic [c] called in to a radio or television talk show [d] taken part in a protest, march or demonstration [e] signed an e-mail or written petition.

Table 16: Political Engagement (n=101)

Please indicate yes/no if you have done the following:

Political Actions	*Experimental Group (n=51)*		*Control Group (n=50)*	
	Yes	*No*	*Yes*	*No*
Contacted a newspaper or magazine	15 (29%)	35 (69%)	17 (34%)	33 (66%)
Written/responded to a political blog post	7 (14%)	41 (80%)	3 (6%)	45 (90%)
Called in a radio or television talk show	9 (18%)	41 (80%)	10 (20%)	40 (80%)
Taken part in protest/march/demonstration	16 (31%)	34 (67%)	8 (16%)	41 (82%)
Signed e-mail or written petition	34 (67%)	16 (31%)	27 (54%)	21 (42%)

Table 16 summarizes the voter response to each political engagement activity, using a binary yes/no format for each measure of *political engagement*. In the table, cells that contain the most common responses are highlighted for each group. Using a standard set of political-type actions, respondents in the experimental group were most likely to say they were politically engaged by having signed an email or written petition (66.7%), taken part in a protest, march or demonstration (31.4%) or contacted a newspaper/ magazine regarding a political issue (29.4%). Respondents in the control group differed slightly and were most likely to be politically engaged by having signed an email or written petition (54.0%), called in to a radio or television talk show (20.0%) or contacted a newspaper/ magazine regarding a political issue (34.0%).

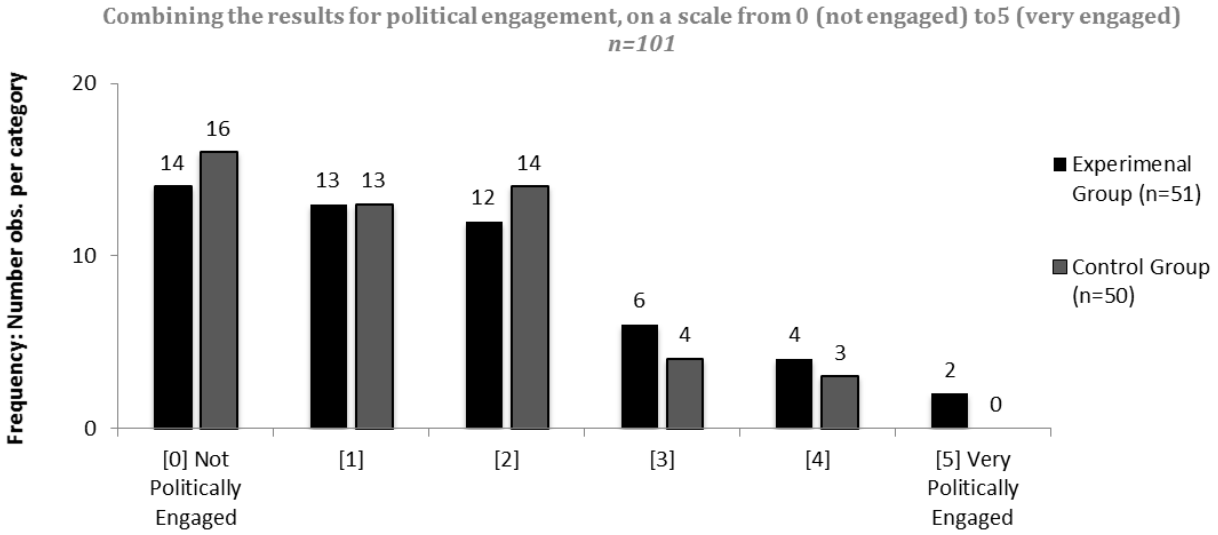
Similar to the process by which individual scales were combined to form one control variable for *media usage*, these five binary scales were combined to create one control variable for *political engagement* that was also used in Section VII to analyze the effect of exposure to opinion polling data on voter support. In order to combine these five scales, each set of responses was re-coded with a 1, indicating a response of "yes" or a 0, indicating any response that was not a "yes". The values for each of these scales were then added together using the following equation:

> ***Political Engagement*** *= [a] contacted a newspaper or magazine + [b] written or responded to a blog post on a political topic + [c] called in to a radio or television talk show + [d] taken part in a protest/ march/demonstration + [e] signed an e-mail or written petition*

This combined measure for *political engagement* was a discrete interval ranging from 0 (i.e. not politically engaged) to 5 (i.e. very politically engaged). Whereas the five, individual binary scales were polarized by the frequency of responses for each measure of engagement, the response distribution for

this new *political engagement* scale mimicked a continuous scale with most respondents in the experimental and control groups being not politically engaged and very few who were very politically engaged (Figure 7). The distribution for this new variable also lent itself more easily to the analysis using multinomial logistic regression in the following section.

Figure 7: Response Distribution for Political Engagement v. Exposure to Polling Data



VII. Multinomial Logistic Regression Analysis

Contrary to the initial hypothesis, the experimental results in Section VI did not offer evidence of a bandwagon effect among voters in the experimental group. Instead, the two simple linear regression equations showed voter support *decrease* overall for Maggie Brooks and remain unchanged overall for Louise Slaughter among voters in the experimental group. Other measures of voter support, including the additional qualitative notes and binary support question, also indicated that some voters in the experimental group were either skeptical of the polling data received and/or were not likely to increase support for Maggie Brooks after receiving the polling data. In Section VI, the binary question results (Table 12) showed that voters in the experimental group did not change support for Maggie Brooks between the first telephone survey (31%) and the second telephone survey (31%). Meanwhile, voters in the control group who increased support for Maggie Brooks by two percentage points between the first telephone survey (42%) and the second telephone survey (44%).

In this section, the survey results are explored further with a multivariate logistic regression analysis to better understand the effect(s) of exposure to polling data on voter support. The difference between the simple linear regression presented in Section VI and the multinomial logistic regression presented in this section is that the simple linear models assumed the dependent variable (i.e. change in voter support) was a continuous value whereas the multinomial logistic models assume this variable is a categorical outcome. In this section, the values for change in voter support were re-structured into three categories to describe change(s) in voter support from the first to the second telephone surveys. The three categories identify voter support that decreased for each candidate (category 1), voter support that remained the same for each candidate (category 2), or voter support that increased for each candidate (category 3). The reason for using a categorized response variable was that very few voters in the experimental or control groups exhibited a change in support for either candidate between the first and second telephone surveys. Figures 8 and 9 compare the distribution when voter support is viewed on an ordinal scale, from -4 scalar point changes to +4 scalar point changes. Both distributions show that a majority of voters in both groups exhibited no change in support for either candidate. Among those who did change support for Maggie Brooks (Figure 8), the range is smaller for voters in the control group falling between [-1, +2] scalar points when compared to the range among voters in the experimental group with a greater spread between [-4, +3] scalar points. Similarly, the distribution of change in support for Louise Slaughter (Figure 9) differs somewhat between the control group [-2, +3] and experimental group [-2, +2].

Figure 8: Change in Voter Support for Brooks between the First and Second Phone Surveys

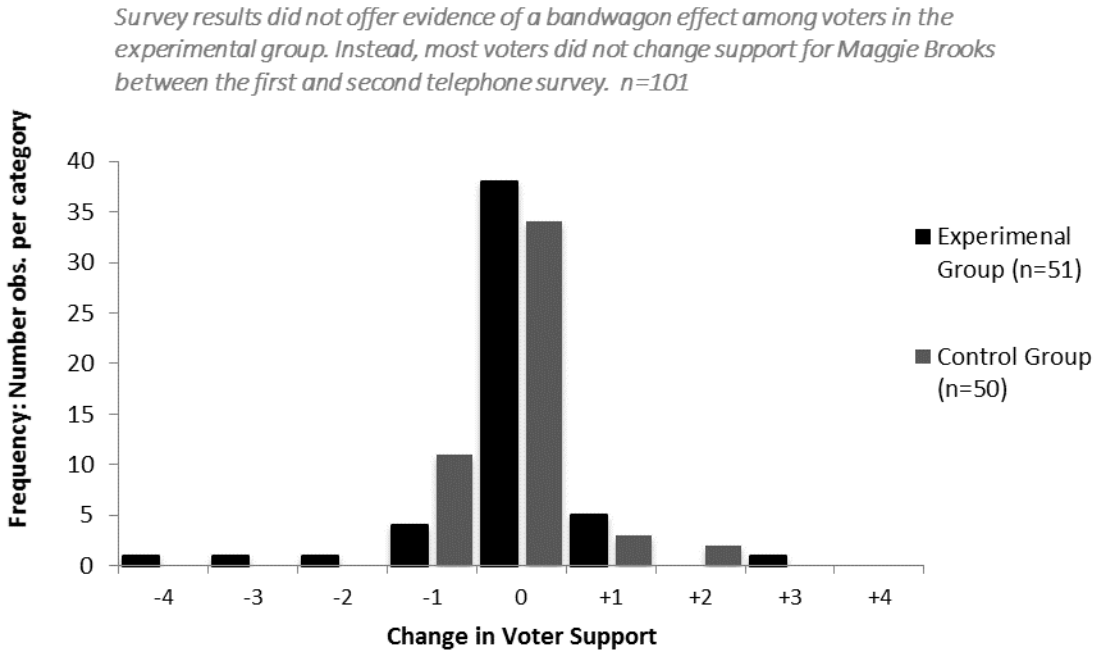
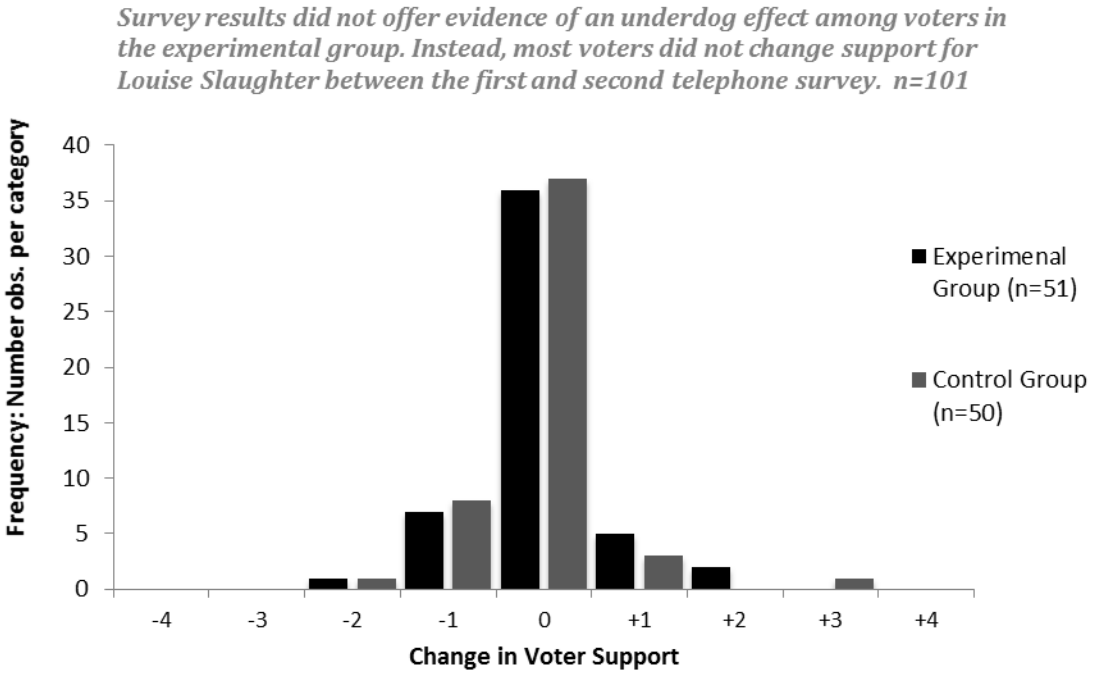


Figure 9: Change in Voter Support for Slaughter between the First and Second Phone Surveys



Rather than consider the change in voter support along an ordinal scale [-4, +4], the results were re-structured into three categories, in an attempt to better illustrate the frequency of voters who *did* exhibit a change in support. Figures 10 and 11 compare the distribution when change in voter support is viewed as three distinct categories including: a decrease in support, no change in support and an increase in support. These distributions are consistent with those in Figures 8 and 9, showing again that a majority of voters exhibited no change in support while fewer voters either decreased support (category 1) or increased support (category 3). The use of discrete categories for the dependent variable fits the first assumption of the multinomial logistic model as well as provides a more meaningful description of the change(s) in voter support, given that there are relatively few data points in the final sample (n = 101).

Figure 10: Change in Voter Support for Brooks between the First and Second Phone Surveys
(3 Categories)

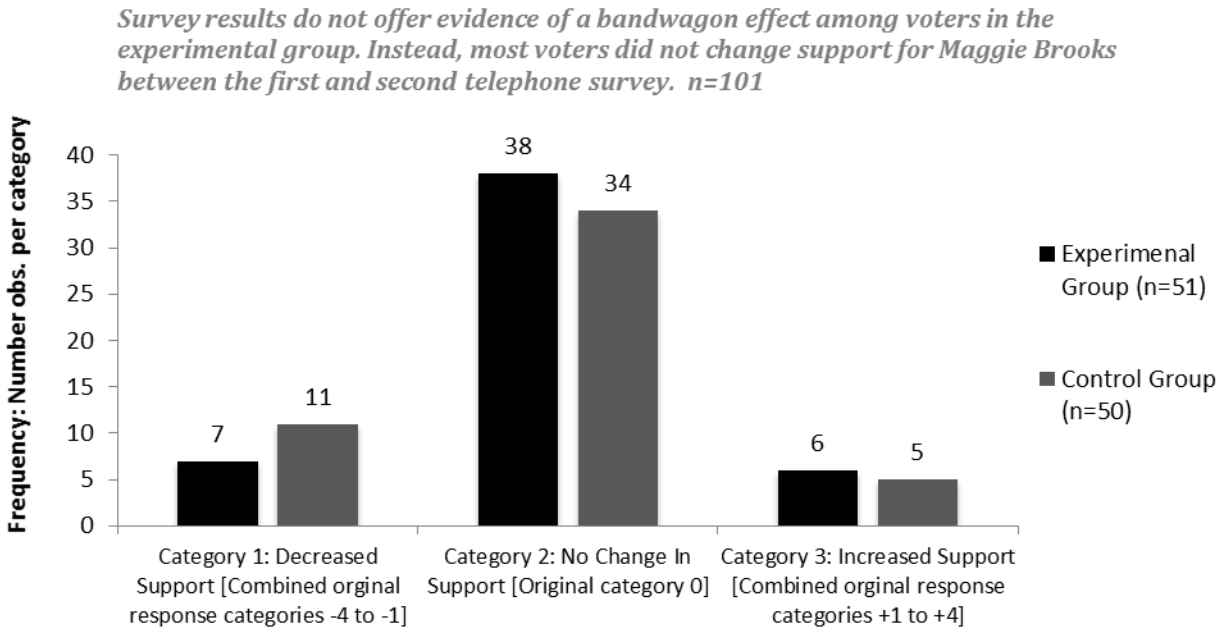
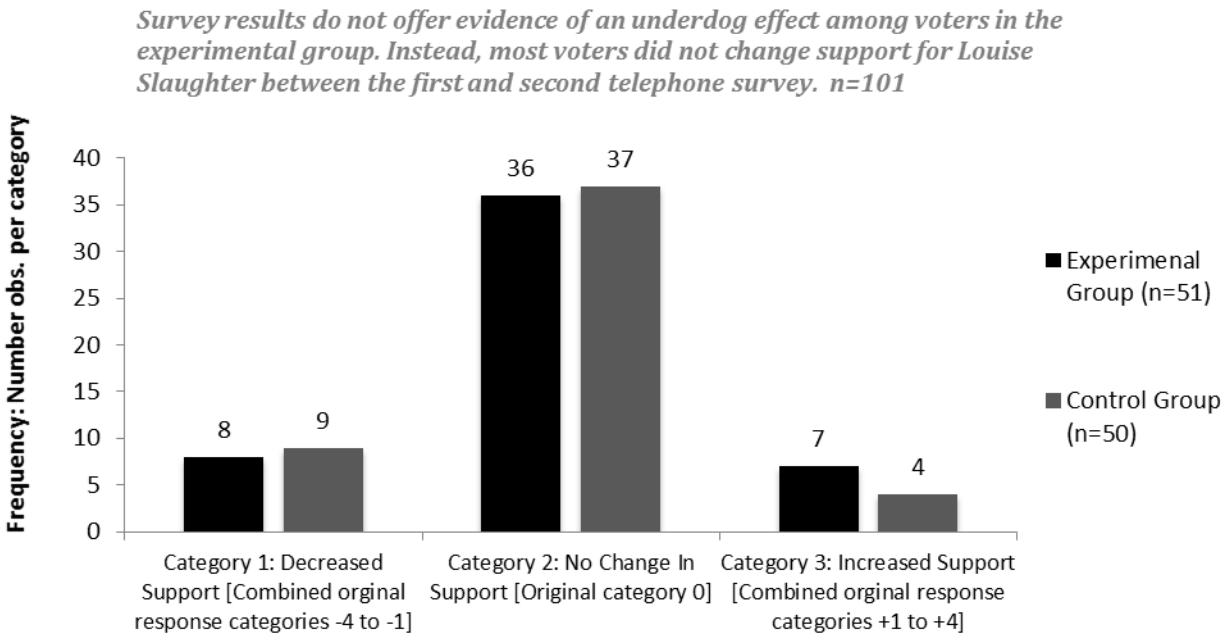


Figure 11: Change in Voter Support for Slaughter between the First and Second Phone Surveys (3 Categories)



Another reason for using the multinomial logistic models was to describe survey results using calculated relative risk ratio (RRR) values, which are used to ascertain the likelihood of voter support decreasing or increasing relative to a reference category that signifies no change in support. In both multinomial logistic models presented here, the reference category was 2, signifying no change in voter support for either Maggie Brooks or Louise Slaughter between the first and second telephone surveys. The two remaining categories, 1 and 3, signify that voter support did change either by decreasing (category 1) or increasing (category 3). Going forward, categories 1 and 3 are referred to as comparison groups with results that are interpreted relative to their relationship with the reference category (category 2). The RRR values in each model were interpreted as the risk that a respondent would fall in either comparison group relative to the risk of falling in the reference category, for each control variable. In these models, an RRR value greater than 1 indicated that falling in the comparison group was more likely than falling in the reference group, given a particular control variable. Conversely, an RRR value that was less than 1 indicated that falling in the comparison group was less likely than falling in the reference group, given a particular control variable. An interpretation of each model in this section includes RRR values in an effort to explain when voter support was most likely to decrease or increase for each of the congressional candidates. Related to the consideration of RRR values, another practical use of the multinomial logistic model was the calculation of probabilities that each of the three response categories had of occurring, when given particular voter characteristics. In this section, the predicted probabilities

are discussed in an attempt to find evidence of a bandwagon effect among voters in the experimental group.

Multinomial logistic regression, like other regression techniques, also makes assumptions about the data being analyzed. In this section, these assumptions were used to create diagnostic tests that determined whether each model was a good fit for a dataset. The first assumption of multinomial logistic regression, as discussed, is that the response variable is a set of nominal categories that do not have an inherent order. The second assumption is the independence of irrelevant alternatives (IIA), meaning each category in the dependent variable is independent so that membership in one category is not contingent on membership in any other category (Starkweather & Moske, 2011; Freese & Long, 2000). A third assumption of multinomial logistic regression is that independent variables in the model are able to differentiate between categorical outcomes, meaning that the dependent variable outcome is not perfectly separated by the independent variables but rather is dependent on their unique values (Starkweather & Moske, 2011; Freese & Long, 2000).

A. Multinomial Logistic Model: Change in Voter Support for Maggie Brooks

A multinomial logistic regression model for voter support of Maggie Brooks was created using Stata Version 10 statistical software. The model used a three categorical outcome for the dependent variable (i.e. change in voter support) with the final output summarized in Table 17.

Table 17: Multinomial Logistic Regression Model for Maggie Brooks

Significance testing did not yield evidence of a bandwagon effect among voters who were exposed to polling data. Instead, significant results were limited to registered Republicans who were less likely to decrease their support for Maggie Brooks and voters with more political knowledge who were less likely to increase their support for Maggie Brooks.

Values marked with a * are significant at a $p < 0.05$ level

Multinomial Logistic Model: Change in voter support for Maggie Brooks	*RRR*	*Std. Error*	*Significance p-value*
Category 1: Decrease Support			
Exposed to Polling Data	0.570	0.333	0.336
Formal Education	1.094	0.265	0.710
Political Knowledge	0.902	0.264	0.725
Registered Democrat	0.402	0.305	0.230
Registered Republican	0.164	0.136	0.029*
Political Engagement	0.870	0.229	0.597
Media Usage	0.979	0.051	0.676
Political Discussion	0.768	0.301	0.501
Category 3: Increase Support			
Exposed to Polling Data	1.610	1.280	0.548
Formal Education	0.864	0.274	0.646
Political Knowledge	0.288	0.143	0.012*
Registered Democrat	0.096	0.122	0.064
Registered Republican	0.210	0.239	0.169
Political Engagement	0.733	0.292	0.436
Media Usage	0.865	0.071	0.078
Political Discussion	1.654	0.914	0.362

The results in the final multinomial logistic regression model for Maggie Brooks (Table 17) were interpreted as two mini-models, comparing each response category (either a decrease or increase in support) to a reference category (no change in support). In the model for Maggie Brooks, only two variables- *registered Republican* and *political knowledge*- were statistically significant, meaning that the relationship between these variables and a change in voter support is unlikely to occur due to chance alone. The relationship between these variables and change in voter support was also not surprising, given the theory discussed in Section II. Using the RRR values, the relationship was interpreted as registered Republicans being less likely to decrease support for Brooks (RRR < 1) while voters with more political

knowledge are less likely to increase support for the Brooks (RRR < 1). Or, a more precise interpretation using the RRR values is that registered Republicans were 8 times less likely to decrease support for Maggie Brooks while voters with more political knowledge were 4 times less likely to increase support for Maggie Brooks. The multinomial logistic regression results were consistent with the conclusions in Section VI by offering no evidence to support a bandwagon effect. Whereas the RRR value for *exposure to polling data* was greater than, indicating that voters who were exposed to polling data are more likely to increase their support the candidate leading in the poll (Brooks), this result was not statistically significant meaning it is more likely due to chance rather than an actual relationship.

A.1 Diagnostic Tests for the Maggie Brooks Multinomial Logistic Model

Two diagnostic tests were performed on the model in Table 17 to determine whether the assumptions of a multinomial logistic model were satisfied. The first diagnostic test verified the independence of irrelevant alternatives (IIA) assumption, using the suest-based Hausman test available in Stata. This test confirmed that each outcome category for change in voter support was independent, meaning that membership in one category was not contingent on membership in any other category. The results for this diagnostic test are summarized in Table 18 with values that show the IIA assumption has not been violated for the Maggie Brooks model between categories 1 (decrease in support) and 3 (increase in voter support) with respect to the baseline category 2 (no change in voter support).

Table 18: Diagnostic Test with the IIA Assumption using suest-based Hausman test

Evidence supported H0: Odds v. Outcome are independent of other alternatives n=101

suest-based Hausman test *Category 2 (baseline) is omitted*	*chi2*	*df*	*p<chi2*	*Evidence*
Category 1: Decrease Support	3.832	9	0.922	for H0
Category 3: Increase Support	4.810	9	0.851	for H0

A second diagnostic test, known as the Wald test, was used to determine whether the effect(s) of multiple control variables in the model was equal to zero. These test results are summarized in Table 19 with values that indicate neither the independent nor control variables had a statistically significant effect on change in voter support for Maggie Brooks when tested at an α = .05 significance level – although *political knowledge* and *registered Republican* are close with p-values of 0.053 and 0.065, respectively. The Wald test results imply that one or more of the control variables may be redundant and that a more parsimonious (or reduced) model may better explain the changes in voter support for Maggie Brooks.

Table 19: Diagnostic Test with the effect of multiple control variables using the Wald test

Evidence supported H0: that all coefficients associated with given variables are zero n=101

Wald test	*chi2*	*df*	*p<chi2*	*Evidence*
Exposed to Polling Data	1.275	2	0.529	for H0
Formal Education	0.363	2	0.834	for H0
Political Knowledge	5.867	2	0.053	for H0
Registered Democrat	4.097	2	0.129	for H0
Registered Republican	5.459	2	0.065	for H0
Political Engagement	0.896	2	0.639	for H0
Media Usage	2.366	2	0.306	for H0
Political Discussion	2.082	2	0.353	for H0

In an attempt to create a more parsimonious model, redundant variables were identified and dropped from the model in Table 17 using a method of backward variable selection. The method of backward variable selection began with the full regression model and dropped the least significant control variables (using individual p-values as the criteria) one at a time until only statistically significant variables remain in the final model. However, after applying the method of backward variable selection, the final multinomial logistic model for Maggie Brooks was left with only one control variable (*media usage*) that was found to be statistically significant with an individual p-value = 0.031. This reduced model was more parsimonious but did not include a number of control variables that were an intrinsic part of this experiment, namely the binary variable for exposure to polling data which indicated whether a voter was in the experimental or control groups. Further, this reduced model failed to include the two significant variables found in the full model: *registered Republican* and *political knowledge*. While it may be possible to use the reduced multinomial logistic model to explain change in voter support for Maggie Brooks relative to *media usage*, the results could not be used to infer anything about exposure to opinion polling data and did nothing to improve the overall value of the model in Table 17. Therefore, it was decided to continue using the full multinomial logistic model for Maggie Brooks even though the final results were not as statistically significant as with a reduced model.

A.2 Predicted Probabilities for Change in Voter Support for Maggie Brooks

The multinomial logistic regression results in Table 17 showed only two significant predictors of change in voter support for Maggie Brooks that were: *registered Republican* and *political knowledge*. Despite have two significant control variables, these results did not offer evidence of a bandwagon effect based on exposure to polling data alone. As the primary hypothesis of this experiment stated, a bandwagon effect was expected to occur when voters were exposed to polling data along with a number of other control factors:

> **Primary Hypothesis [H1]:** Voter support for Maggie Brooks will increase after voters read the polling data. Those voters who become more supportive of Maggie Brooks will also report having low levels of formal education, have low levels of demonstrated political knowledge, are registered Republican and report low levels of political disturbance (i.e. media usage, political discussion and political involvement).

In an attempt to find any evidence of a bandwagon effect in the results relative to Maggie Brooks, the primary hypothesis was further tested using predicted probabilities for each of the outcome categories. In a multinomial logistic regression analysis, the predicted probabilities for any model fall in the range from 0 (not at all likely) to 1 (very likely) and are calculated for all categories of the response variable. The predicted probabilities for the Maggie Brooks model are summarized in Table 20 with results that are consistent with prior conclusions- that voters were most likely not to change support for Maggie Brooks between the first and second telephone surveys, with one notable exception.

The first two columns in Table 20 compare the predicted probabilities of a bandwagon effect among voters who were exposed to polling data with voters who were not exposed to polling data. The probabilities in these first two columns were generated by changing the value of the control variable, *exposure to polling data*, from 0 (not exposed to polling data) to 1 (exposed to polling data) while the values for all remaining control variables remained constant, at their mean values. Contrary to the hypothesis of this experiment, these first two columns indicated that exposure to polling data on its own did not increase the likelihood that voters will increase support for the candidate leading in that poll. Instead, the predicted probabilities remained highest that there will be no change in support for Maggie Brooks among voters who were either exposed to the polling data (Pr = 0.8206) or not exposed to the polling data (Pr = 0.7573).

The third column in Table 20 extended the analysis to more extreme circumstances, as defined by the primary hypothesis [H1]. This concept of more extreme circumstances refers to voters were expected to become more likely to increase support for Maggie Brooks when exposed to polling data in conjunction

with other predisposing characteristics. The probabilities in the third column (X: Hypothesis 1) were calculated using the lowest possible values for each predisposing control variable, including: low levels of formal education, low levels of political knowledge, registered Republican and low reported levels of political disturbance (for more detail on these values, refer to the descriptive results in Section VI). For the third column, values for each control variable were set to: *formal education* = 1; *political knowledge* = 1; *media usage* = 7; *political engagement* = 0 and *political discussion* = 0. The categorical variables, *exposure to polling data* and *party registration*, were set to values indicating that a voter was exposed to polling data, registered Republican and not registered Democrat so that: *exposure to polling data* = 1, *registered Democrat* = 0 and *registered Republican* = 1. While no actual voters in the sample fit these extreme criteria, the predicted probabilities were estimated using the model overall. At last, when given more extreme circumstances, evidence of a bandwagon effect did appear where voter support was most likely (Pr = 0.5982) to increase for Maggie Brooks. In fact, this was the only column in Table 20 for which the predicted probability for *any* change in voter support for Maggie Brooks exceeded the probability that a voter would exhibit no change in support between the first and second telephone surveys (Pr = 0.3429).

Table 20: Predicted Probabilities for Change in Voter Support for Maggie Brooks

Predicted Probabilities	*X: Received polling data*	*X: Did not receive polling data*	*X: Hypothesis 1*	*X: Alternative to Hypothesis 1*
	1	2	3	4
Pr (decrease support | X):	0.1338	0.2165	0.0589	0.0978
Pr (increase support | X):	0.0457	0.0262	0.5982	0.0021
Pr (no change in support | X):	0.8206	0.7573	0.3429	0.9001

While the predicted probabilities in Table 20 offered some evidence of a bandwagon effect using more extreme values for each of the control variables, it was decided to test the results further to determine whether voter support was more likely to decrease for Maggie Brooks under opposite circumstances. In other words, would voters become more likely to decrease support for Maggie Brooks if they were exposed to polling data and registered Democrat with high reported levels of formal education, political knowledge and political disturbance? This question was used to define an alternative to the primary hypothesis [H1.a] as stated below:

> **Alternative to the Primary Hypothesis [H1.a]:** Voter support for Maggie Brooks will decrease after voters in the experimental group receive polling data, report having high levels of formal education, have high levels of demonstrated political knowledge, are registered Democrat and report high levels of political disturbance (i.e. media usage, political discussion and political involvement). These voters are expected to reject the polling data based on partisan support for Louise Slaughter and, having access to more information, are expected to reject the polling data that conflicts with their already-formed opinion.

Using a method similar to the approach in column 3, the predicted probabilities for this alternative to the primary hypothesis were generated using appropriate values for each of the control variables to reflect more extreme pre-disposition characteristics thought to decrease support for Maggie Brooks. These probabilities are reported in the fourth column (X: Alternative to Hypothesis 1) and were calculated using the highest possible values for each predisposing control variable, including: high levels of formal education, high levels of political knowledge, registered Democrat and high reported levels of political disturbance (for more detail on these values, refer to the descriptive results in Section VI). For the fourth column, values for each control variable were set to: *formal education* = 5; *political knowledge* = 4; *media usage* = 42; *political engagement* = 5 and *political discussion* = 4. The categorical variables, *exposure to polling data* and *party registration*, were set to values indicating that a voter was exposed to polling data, registered Democrat and not registered Republican so that: *exposure to polling data* = 1, *registered Democrat* = 1 and *registered Republican* = 0. Once again, no actual voters in the sample fit these extreme criteria but the predicted probabilities were estimated using the model overall. Here, it is interesting to note that evidence of a bandwagon effect in column 3 [H1] did not result in an equal and opposite outcome among voters at the other extreme in column 4 [H1.a]. Rather than creating a scenario in which voters were likely to *decrease* support for Maggie Brooks after receiving polling data, the predicted probabilities in column 4 showed instead that voters were most likely to exhibit no change in support for Maggie Brooks (Pr = 0.9001) when compared to the likelihood that support would either increase (Pr = 0.0021) or decrease (Pr = 0.0978). These observations imply that changes in voter support occur independently of one another, and that conclusions about one subset of voters should not necessarily be used to presume anything about the effects among a different subset of voters. This conclusion in fact supports the IIA assumption that is central to the multinomial logistic model.

B. Multinomial Logistic Model for Louise Slaughter

Although this experiment was concerned with finding evidence of a bandwagon effect in the Maggie Brooks model, a multinomial logistic model was also created to review voter support for Louise Slaughter with results that are summarized in Table 21.

Table 21: Multinomial Logistic Regression Model for Louise Slaughter

In this model, significant results were limited to registered Republicans and registered Democrats who both appeared less likely to increase their support for Louise Slaughter. However, the extreme significance levels (p = 0.000) were more indicative of very few data points and less of an actual relationship between party registration and change in voter support.

Values marked with a ** are significant at a p < 0.001 level

Multinomial Logistic Model: Change in voter support for Louise Slaughter	*RRR*	*Std. Error*	*Significance p-value*
Category 1: Decrease Support			
Exposed to Polling Data	1.186	0.685	0.767
Formal Education	0.890	0.206	0.615
Political Knowledge	0.699	0.200	0.211
Registered Democrat	0.622	0.486	0.544
Registered Republican	0.278	0.226	0.115
Political Engagement	0.723	0.195	0.231
Media Usage	1.010	0.053	0.845
Political Discussion	1.530	0.707	0.358
Category 3: Increase Support			
Exposed to Polling Data	1.950	1.443	0.367
Formal Education	0.654	0.229	0.224
Political Knowledge	0.742	0.281	0.430
Registered Democrat	0.000	0.000	.000**
Registered Republican	0.000	0.000	.000**
Political Engagement	0.686	0.255	0.310
Media Usage	1.008	0.066	0.902
Political Discussion	0.847	0.382	0.713

Similar to the model for Maggie Brooks (table 17), only two variables were found to be significant in the model for Louise Slaughter. Table 21 shows the variables *registered Republican* and *registered Democrat* are highly significant with a p-value < 0.001, meaning that the relationship between these variables and a *change in voter support* for Louise Slaughter was unlikely to occur due to chance alone. The particular strength of the relationship, as signified by such low p-values, between these variables and *change in voter support* was somewhat surprising with registered voters in both political parties being less likely to increase support for Slaughter (RRR < 1). After exploring the data further, these results became less indicative of a strong relationship and instead pointed to a lack of sufficient data points that would be

needed to establish such a relationship. In order to understand the cause of such strong p-values, it is important to know that categorical variables (i.e. *party registration*) in multinomial logistic models are reported in reference to a base value. As discussed earlier, the variable *party registration* consisted of three categories for *registered Republican*, *registered Democrat* and *registered Other*. In the multinomial logistic model, *registered Other* was the reference value for *party registration*. Upon closer examination of the data, it was discovered that category 3 in Table 21 was the only instance in which the reference value for party registration was not present. This meant that voters who increased support for Louise Slaughter were either registered Democrats or Republicans but none were registered in the Other category. Therefore, the results imply with 100% certainty that being registered Republican or Democrat would make a voter less likely to increase support for Louise Slaughter because there was no baseline to compare each of these party registration categories to. Therefore, the relationship, while significant, implied less about an existing relationship between party registration and support for the candidate losing in the poll. Instead, it is the result of very few data points in the final sample to establish any relationship between exposure to polling data and voter support for the candidate losing in that poll.

Again, similar to the results for Maggie Brooks, there was no statistically significant evidence that voter support for Louise Slaughter would increase or decrease when exposed to polling data alone. While the RRR values for *exposure to polling data* were greater than 1 in both categories, indicating that voters who were exposed to polling data were more likely to increase and/or decrease their support the candidate trailing in the poll (Slaughter), this result was not statistically significant. This implied that these results were more likely to have occurred due to chance rather than an actual relationship between exposure to polling data and voter support for the candidate losing in the poll.

B.1 Diagnostic Tests for the Louise Slaughter Multinomial Logistic Model

The results from the suest-based Hausman test for the IIA assumption are summarized in the Table 22. Unlike the Maggie Brooks model, the results of the IIA test for this model show that the IIA assumption had been violated with the Louise Slaughter model. A violation of the IIA assumption implied that the response categories (i.e. change in voter support for Slaughter) were not independent of one another, making this a less effective model for analyzing voter support relative to Louise Slaughter. However, on the part of the researcher, there was a desire to attempt predicting the probabilities that candidate support may change (increase, decrease or remain the same) in relation to the identified control variables and in a manner that was consistent with the analysis for Maggie Brooks. Despite the IIA violation, this model for Louise Slaughter was retained merely to compare with the Brooks model. Due to a lack of statistical significance, however, the results presented here cannot be generalized nor used to conclude that a relationship exists between voter support and the variables in this model.

Table 22: Diagnostic Test with the IIA Assumption using suest-based Hausman test

Evidence supported H0: Odds v. Outcome are independent of other alternatives
For Category 3 but not Category 1

suest-based Hausman test *Category 2 (baseline) is omitted*	*chi2*	*df*	*p<chi2*	*Evidence*
Category 1: Decrease Support	167.519	8	0.000	against H0
Category 3: Increase Support	2.020	9	0.991	for H0

Similarly, the Wald Test results (Table 23) indicated that only one control variable, *party registration*, had a statistically significant effect on the Slaughter Model with an individual p-value=0.000. The remaining control variables did not have a statistically significant effect on the model, meaning that some of these variables may be redundant and a more parsimonious (or reduced) model may be desired. However, to maintain consistency between the Slaughter and Brooks models, it was determined that all control variables should be included in the Slaughter model while sacrificing potential statistically significant results in a more parsimonious model.

Table 23: Diagnostic Test with the effect of multiple control variables using the Wald test

Evidence supported H0: that all coefficients associated with given variables are zero
except for registered Democrat and registered Republican

Wald test	*chi2*	*df*	*p<chi2*	*Evidence*
Exposed to Polling Data	0.833	2	0.659	for H0
Formal Education	1.578	2	0.454	for H0
Political Knowledge	1.902	2	0.386	for H0
Registered Democrat	162.101	2	0.000	against H0
Registered Republican	144.997	2	0.000	against H0
Political Engagement	2.164	2	0.339	for H0
Media Usage	0.047	2	0.977	for H0
Political Discussion	1.125	2	0.570	for H0

B.2 Predicted Probabilities for Change in Voter Support for Louise Slaughter

The predicted probabilities for the Louise Slaughter model (Table 24) look very similar to the predicted probabilities in the Maggie Brooks model (Table 20). When only a change in exposure to polling data was considered, in columns 1 and 2, the predicted probabilities remained highest that voters would not change their support for Louise Slaughter regardless of whether they received polling data (Pr = 0.8088) or did not receive polling data (Pr = 0.8367). Based on these results, and due to a lack of statistically significant results, there was not sufficient evidence to support the idea that those who were exposed to the polling data were much more likely to change their support for the candidate losing in the poll (Slaughter) compared those who were not exposed to the polling data.

Table 24: Predicted Probabilities for Change in Voter Support for Louise Slaughter

Predicted Probabilities	*X: Received polling data*	*X: Did not receive polling data*	*X: Hypothesis 2*	*X: Alternative to Hypothesis 2*
	1	2	3	4
Pr (decrease support | X):	0.1813	0.1581	0.1293	0.0447
Pr (increase support | X):	0.0099	0.0052	0.5367	0.0140
Pr (no change in support | X):	0.8088	0.8367	0.3341	0.9414

However, the probability that voters would increase support for Louise Slaughter did get larger (Pr = 0.5367) when values for the secondary hypothesis, discussed in Section III, were factored in. The secondary hypothesis for this experiment is below:

> Secondary Hypothesis [H2]: After receiving polling data, voters in the experimental group will increase support for the candidate losing in the poll (Louise Slaughter) and also have the following characteristics: high levels of education, high levels of political knowledge, registered Democrat with and report high levels of political disturbance.

The predicted probabilities for the secondary hypothesis (column 3, Table 24) were generated using the highest possible values for each of the predisposing control variables, including: high levels of formal education, high levels of political knowledge, registered Democrat and high reported levels of political disturbance (for more detail on these values, refer to the descriptive results in Section VI). For the third column, values for each control variable were set to: *formal education* = 5; *political knowledge* = 4; *media usage* = 42; *political engagement* = 5 and *political discussion* = 4. The categorical variables, *exposure to polling data* and *party registration*, were set to values indicating that a voter was exposed to

polling data, registered Democrat and not registered Republican so that: *exposure to polling data* = 1, *registered Democrat* = 1 and *registered Republican* = 0. While no actual voters in the sample fit these extreme criteria, the predicted probabilities were estimated using the model overall and in a hypothetical context. Given these more extreme circumstances, the predicted probabilities did show that voter support was likely to increase for the underdog in the poll, Louise Slaughter (Pr = 0.5367). However, an opposite but equal change in predicted probabilities was not observed when given extreme values for the control variables that were expected to decrease support for Louise Slaughter. In order to test an opposite effect, an alternative to the secondary hypothesis [H2.a] was defined accordingly:

> **Alternative to the Secondary Hypothesis [H2.a]:** After receiving polling data, voters in the experimental group will decrease support for the candidate losing in the poll (Louise Slaughter) and also have the following characteristics: high levels of education, high levels of political knowledge, registered Republican and report high levels of political disturbance.

The predicted probabilities for this alternative to the secondary hypothesis (column 4, Table 23) were calculated using values for each of the control variables that reflected more extreme pre-disposition characteristics and expected to decrease support for Louise Slaughter. Once again, values were set at the highest possible value for *formal education* = 5; *political knowledge* = 4; *media usage* = 42; *political engagement* = 5 and *political discussion* = 4. The categorical variables, *exposure to polling data* and *party registration*, were set to values indicating that a voter was exposed to polling data, registered Republican and not registered Democrat so that: *exposure to polling data* = 1, *registered Democrat* = 0 and *registered Republican* = 1. While no actual voters in the sample fit these extreme criteria, the predicated probabilities in column 4 were estimated using the model overall. As discovered while generating the predicted probabilities for the Maggie Brooks model (Table 20), a change in pre-disposition characteristics did not result in an equal and opposite change in voter support for Louise Slaughter. Instead, when given opposite circumstances, the predicted probability was lowest that voters would either increase support for Louise Slaughter (Pr = 0.0140) or decrease support for Louise Slaughter (Pr = 0.0447). Instead, the probability was highest that these voters would exhibit no change in support for Louise Slaughter (Pr = 0.9414).

C. Summary of the Maggie Brooks and Louise Slaughter Models

The results from the multinomial logistic regression models for Maggie Brooks and Louise Slaughter were consistent with Section VI results, concluding that voter support was most likely not to change for either candidate regardless of exposure to polling data alone. Moreover, the multinomial logistic results for Maggie Brooks were consistent with theory presented in the literature view (Section II), showing evidence of a statistically significant relationship between voter support and *political knowledge* among highly educated voters who were less likely to increase support for the frontrunner in a poll (Eldersveld, 1956). In addition, the multinomial logistic results provided evidence of a statistically significant relationship between voter support and *registered Republican* among Republican voters who were less likely to decrease their support for Maggie Brooks, a finding that again was consistent with other literature on this topic (Navazio, 1977).

The only evidence of a bandwagon effect was detected under more extreme circumstances in which the control variables were purposefully stacked to favor this effect. Here, the predicted probabilities indicated that voter support would increase for the frontrunner in a poll (Brooks) when voters received the polling data and also reported low levels of formal education, demonstrated low levels of political knowledge, were registered Republican and reported low levels of political disturbance (i.e. media usage, political discussion and political involvement). Under these more extreme circumstances the probability was highest (Pr = 0.5982) that voters would increase support for Brooks when compared to the probability that these voters would decrease support for Brooks (Pr = 0.0589) or remain unchanged in their support (Pr = 0.3429). Unfortunately, the lack of statistical significance in either multinomial logistic model does not allow for these results to be conclusive; meaning that evidence of a bandwagon effect presented here may simply be due to chance rather than the existence of an actual relationship between exposure to polling data and change(s) in voter support.

VIII. Validity and Reliability Concerns

Finally, it is important to consider the validity and reliability of these experimental results. Due to a small final sample and lack of statistically significant results in either multinomial logistic model, the conclusions of this experiment are limited in scope and should be considered descriptive. Additionally, and in despite of the theory presented in Section II, a lack of statistically significant results in this experiment make it difficult to draw conclusions about the relationship between exposure to polling data and voter support as anything more than pure chance. This section will discuss both the internal and external validity of these descriptive results. Internal validity concerns include logistic model assumptions, scale confusion (question design), time bias and non-response bias. External validity concerns will discuss the extent to which these results may or may not be generalized to the general population of registered voters.

A. Internal Validity

Internal validity addresses flaws within the experimental and survey design(s) as well as the extent to which extraneous variables have been controlled in order to establish a causal relationship between the response and control variables in an experimental study (Trochim, 2006). When the multinomial logistic regression models were created for each of the response variables, it was determined that the models did not adequately fulfill the necessary assumptions. Thus, the first concern related to internal validity is that neither multinomial logistic regression model appeared to be the best fit for the given data. In both models, a more parsimonious approach as well as generating a larger sample of registered voters would be necessary to build stronger models with potentially significant results.

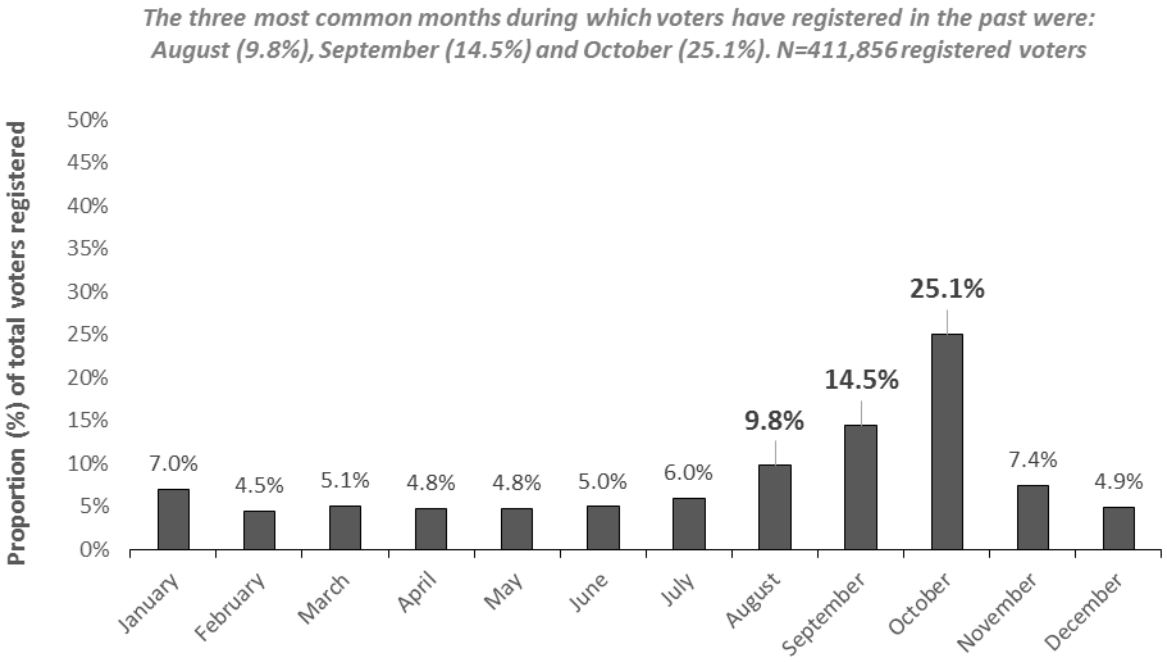
The second internal validity concern is related to survey measurement and response bias due to scale confusion among survey respondents. This experiment measured preferences and behaviors of voters with a variety of verbal scales that ranged from numeric (e.g. five point Likert Scale) to verbal labels (e.g. always, sometimes, rarely or never). Relative to survey questions that used verbal scales, a lack of consistency between survey questions may have caused scale confusion among respondents who were either rushed or in some way failed to distinguish between the changes in response options from question to question.

More so than with verbal scales, scale confusion is particularly common in Likert scales because people typically do not express daily emotions in terms of numeric values. While on their own, numeric scales may be more precise and easier to remember than verbal scales; yet, they tend to require fewer options (seven points or less) and a midpoint in order to increase accuracy of survey responses (Krosnick

& Fabrigar, 1997). In this experiment, the five point Likert scales used to measure voter support for Maggie Brooks and Louise Slaughter were useful because they produced results that were easy to analyze. Additionally, the numeric scales were kept short (five points) with a natural midpoint at 3. However, these numerical scales were only end-anchored, meaning that each number was not presented with a unique, verbal label. As such, these scale points did not clearly distinguish a mid-point for voter support (at 3). While some telephone respondents appeared to interpret 3 as a neutral, mid-point, it is unclear whether all others did the same. This means that some, who rated their support for a candidate as 3, intended this response to reflect a neutral or non-committal rating. Meanwhile, other respondents who rated their support as 3 may have considered this response to reflect a strong rating that was associated with either the low end of the scale (1 or 2) or the high end of the scale. While the experimental analysis considered a voter support rating of 3 as a neutral midpoint on the Likert scales, it is likely that the true meaning of this value differed (even slightly) between survey respondents.

Another internal validity concern is related to time bias and new voter registration. Due to the fact that this experiment was conducted over multiple months, it is possible that a large number of new voters who registered in July and August (after the sample had been drawn) were excluded from the sample. If so, this could result in a sample bias that excludes a large demographic of voters. However, after reviewing the voter file and new voter registration dates, any concern relative to the exclusion of new voters would seem to be minimal at best. Figure 12 summarizes the percentage increase for new voter registration, using the registration information for all registered voters in the NY 25th Congressional District (n = 411,856). The summary information shows the percentage of voters who registered in each month for all possible election years. According to Figure 12, the months between November and August have low levels of voter registration- with less than 10% of the current registered voters having registered to vote during these months. Meanwhile, in the months that are closer to the general election (in November) there is a spike in newly registered voters. Of the registered voters in the 25th Congressional District, 14.5% had previously registered to vote in September and 25.1% had previously registered to vote in October. Since this field experiment was conducted during the summer, between July and August, it is likely that some newly registered voters were not included in the sample. However, the numbers are considered low enough for this group so as not to be a significant concern.

Figure 12: NY 25th Congressional District Voter Registration by Month



The final concern related to the internal validity of this experiment is possible non-response bias between the first and second telephone surveys were conducted. As a modified form of a longitudinal study, the benefit of this experimental design was its ability to provide information about change in voter support, at an individual level, over a short period of time (two months). This method stands in contrast to a cross-sectional study that is able to measure change over time but utilizes different sample participants and therefore generates results from which one is unable to draw conclusions at the individual level. Despite obtaining descriptive data at the individual level, this longitudinal design did not involve equal measurement periods for the first and second telephone surveys and therefore the final sample may be subject to non-response bias. The first telephone survey was conducted over a month-long period (30 days) while the second telephone survey was conducted over a period of 3 days. After 30 days, the first telephone survey was terminated with a sample of 200 respondents because: (1) every voter had received multiple call attempts; and (2) limited time and resources demanded that experiment move forward into the treatment stage. Following the experimental treatment, the second telephone survey was administered and terminated after the third day of calls because, based on personal conversations, respondents in the experimental group were failing to clearly recall having received the polling data.

Due to time and resource constraints, the second telephone survey did not strictly adhere to the call plan (outlined in Section IV) that was used during the first telephone survey. While all respondents from the first telephone survey received one call attempt during the second telephone survey, no attempt was made to schedule follow-up calls or to otherwise pursue survey respondents who did not respond during

the first call attempt of the second telephone survey. As a result, it is likely that the final sample was affected by non-response bias, meaning that respondents in the second telephone survey would have given answers that would significantly differ from those who did not participate in the survey. In this experiment, it is possible that non-response may have occurred among voters who either (1) were more receptive to telephone surveys, or (2) those who were more active or interested in local politics and therefore more interested in the survey's subject matter. Introducing non-response bias into the final sample further limits the extent to which results may be generalized outside this experiment. If this experiment were conducted in a similar context, using a similar methodology, an effort to conduct both telephone surveys over an equivalent time frame would be made. In addition, efforts to achieve a higher retention rate (> 50%) would also be made in order to yield more data points from which statistically significant conclusions could be drawn.

B. External Validity

External validity addresses the ability of results in an experiment to be generalized to the larger population (Trochim, 2006). As discussed throughout this thesis, and particularly during the analysis in Sections VI and VII, the results of this experiment are not able to be generalized beyond the sample in this study. Although randomly selected, the final sample was not representative of either the townships being studied or the 25th district overall due to a low response rate and other design-related concerns including non-response bias.

At the outset, the estimated sample size that was necessary to yield statistically representative results for voters in the towns of Brighton and Greece was 68 respondents in each the experimental and control groups for a total sample of n = 136 total respondents (Equation 1). If achieved, this sample size would have allowed the final results to be generalized to the voting population from which the sample was drawn (Brighton and Greece) at a significance level of 90% with a margin of error $\pm$ 10%. As discussed previously, most general opinion polls use stricter standards with 95% confidence and a narrower margin of error $\leq$ 5%, while anything larger than this margin of error becomes less significant because it is difficult to draw meaningful conclusions about the estimated value within a larger range (Kotrlik & Higgins, 2001). Still, a smaller significance level and larger margin of error were chosen for this experiment due to time and resource constraints that would not allow for a larger final sample needed to achieve higher significance and a lower margin of error. The final results therefore preclude a larger margin of error, but not by much. For each the experimental and control groups, final results and change in voter support can be stated 90% confidence $\pm$ 10.7% margin of error. While the final sample cannot be generalized to a greater voter population, this lower confidence level and relatively large margin of error

also yielded results that were less precise, meaning that repeated trials of this experiment are less likely to yield consistent results.

Another external validity concern relates to sampling quotas for landline and cell phone users that may also lead to non-response bias. Over time, telephone survey research has evolved to meet the changing landscape of contact methods that are used to reach survey respondents. In the 1970's, nearly 90% of households in America had landlines, making survey research by telephone very easy to conduct in a manner that was reliable and representative through achievable probability samples (Lavrakas, Shuttles, Steeh & Fienberg, 2007). Unfortunately, the relative strength of telephone survey research has since deteriorated due to new advances in telephone technology – namely the use of caller ID and cellular telephones. Between 1996 and 2000, caller ID technology increased by 500% in U.S. households, therefore increasing the ability for potential respondents to ignore telephone calls while also increasing the level of non-response. The University of Michigan Survey of Consumers (SCA) is a reliable baseline metric to measure the ongoing trend in survey response rates because of its consistent and reliable design along with a long history of telephone survey research (Curtin, Presser & Singer 2005). According to SCA response data, there are three distinct periods during which telephone response rates exhibited a particular trend: a gradual decline in response rates between 1979-1989, a plateau or no significant change in response rates between 1989-1996, and a sharp decline in response rates starting in 1996 (Curtin, Presser & Singer 2005). Some of the observed decline in telephone survey response rates is attributed to caller ID technology while other factors include an increased rate of cell phone usage.

The increasing number of Americans who are 'cell phone only' users also presents certain logistical challenges to survey researchers. In 2007, an article in the *Public Opinion Quarterly* stated that,

> "*At present there is exists no widely accepted set of cell phone surveying best practices for U.S. survey researchers to follow regarding how to plan, conduct and interpret surveys of respondents who are reached on wireless cell phone numbers*." (Lavrakas, Shuttles, Steeh & Fienberg, 2007).

The growing gap between cell phone users and landline users adds to the logistical challenges associated with general telephone surveys because, often, phone preferences are associated with age. Whereas older respondents are still often reachable by landline, younger respondents are often reachable by cell phone only. Contacting respondents by cell phone is further complicated by legal restrictions, ethical concerns and challenges to data quality since many cell phone survey respondents are often multi-tasking or in public places that may inhibit the accuracy of their responses (Lavrakas, Shuttles, Steeh & Fienberg, 2007).

Additional concerns related to cell phone respondents were addressed in a recent AAPOR discussion thread on the topic. In this conversation, one researcher noted the additional financial costs associated with cell phone respondents,

> "*Our experience shows that cell interviews cost 2 – 4 times more than landline interviews and we often need to offer an incentive to cell respondents.*" (AAPOR, personal communication, January 3, 2013).

In fact, the need to offer incentives to cell phone respondents is common since cell phone users may incur more costs associated with taking a survey, such as paying for minutes or phone usage, compared to landline respondents (Lavrakas, Shuttles, Steeh & Fienberg, 2007).

While cell phone sampling quotas are still an area in which survey researchers fail to reach a consensus, it should be noted that these sampling quotas are more of a concern in general population surveys and not as much of a concern in private surveys with clearly defined sample frames such as, in this case, registered voters (Lavrakas, Shuttles, Steeh & Fienberg, 2007). This particular experiment did not consider cell phone sampling quotas primarily because the sample frame was clearly defined by the list of registered voters in the NY 25th Congressional District and other essential demographic variables were accounted for including age, gender and party affiliation. Moreover, it was determined that drop-off among younger voters and other relevant demographics have been accounted for due to sample design and time of survey administration (weeknights) rather than a lack of cell phone sampling quotas.

IX. Public Policy Implications

The research presented in this thesis offers a descriptive assessment of the effects associated with exposure to polling data on voter support within the context of a two-way congressional race. Whereas a number of other laboratory-based studies on the same topic have been criticized for making these effects appear greater or more extreme than in real-life settings, the results from this experiment contribute to the existing body of literature with real-life evidence (or lack thereof) for the bandwagon effect in the context of a political campaign (Boudreau & McCubbins, 2010; Grosser & Schram, 2010). With a lack of statistically significant results, the conclusion of this thesis is that any effects on voter support, resulting from exposure to polling data, are minimal at best. In fact, during the multinomial logistic regression analysis, the results showed only slight evidence of a bandwagon effect occurring among very small pockets of voters, with less than half of the voters in the experimental group (n=51) showing a change in support for either candidate. Unfortunately, the results cannot be generalized outside this experiment due to a non-representative sample size and other validity concerns.

Within a public policy context, this research is particularly relevant. Outside the United States, many governments have tried to suppress the publishing of polling data during public elections out of fear that the results will either bias voter support (e.g. bandwagon, underdog effects) or negatively impact voter turnout on Election Day. For example, the Canadian Elections Act (2000) prohibits opinion polls from being published on Election Day until voting stations have closed in all time zones. Other countries prohibit the publication of polling data for longer periods of time, such as the 24-hour pre-election ban in France and the 14-day pre-election ban in Bulgaria (*Comparative Study*, 2003). As a result, these various bans on opinion polls have caused concern among international groups who are wary of media suppression. Despite the obvious limitations of this study that includes only a small sample of registered voters from two townships within the 25th Congressional District, the results from this experiment help build the case that exposure to polling data is not significantly associated with an increase in voter support for the candidate leading in the poll among American voters. Repeated trials of this, or perhaps similar experiments, would be necessary to draw more definitive conclusions about American and/or foreign electorates.

X. Sources

Akhter, S. (2003). Digital Divide and Purchase Intention: Why Demographic Psychology Matters. *Journal of Economic Psychology*, 24(3), 321-327.

Ansolabehere, S. & Iyengar, S. (1994). Of Horseshoes and Horse Races: Experimental studies of the impact of poll results on electoral behavior. *Political Communication*, 11(4), 413-430.

Boudreau, C. & McCubbins, M. D. (2010). The Blind Leading the Blind: Who Gets Polling Information and Does it Improve Decisions? *The Journal of Politics, 72*(2), 513-527.

Brown, K. & Zech, C. (1973). Welfare effects of announcing election forecasts. *Public choice*, *14*(1), 117-123.

Comparative Study of Laws and Regulations Restricting the Publication of Electoral Opinion Polls. (2003). *Global Campaign for Free Expression*. Retrieved online: www.article19.org/data/files/pdfs/publications/opinion-polls-paper.pdf

Curtin, R., Presser, S., & Singer, E. (2005). Changes in Telephone Survey Nonresponse over the Past Quarter Century. *Public Opinion Quarterly*, 69(1), 87-98.

Donsbach, W. (2001). Who's Afraid of Opinion Polls? Normative and Empirical Arguments for the Freedom of Pre-Election Surveys. *ESOMAR: Foundation for Information*. Retrieved online: http://www.wapor.unl.edu/wp-content/uploads/2011/02/who-is-afraid-of-opinion-polls.pdf

Eldersveld, S. (1956). Experimental Propaganda Techniques and Voting Behavior. *The American Political Science Review*, 50(1), 154-165.

Fleitas, D. (1971). Bandwagon and Underdog Effects in Minimal Information Campaigns. *The American Political Science Review*, 65, 434-438.

Freese, J. & Long, J. (2000). Tests for the Multinomial Logit Model. University of Wisconsin-Madison and Indiana University. Retrieved from: http://www.indiana.edu/~jslsoc/files_research/reprints/STBmlogtest.pdf

Goldstein, N., Cialdini, R. & Griskevicius, V. (2008). A Room with a Viewpoint: Using Social Norms to Motivate Environmental Conservation in Hotels. *Journal of Consumer Research*, 35(3), 472-482.

Green, D., & Gerber, A. (2006). Can Registration-Based Sampling Improve the Accuracy of Midterm Election Forecasts? *Public Opinion Quarterly*, 70(2), 197-223.

Garson, G. (2012). Testing Statistical Assumptions. *NC: Statistical Publishing Associates*. Retrieved from: http://www.statisticalassociates.com/assumptions.pdf

Grosser, J. & Schram, A. (2010). Public Opinion Polls, Voter Turnout, and Welfare: An experimental study. *American Journal of Political Science*, 54(3), 700-717.

Hillygus, D. (2005). Campaign Effects and the Dynamics of Turnout Intention in Election 2000. *Journal of Politics*, 67(1), 50-68.

Kotrlik, J. & Higgins, C. (2001). Organizational research: Determining appropriate sample size in survey research appropriate sample size in survey research. *Information technology, learning, and performance journal*, *19*(1), 43.

Krosnick, J. & Fabrigar, L. (1997). Designing Rating Scales for Effective Measurement in Surveys. In: Lydberg L., Biemer P., Collins, M.,…Trewin D. (Eds.), *Survey Measurement and Process Quality* (pp. 141-164). New York: Wiley and Sons, Inc.

Lavrakas, P., Shuttles, C., Steeh, C. & Fienberg, H. (2007). The State of Surveying Cell Phone Numbers in the United States 2007 and Beyond. *Public Opinion Quarterly*, *71*(5), 840-854.

Loewen, P., Milner, H. & Hicks, B. (2008). Does Compulsory Voting Lead to More Informed and Engaged Citizens? An experimental test. *Canadian Journal of Political Science*, *41*(3), 655-672.

Logistic Regression Diagnostics. UCLA. Retrieved from: http://www.ats.ucla.edu/stat/stata/webbooks/logistic/chapter3/statalog3.htm

Maggie Brooks for Congress. (2012). Retrieved from: www.maggiebrooks.com/about

Monroe County Board of Elections. (2012). Retrieved from: http://www2.monroecounty.gov/files/2012%20General%20Certification.pdf

Navazio, R. (1977). An Experimental Approach to Bandwagon Research. *Public Opinion Quarterly*, 41(2), 217-225.

Sangster, R. (2003). Do Current Methods Used to Improve Response to Telephone Surveys Reduce Nonresponse Bias? (2003). *Bureau of Labor Statistics, Office of Survey Methods Research*. Retrieved from: www.bls.gov/osmr/pdf/st030290.pdf

Simon, H. (1954). Bandwagon and Underdog Effects and the Possibility of Election Predictions. *Public Opinion Quarterly*. 18(3), 245-253

Schwab, A. (2003). *Multinomial Logistic Regression Basic Relationships*. [PowerPoint Slides]. University of Texas at Austin. Retrieved from: http://www.utexas.edu/courses/schwab/sw388r7/SolvingProblems/MultinomialLogisticRegressionBasicRelationships.ppt

Starkweather, J. & Moske, A. (2011). Multinomial Logistic Regression. Retrieved from: http://www. unt. edu/rss/class/Jon/Benchmarks/MLR_JDS_Aug2011. pdf.

Trochim, W. (2006). The Research Methods Knowledge Base, 2nd Edition. Retrieved from: http://www.socialresearchmethods.net/kb/

Stata Annotated Output: Multinomial Logistic Regression. UCLA. Retrieved from: http://www.ats.ucla.edu/stat/stata/output/stata_mlogit.htm

U.S. Postal Service: Information about Restrictions and Mailbox Access. (1997). *United States General Accounting Office*. GAO/GGD-97-85. Retrieved from: www.gao.gov/archive/1997/gg97085.pdf

Zaller, J. (1992). *The Nature and Origins of Mass Opinion*. New York: Cambridge University Press.

Appendix A: Survey Scripts

First Telephone Survey

Q1: Are you aware that Monroe County Executive Maggie Brooks is challenging current Representative Louise Slaughter this year for a seat in Congress? [do not read responses]

A. Yes B. No C. Unsure D. No response E. Refused

Q2: On a scale from 1 to 5, with 1 being very unsupportive and 5 being very supportive, how do you rate your current level of support for Louise Slaughter in the general election this November? [do not read responses; code response here]

1 2 3 4 5 No answer

Q3: On a scale from 1 to 5, with 1 being very unsupportive and 5 being very supportive, how do you rate your current level of support for Maggie Brooks in the general election this November? [do not read responses; code response here]

1 2 3 4 5 No answer

Q4: If an election were held today, would you vote for: [read; rotate responses to A and B to reduce order bias]

A. Louise Slaughter B. Maggie Brooks C. Undecided D. Prefer not to answer

Q5: Between Democrats and Republicans, which political party would you say is further to the right or in, other words, more conservative than the other? [read options; rotate options A and B to reduce order bias]

A. Democrat B. Republican C. Unsure

Q6: Which political party currently holds the majority in the United States House of Representatives? [read options; rotate options A-E to reduce order bias]

A. Democrat B. Republican C. Conservative D. Liberal E. Green

F. Unsure G. Prefer not to answer

Q7: How many representatives currently serve in the United States House of Representatives? [read responses]

A. 50 B. 100 C. 435 D. 535 E. Unsure F. Prefer not to answer

Q8: In which month do you vote in the general election? [read responses]

A. August B. September C. October D. November

E. Unsure F. Prefer not to answer

Q9: Some people seem to follow what's going on in the NY 25th Congressional election most of the time. Others aren't that interested. Have you been following what's going on in the NY 25th Congressional election most of the time, some of the time, rarely or never? [do not read responses]

A. Most of the time B. Some of the time C. Rarely D. Never

E. Refused

Q10: How often do you talk about current events or things you have heard about in the news with your family or friends: very often, some of the time, rarely or never? [do not read responses]

A. Very often B. Some of the time C. Rarely D. Never

E. Refused

Q11: The following list includes typical ways that people get news and information. Over the last 7 days, please estimate how many days you have done each of the following:

A. Read a printed newspaper [code response here, 0-7]:
B. Watched the news on t.v. [code response here, 0-7]:
C. Listened to news on the radio [code response here, 0-7]:
D. Read news on the internet [code response here, 0-7]:
E. Read a blog for news or other political information [code response here, 0-7]:
F. Read political information on a social media website such as Facebook or MySpace [code response here, 0-7]:

Q12: The following list includes five typical actions that people take to express their personal views. For each option, please indicate yes if you have done it or no if you have not done it:

A. Contacted a newspaper or magazine to express your opinion on a political issue.
   [code response here]: y/n/unsure/no response/refused
B. Written a blog post on a political topic or responded to a political blog post.
   [code response here]: y/n/unsure/no response/refused
C. Called in to a radio or television talk show to express your opinion on a political issue, even if you did not get on the air. [code response here]: y/n/unsure/no response/refused

D. Taken part in a protest, march or demonstration.
   [code response here]: y/n/unsure/no response/refused
E. Signed an e-mail or a written petition about a political issue.
   [code response here]: y/n/unsure/no response/refused

Q13: Finally, what is the highest level of education that you have completed: [read options]

A. Less Than High School B. High School Degree C. 2-year Associate's degree
D. 4-year degree E. Graduate degree F. Other
G. Prefer not to answer

Second Telephone Survey

Q1: On a scale from 1 to 5, with 1 being very unsupportive and 5 being very supportive, how do you rate your current level of support for Louise Slaughter in the general election this November? [do not read responses; code response here]

1 2 3 4 5 No answer

Q2: On a scale from 1 to 5, with 1 being very unsupportive and 5 being very supportive, how do you rate your current level of support for Maggie Brooks in the general election this November? [do not read responses; code response here]

1 2 3 4 5 No answer

Q3: If an election were held today, would you vote for:

[read; rotate responses to A and B to reduce order bias]

1. Louise Slaughter 2. Maggie Brooks 3. Undecided 4. Prefer not to answer

Q4: I have a list 5 scenarios in which you may have received information about either the Louise Slaughter campaign or the Maggie Brooks campaign. For each scenario can you re-call whether you have done any of these in the last month by responding with yes, no, or unsure [read all options; if "other" please specify]

1. In the last month, Read a newspaper article or editorial directly related to the Louise Slaughter or Maggie Brooks campaign

yes no unsure

2. In the last month, Read a blog post directly related to the Louise Slaughter or Maggie Brooks campaign

yes no unsure

3. In the last month, Read a public opinion poll directly related to the Louise Slaughter or Maggie Brooks campaign

yes no unsure

4. In the last month, Reading information from a social media website such as Facebook or MySpace directly related to the Louise Slaughter or Maggie Brooks campaign

yes no unsure

5. In the last month, been contacted with a phone call, in person or by mail by either the Louise Slaughter campaign or the Maggie Brooks campaign

yes no unsure

6. Are there any other sources that may not have been mentioned here [please specify]:

No answer [do not read] Refused [do not read]

Appendix B: Experimental Treatment (Polling Data)

A recent poll shows that a majority of voters favor Maggie Brooks for Congress.

On November 6, 2012, you will have the choice to re-elect current Representative Louise Slaughter or to elect current Monroe County Executive Maggie Brooks to the United States House of Representatives.

1,200 voters in the Monroe County area were recently asked the question:
"If the election were held today with Republican Maggie Brooks and Democrat Louise Slaughter as the candidates for Congress, whom would you support?"

The results show that a majority of voters favor Maggie Brooks for Congress:

Maggie Brooks: 59%

Louise Slaughter: 41%