

**Missing the Message:  
The Measurement and Effects of  
Attention to Political Advertisements**

by

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## **Dedication**

*To my family, for their unwavering support*

## **Acknowledgments**

While largely a solitary endeavor, I am fortunate that my dissertation rarely brought about feelings of isolation. As such, it is my pleasure to acknowledge all of the help that I received throughout this project. I wish to start by thanking my committee. I had the great benefit of learning from and regularly interacting with scholars that are truly at the top of their fields. Their professional expertise has shaped my work and their mentorship has made a career in academia seem possible. My gratitude to each of them is immense.

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## **Abstract**

Political advertisements are everywhere. In the current media environment, it seems as if you cannot turn on your television, open your laptop, or listen to the radio without encountering some form of a political ad. Yet most citizens express disdain for their existence, seemingly giving ads only glancing attention. Existing theories of political communication poorly understand the way in which ads are processed and how engagement with ads impacts behavior. This work examines the impact of personal attributes and environmental factors on the degree of attention afforded to both televised and online political advertisements. In particular, I highlight the role of unconscious processes in determining attention to political ads. Using physiological arousal as an indicator of attention, I find evidence that citizens' existing predispositions, namely political knowledge, partisanship, and interest in politics, influence their degree of attention, memory, and subsequent self-reported emotion and behavior.

The first paper, "Tuned Out," uses a laboratory experiment to demonstrate that individuals with the highest levels of knowledge about politics "tune in" or pay attention to political ads more often than their peers. Moreover, those with the lowest levels of political knowledge pay significantly greater attention to ads about their in-party, irrespective of whether the ad is positive or an attack.

The second paper, "Motivating Participation," directly compares the impact of self-reported emotion and physiological arousal on citizens' stated intent to participate in politics. The results suggest that as arousal increases, so too does citizens' willingness to participate in politics.

The third paper, "Incidental or Captive," focuses on online political advertisements and the influence of viewing context—whether citizens were told to pay attention to the ad or not—on self-reported emotion. I find "who is angry" varies based on how often one follows politics and whether attention to the ad is forced. Specifically, asking citizens to pay attention to an online ad only benefits those with low levels of political interest, as those with high levels of interest already pay attention to the ad on their own.

# **Chapter One**

## **Tuned Out: The Role of Physiology in Processing Political Ads<sup>1</sup>**

### Abstract

Whether watching television, listening to the radio, or searching the Internet, political advertisements are ubiquitous. What draws our attention to these ads? Recent studies have produced conflicting evidence with regard to the role of valence (positive versus negative tone) and personal characteristics in influencing the amount of attention and degree of processing afforded to televised campaign advertisements. To date, most studies of political advertising effects have relied heavily upon self-reported measures of attention and emotion to gauge citizen responses. This study uses a physiological measure (skin conductance) to capture an unbiased indicator of respondents' arousal in response to televised ads. I find evidence that respondents' unconscious responses are moderated by two political dispositions: partisanship and political knowledge. Specifically, respondents with the highest levels of information about politics tend to “tune in” to campaign ads more often than their peers. Further, respondents with the lowest levels of information are significantly more aroused by ads about their preferred party, irrespective of ad tone. The results suggest that appealing to topics that have preexisting importance—politics generally for some or in-group partisan identity for others—unconsciously motivates citizen engagement with televised ads.

Citizens, by necessity, economize their attention to public affairs. The world dispenses an overload of information—and political advertisements are just one form—that is in constant

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<sup>1</sup> I thank Dr. Stephanie Preston from the University of Michigan's Department of Psychology for assistance in experimental design and physiological data analysis, as well as gaining access to the lab, measurement devices, and subject pool populations. The study would not have occurred without her help.

competition with the demands of everyday life. For campaigns, the 30-second television spot remains a “tried and true” technique: broadcast TV accounted for approximately 55% of all political media spending in 2014 (Lieberman 2014). Simply stated, citizens are bombarded by political ads: on our TVs, our laptops, our radios, and even our cellphones and tablets. Recent evidence suggests the volume of televised political advertising has risen dramatically in the past decade, including the 2012 election cycle (Fowler and Ridout 2013). Moreover, despite the growth in digital media and increased user-control over exposure, one study finds little evidence of users “skipping”, especially among those with low levels of political engagement (Jackman et al. 2013). Do citizens pay any attention to all of these ads? As both the length of the campaign cycle and sheer amount of campaign ads grow, discontent among the public seems to grow too. In 2000, for example, 61% of Americans preferred fewer political advertisements to more, and 84% preferred no advertisements to increased negative ones (Gallup 2000). “Pundits and the conventional wisdom often consider most political TV ads ‘nasty, brutish and short’—an annoyance at best, and at worst, corrosive to democratic citizenship and debasing to political discourse” (Cannon 2008, 1). Yet ads, and the information they contain, have been shown to inform vote choices, activate interest, and increase engagement and participation (Chang 2001; Franz and Ridout 2007; Kahn and Geer 1994; Lau et al. 1999; Pfau et al. 2001; Valentino, Hutchings, and Williams 2004).

Few studies of political advertising have addressed the extent to which citizens are engaged with the ads to which they are exposed. Put differently, thorough attention to topics about “for whom ads are effective” is notably scarce. This study focuses on asking: Under what conditions do citizens “tune in” to televised political ads?

When deciding where to allocate their cognitive resources, I suggest that citizens react to political information in patterned ways, not only in terms of their attitudes, but also in their

biological responses. In what follows, I argue there are at least three key factors that determine a citizen's degree of attention, measured by physiological arousal, to a particular ad: ad valence (positive or attack), political knowledge, and partisanship (as captured by in- and out-party topic). The results suggest individuals with the highest levels of information are the most likely to devote cognitive resources to a political ad, a finding consistent with work in emotion and politics emphasizing the "relevance" of politics to those with the highest levels of interest and engagement. Moreover, I find evidence that citizens with the lowest levels of information are significantly more aroused by ads about their preferred political party, irrespective of whether the ad tone is positive or attack. In other words, for those with high levels of knowledge, any mention of politics is sufficient to activate their attentional resources whereas for those with low levels of knowledge, it is necessary that the ad be about their preferred party. Before outlining my expectations about the nature of these relationships and testing them with experimental data, I first begin by reviewing existing research.

### **Political Knowledge and Partisan Biases**

The average citizen pays little attention to and exhibits a low level of knowledge about politics (Converse 1964; Delli Carpini and Keeter 1996; Neuman 1986). Nonetheless, this oft-repeated lament overshadows the fact that some members of the public pay close attention to and are quite knowledgeable about politics. Two seminal works suggested citizens ought to be classified into "frames of reference" (Campbell et al. 1960) or "levels of conceptualization" (Converse 1964). Since then, political sophistication has been defined and measured in a multitude of ways, yet it is theoretically thought to be an overarching term for a latent construct that reflects awareness of political matters. Those high in sophistication tend to follow political news and understand how politics works. Put differently, political sophistication is an individual

characteristic that implies the existence of well-developed networks of associations in the brain designed to make sense of the political world, provide perspective and attitudes on political matters, and allow new information to be easily integrated. As sophistication increases, individuals tend to rely more on automatic processing and they become more efficient at making political decisions, often without conscious reflection.<sup>2</sup>

Consistent with this perspective, we know that how closely you pay attention to politics is one factor that shapes the way you respond to political information (Fiske, Kinder, and Larter 1983; Zaller 1992). A long research tradition in social psychology has found that people will draw upon their previous experiences in order to understand new information (Fiske and Kinder 1981). According to Fiske, Kinder, and Larter (1983), “expertise affects *how* old information is used to understand new information”(382). For example, Zaller (1992) contends that both novices and experts react to political questions or stimuli with “top of the head” responses; the distinction between them however, is that each group is using different materials to construct their response. Specifically, experts have a wider knowledge base and ideological constraints that provide a more stable foundation for response whereas novices are more influenced by day-to-day events. Consistent with this distinction, researchers have also found evidence that novices and experts differ in their ability to apply heuristics (such as values) in a manner that connects their preferences with policy (Alvarez and Brehm 2002; DeNardo 1995).

Political sophistication is widely thought to consist of four components: knowledge or amount of information, range of information (often with respect to topics), consistency or stability over time of existing opinions, and levels of conceptualization or ideological constraint (Smith

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<sup>2</sup> Contemporary political psychology and motivated reasoning theory suggest citizens with the highest levels of engagement and knowledge will be the most resistant to new information and the most likely to respond with automatic thinking (see Lodge and Taber 2000; Taber and Lodge 2006, 2013). This is in contrast to much early political thought that these so-called experts would act as a saving grace for democracy. For a more thorough discussion of this literature, see Ryfe (2005).

1989). When addressing the components, Smith (1989) notes:

Are having a great deal of information (including facts that are conceptually sophisticated) on the one hand and organizing and processing information in a conceptually sophisticated way on the other hand different from each other? ... Knowledge and conceptual sophistication are closely related. The reason, many investigators argue, is that conceptual sophistication is required in order to retain large amounts of information; thus the two come together... As people acquire information, they develop hierarchical structures, or schemas, in which to store the information. The greater the amount of information, the larger the hierarchical structure, and the more abstract the unifying themes at the top (Anderson and Bower 1973; Bower et al. 1969; Crowder 1976; Reardon 1981; Schroder et al. 1967). Of course, knowledge and conceptual sophistication are, as noted, not the same. No one claims that they are identical, only that they are closely associated. (225)

This study relies solely on a factual measure of political knowledge. Given the theoretical definition of political sophistication, political knowledge alone will *not* fully capture the construct of political sophistication.<sup>3</sup> Nonetheless, Zaller (1992) suggests several theoretical reasons why a factual scale is preferable and discusses empirical tests with respect to attitude stability, consistency, and predictive validity against four alternatives (education, media use, interest, and participation). He maintains that a neutral factual knowledge battery “to a greater extent than any of the others, captures political learning that has actually occurred—political ideas that the individual has encountered, understood, and stored in his head” (335). Further support for a factual knowledge scale comes from Schreiber (2007). Using brain imaging, he provides evidence that individuals with a high level of political knowledge and activity may be able to automatically extend the mental tools used to navigate everyday life to national politics; on the other hand, individuals with low levels of knowledge and activity appear incapable of doing so and must increase their level of cognitive effort to process political information.

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<sup>3</sup> As indicated, this study uses political knowledge as an indicator of sophistication, a dominant practice in the field. Nevertheless, much work remains to be done to more carefully address the adequacy of such a measure, including—but not limited to—attention to how particular questions are chosen, the weighting of responses, and the breadth of the standard scale. See Lupia (2015) for a more thorough discussion. The full question wording and operationalization of political knowledge for this study is included in-text below.

Recall from the previous discussion, I argue there are at least three key factors that determine a citizen's degree of attention, measured by physiological arousal, to a particular ad: ad valence (positive or attack), political knowledge, and partisanship (as captured by in- and out-party topic). For clarity, Figure 1.1 provides a schematic of the causal model. Before outlining specific hypotheses, it is helpful to review existing research on physiology and politics to enable a clearer operationalization of my expectations.

### **Physiology and Politics**

More than a century ago, the president of the American Political Science Association suggested that physiology might be suitable for the study of politics (Lowell 1910). Psychophysiology suggests that changes in heart rate, respiration, and muscle contraction are related to our psychological states. Over time, measures of physiology appeared periodically in political science research, including two pioneering studies of the link between physiology and political attitudes (Wahlke and Lodge 1972; Lodge et al. 1975). In recent years, there has been a growth of work examining the relationship between physiology and political attitudes. For example, Oxley and colleagues (2008) used measures of skin conductance to demonstrate that variations in response to threatening stimuli correlate with political attitudes on social policies. Additionally, recent work has shown that individuals with a general proclivity toward higher electrodermal responsiveness are likely to actively participate in politics (Gruszczyński et al. 2013).

Due to its visual nature, television has been thought to encourage "gut reactions" (see Sullivan and Masters 1987). Indeed, physiological reactions to political debate have been shown to impact levels of trust in government, recollection of arguments, and the perceived legitimacy

of political actors (Mutz and Reeves 2005; Mutz 2007a). Early work by McHugo and colleagues found facial displays of emotion among political leaders to have a direct influence on both self-reported emotion and physiological responses (McHugo et al. 1985, 1991). Importantly, they find evidence that prior attitudes influence both self-reported emotion and bodily responses, a finding consistent with the expectations of this study.

Only three published studies to date have examined physiological responses to televised political campaign ads. A 2007 study by Bradley, Angelini and Lee, used eyeblink startle reflex in response to negative advertisements to demonstrate activation of the aversive motivational system. Wang and colleagues (2014) used a host of physiological measures and found individuals to be more physiologically responsive to ads about their favored candidate, irrespective of the ad's tone, suggesting attention might be selectively motivated. Most recently, work by Daignalt, Soroka, and Giasson (2013) found evidence of a negativity bias in physiological responses such that negative ads produce higher ongoing activation relative to positive ads.<sup>4</sup> This study is the first to use physiological indicators to examine the extent to which citizens grant attention to political ads based on a combination of ad tone and personal characteristics.

Specifically, this study uses skin conductance level (SCL), a measure of electrodermal activity (EDA) or the rate of movement of electricity across the surface of the skin. Higher skin conductance is attributable to increased activation in the sympathetic nervous system (the fight or flight system); specifically, arousal increases moisture, which in turn enhances conductivity. Skin conductance has been found to be a good measure of emotional arousal and attention (Hubert and de Jong-Meyer 1991; Dawson, Schell, and Filion. 2007).<sup>5</sup> Notably, skin conductance has not

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<sup>4</sup> All three studies used existing political advertisements. By contrast, this study involved designing and creating novel political advertisements. The decision to do so is discussed in the design section.

<sup>5</sup> For more background on EDA and psychophysiology, see Dawson, Schell, and Filion (2007) and/or Smith and Hibbing (2011).

been found to be a reliable measure of specific discrete emotions, though it does reliably capture emotional arousal (Cacioppo et al. 2000). In other words, skin conductance indexes the intensity dimension of affect; it is not capable of distinguishing between high arousal anger versus high arousal fear, for example.

## **Cognitive Framework**

The limited capacity model of mediated message processing (LC3M) provides much of the framework for the present study (Lang 1995, 2000). There are two research traditions on which this framework relies: information-processing in cognitive psychology and media effects in communications research. Moreover, there are two major assumptions behind the LC3M model. First, people are information processors and second, an individual's ability to process information is limited. In other words, mental resources are needed in order to perceive a stimulus, to represent it somehow, and to reproduce it in the brain and, perhaps most importantly, these resources have a limited (arguably fixed) capacity.

According to decades of research in cognitive psychology, after sensory perception of a stimulus, some of the available information is transformed into an active mental representation in working or short-term memory. This representation is based on an individual's goals, knowledge, and the environment. Notably, both automatic and controlled processes drive the formation of this representation. Top-down or controlled attentive processes are under the volition of the individual, whereas bottom-up or automatic processes are involuntary and often occur without conscious intent by the individual. To reiterate,

Limited capacity theory proposes that attention is under the dual control of the audience member and characteristics of the message. Audience members can purposefully allocate attention based on goals. Attention can also be reflexively elicited from audience members by features of the message. (Bolls et al. 2001)

Thus, the encoded message (that ultimately makes it to short-term or working memory) is a representation that contains “only a small fraction of the total information in the original message” (Lang 2000, 49).

Consistent with LC3M, both top-down and bottom-up processes are expected to contribute to the allocation of attention to the political ads used in this study. I expect ad valence to represent a feature of the message that reflexively elicits attention, a bottom-up process. From a theoretical standpoint, negative stimuli have been thought to automatically elicit arousal due to evolutionary needs regarding survival (Bradley 1994; Zajonc 1984). And there is evidence in support of the negativity bias with respect to physiology (Bolls et al. 2001; Daignault et al. 2013). I therefore hypothesize:

*H1: Negative (i.e. attack) ads will elicit higher arousal than positive ads.*

Aside from the automatic influence of valence, political knowledge represents an individual characteristic that ought to impact cognitive processing in a goal-driven, bottom-up manner. Research in cognitive psychology has demonstrated that individuals with prior knowledge on a topic are more likely to form multiple connections in their brain that allow them to more easily access relevant information later ( Craik and Lockhart 1972; Jerit, Barabas, and Bolsen 2006). According to Converse (2000), “it takes information to get information.” In other words, people’s brains are wired for the development of new linkages and an individual’s goals and interests determine how easily new information is integrated. Thus I expect political knowledge and partisanship to represent characteristics of the individual that alter the allocation of attention (i.e. arousal) based on goals or top-down processes.

In the past, both popular belief and rhetoric by academic researchers suggested that politicians used emotions to manipulate the uneducated and disinterested. For example,

researchers suggested that individuals high in political sophistication ought to be less responsive to emotional political appeals, as they had the necessary cognitive tools to interpret new information more readily available (Sniderman, Brody, and Tetlock 1991).<sup>6</sup> Recently, however, Brader (2006) has shown that the emotions evoked by political ads act as a mechanism to signal relevance, thus leading to the largest effects among those for whom politics is most relevant (i.e. political experts).<sup>7</sup> He notes,

...the prevailing pattern is one of greater sensitivity on the part of politically savvy citizens... we see evidence of a world in which some people are “plugged in” to politics and therefore can be moved by appeals to emotion, while others are mostly “unplugged” and thus difficult to reach with such appeals” (Brader 2006, 103).

To date, there are no studies that examine the relationship between political knowledge and physiological arousal in response to televised ads. Emotions have been shown to have physiological roots (Damasio 1994, 1999, 2003). My expectations therefore arise in part from existing work regarding emotions and politics. Theories of emotion relying on cognitive appraisals posit a process wherein citizens use their emotional states to infer information about their environment and respond accordingly (Arnold 1960; Frijda 1986; Lerner and Keltner 2001). In other words, individuals are always scanning their environment to make sense of the world around them and prepare for action. In doing so, they are attempting to rapidly determine when a stimulus is relevant for their personal, physical, or psychological well-being. Importantly, these appraisals can, though they need not always, occur outside of conscious awareness. Thus, I expect,

*H2: In response to televised political ads, citizens at the high end of the political knowledge spectrum will be aroused more often than those at low or middle levels of knowledge.*

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<sup>6</sup> Sniderman, Brody, and Tetlock (1991) use education as their measure of sophistication, calling sophistication a “bundle concept” with multiple measures that are “moderately intercorrelated”.

<sup>7</sup> Brader (2006) uses a measure of factual knowledge about state politics to dichotomize sophistication into low and high categories.

Operationally, this expectation implies that when faced with the four possible treatment conditions, citizens with the highest levels of political knowledge will more often demonstrate a significant increase in arousal relative to baseline than citizens at low or middle levels of knowledge. The logic of this hypothesis arises from the theoretical notion that existing knowledge exerts influence as a top-down, controlled process, guiding physiological responses and opening the door for goal-oriented responsiveness to political information. Specifically, arousal is triggered by whether the stimulus is perceived to be relevant to an individual's goals. At the low end of knowledge, citizens are more difficult to arouse due to few cognitive networks devoted to politics whereas, at the high end, engagement with politics is routine and thus, stimuli signaling "politics" is perceived as relevant to one's goals. These expectations are consistent with research highlighting the importance of self-reported emotional responses as a relevance detector (Brader 2006; Frijda 1986). The goal-oriented nature of this expectation is in contrast to the negativity bias, which, as suggested earlier, occurs automatically.

Lastly, the influence of partisanship over physiological responses similarly arises from the role of top-down, controlled processes and goal-pursuit. A wealth of research in political science and psychology has demonstrated that individuals process information in a biased manner (Kunda 1990; Lebo and Cassino 2007; Lodge and Taber 2000; Redlawsk 2002; Taber 2003; Taber and Lodge 2006; Taber et al. 2001). Motivated Reasoning Theory suggests citizens' prior attitudes about everything from candidates to policies influence how they process new information, with citizens preferring to maintain and support existing evaluations, even in the face of discrepant information. In other words, an individual's goal *motivates* processing in a manner that unconsciously directs mental operations, whether through biased information search, biased perception and/or assimilation, weighting, or some other mechanism, to lead to a conclusion that fits one's goal. Researchers now have evidence to support a notion that arose

decades ago: “perhaps resistance to influence is accomplished most often and most successfully at the level of information evaluation, rather than at the level of selective seeking and avoiding of information” (Sears and Freedman 1967, 213). In other words, not only do individuals consciously avoid discrepant information, but processing itself is also biased (Wang et al. 2014).

For many Americans, when it comes to politics, we often hear what we want to hear and behave in a way that supports our original way of thinking. In addition to suggesting that political knowledge can influence citizens’ unconscious responses to political stimuli, I also argue that partisanship can act as a filter through which citizens receive political information and interpret new information. This perspective is consistent with several existing studies of motivated reasoning, yet I extend these expectations to physiological responses. It is well established that voters are likely to trade in shortcuts, assumptions, and cues (e.g. Cohen 2003; Conover and Feldman 1989; Iyengar and Valentino 2000; Kam 2005; Lupia 1994). Party affiliation represents a cognitive heuristic that helps citizens make sense of politics (Lodge and Hamill 1986) and can serve as an important cue when determining where to allocate attentional resources. Therefore:

*H3: Holding ad tone constant, ads about citizens’ in-party will increase arousal, relative to out-party ads, with the strongest effect among political novices (i.e. low PK).*

Hypothesis 3 implies that individuals with less political information, often more reliant on heuristic processing and shortcuts (Lau and Redlawsk 2001), will have increased arousal to advertisements that deal directly with their preferred party.<sup>8</sup> In other words, political novices will most clearly rely on partisan cues to determine cognitive resource allocation (i.e. arousal); and while the effect should be positive among all citizens, I expect those at middle or high levels of knowledge may also perceive alternative stimuli and shortcuts as “relevant.” Put differently,

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<sup>8</sup> In this study, the treatment ads are coded topically, not based on sponsorship. In other words, if the subject matter deals directly with their preferred party (even if it is an attack on their preferred party), the ad is coded as an in-party ad. Therefore, H3 holds constant the valence of the message and assumes political novices will have higher arousal to positive in-party ads than positive ads about the opposition party and higher arousal to ads attacking their in-party than ads attacking their out-party.

political novices ought to be more sensitive to the in- versus out-party focus of an ad.

## **Experimental Design and Data**

In order to test the above hypotheses, I conducted a randomized lab-based experiment designed to capture physiological arousal in response to carefully manipulated campaign advertisements. The design was a 2 (Ad Tone: Positive, Attack) x 2 (Ad Sponsor: Democrat, Republican), such that each participant saw one randomly chosen treatment ad. Four 40-second political ads were crafted to enable careful control of tone, message content, and structural features. Given evidence that variation in SCL could be due to changes in uncontrolled structural features of the messages, such as music and camera changes (see Potter and Choi 2006), each of the four ads created have the following structural design: sponsorship image (still with partisanship), two video clips, three still images, one video clip, four still images, sponsorship image (still with partisanship) with matching timing. The ad scripts, background music and image content were consistent across ads, with the exception of key phrases and images that varied the tone and sponsorship message.<sup>9</sup> Lastly, the ads were designed to mimic actual campaign advertisements: high quality images and sound files were used, research assistants trained in video processing created the ads, and the scripts were read and recorded by professional voice actors.

The experiment was conducted at a large, Midwestern university from March 19 through May 8, 2014, and had a sample size of 61 participants, all U.S. citizens aged 18 years or older.<sup>10</sup> The sample was split evenly among student and non-student populations. There was variation

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<sup>9</sup> Storyboards for the ads are available in the instrumentation appendix. Video files are available from the author upon request

<sup>10</sup> This study has an increased sample size over existing studies of physiological response to political advertisements: Wang and colleagues' (2014) study had  $n = 15$ , Bradley, Angelini, and Lee (2007) had  $n = 51$ , and Daignault, Soroka, and Giasson (2013) had  $n = 31$ . While the full sample was  $n = 69$ , there was a control group that did not see a treatment ad ( $n = 8$ ) that is not used in this paper.

within the sample along race (24% nonwhite), age (mean = 36 years), and gender (59% women), though it was skewed young (35% under 20 years) and Democratic (26% Republican).<sup>11</sup>

Importantly, there were no significant differences across treatment cells in the proportion of these demographic and partisan variables; thus, the differences observed between conditions can be attributed to the stimuli.

Participants were recruited from two databases: students were drawn from an Introductory to Psychology subject pool and non-students were drawn from a Clinical Studies database affiliated with a large hospital system (HS). The HS database consists of more than 17,500 individuals, including healthy volunteers and individuals with existing medical conditions.<sup>12</sup> All participants responded to an online listing that called for participation in a study about “Attention to Advertisements.” The listing intentionally failed to mention politics and remained vague about the topic of the advertisements, a deception designed to mask the political nature of the content to attract participants with varied interest.<sup>13</sup> In exchange for one hour of participation, the students were given course credit whereas the non-students were given \$20 cash.

#### - Procedures -

For each participant, the experiment was conducted individually in the lab. Upon arrival, participants were randomly assigned to an experimental condition and escorted to a small room

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<sup>11</sup> Regarding partisanship, the sample included 17 self-identified Republicans, 42 self-identified Democrats (including ‘leaners’), and 7 self-identified Independents. The analyses that follow rely upon categorizing participants based on whether the ad they viewed favors their in- or out-party, rather than by partisanship, so Independents are excluded.

<sup>12</sup> Participants with existing medical diagnoses known to influence physiology were excluded (e.g. major depressive disorders, substance abuse, etc.). Further, no systematic differences in physiology between the student and non-student samples were found.

<sup>13</sup> In an effort to increase diversity in terms of partisan affiliation, 7 adult participants were recruited after answering a pre-screening question regarding their partisanship. Due to underrepresentation of Republicans, self-identifying as Republican was necessary for selection at this stage; the other 10 self-identified Republicans were not pre-screened. Analyses indicated pre-screened Republicans did not differ significantly from the rest of the sample on demographic and political interest or knowledge variables.

where they were seated facing a computer.<sup>14</sup> After obtaining consent, a researcher told participants that the study would involve watching political advertisements for “candidates running for office in the state of Michigan.” With Michigan residents comprising nearly 77% of the sample, this deception was intended to increase investment in the ads while adding realism to the study.

The experiment was administered through the Qualtrics survey platform and began with several pretest questions, including age, partisanship, and interest in politics. Notably, most demographic questions were asked at the end of the study to limit motivational processing; an exception was the inclusion of partisanship and ideology, which were asked during the pretest to ensure accurate pre-treatment measures of the strength of these attachments.<sup>15</sup> Following the pretest questionnaire, participants washed and thoroughly dried their hands before they were attached to the physiological monitoring equipment.<sup>16</sup> Once attached, participants were instructed to keep their measurement hand as still as possible and told the study would begin with a three-minute sample video before proceeding with the advertisements. Participant interaction with the researcher was minimized throughout the study in an effort to limit interviewer bias; all physiological data collection and survey questions took place without the researcher present.<sup>17</sup>

Immediately following the sample video, participants answered several questions about

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<sup>14</sup> Due to the size and layout of the room, viewing took place 28 to 36 inches away from an 18-inch monitor.

<sup>15</sup> Asking about partisan identity may have primed participants to react to the treatment in a partisan manner. This was a deliberate decision intended to enable the collection of several attitude measures prior to treatment exposure; doing so increases confidence in measures of the strength of one’s partisan attachments, at the expense of (potentially) increasing motivated processing. I’d argue, for many citizens, the mere mention of politics is likely to prime partisan predispositions, so pretest measures of attachment do more good than harm. Moreover, the study occurred in the spring of a midterm election year and the candidates are fictitious, thus making the conditions fairly clinical, limiting the influence of elevated or fervent partisanship.

<sup>16</sup> Measures of physiological arousal were collected using two disposable Biopac electrodes (Model: EL507) placed on the palm of the participant’s nondominant hand (the thenar and hypothenar eminences) (Blascovich et al. 2011). The measurement equipment was a Biopac MP150 bioamplifier and data was recorded continuously using AcqKnowledge (v 3.9) software for Macintosh, sampled at 1000 Hz.

<sup>17</sup> One participant had trouble with a “drag and drop” ranking question in the pretest survey and the researcher was called in to show them how to respond using the computer mouse.

their current emotions and the video content, then completing an unrelated word-search as a distractor task. Next, the treatment ad was viewed, followed by the first post-ad questionnaire which included self-reported emotion, memory measures, and several participation questions. Then, a second distractor task was completed. Once finished, the researcher returned and detached the physiological equipment. Finally, the participant answered several more survey questions before being debriefed on the purpose of the study and compensated.<sup>18</sup>

## **Measurement**

### **- Physiological Arousal -**

When capturing skin conductance level (SCL), higher values indicate greater conductivity; in practice, this translates as higher values equals greater arousal. For this study, the researcher used a keypress to flag the start and end of each video, isolating each treatment ad as a period of interest. To clean and prepare the data for analysis, each period was examined separately. The latency window for each time period was 3 seconds; in other words, data analysis for the treatment ads began 3 seconds after the start of the video and ended three seconds after the conclusion of the video. As is best practice, two functions were used to process the data in order to isolate the physiological changes of interest. First, a difference function reduced or eliminated the slow drift present in SCR signals (see Naqvi, Shiv, and Bechara 2006). Second, high frequency noise, such as electromagnetic disturbances from florescent lights, can cause error and were removed with a smoothing function (see Figner and Murphy 2010).

The current study emphasizes each individual's relative comparison between treatment and baseline levels, thus standardizing measures within each participant as a way to address potential individual differences in variability (see Ben-Shakhar 1985; Dawson, Schell, and Filion

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<sup>18</sup> In the appendix, Figure A.1 provides a schematic of the study procedures.

2007). In other words, all physiological data for this study is a within-subjects difference from baseline. Within-subjects standardization adjusts for individual differences in responsiveness and relies upon the mean, a more stable and reliable statistic than measurements of maximum response (Ben-Shakhar 1985). Specifically, for each participant, difference scores were calculated using a measure of the area bounded by the curve during the time periods of interest. The area measure is “better suited for automated data analysis and captures both the amplitude and temporal characteristics of an SCR, and therefore is likely to be a more valid indicator than either aspect alone” (Figner and Murphy 2010, 8). Operationalized in this manner, the measure captures the effect of each treatment ad on SCL while controlling for individual variation in baseline arousal and reactivity levels.

Skin conductance measures are often positively skewed, as is the case with these data (see Boucsein 2012).<sup>19</sup> Data transformations are common when using EDA because they serve as a statistical method to minimize skew. The usefulness of transformations, however, is controversial. There is a tradeoff between allowing the data to appear normally distributed yet arbitrarily reducing variance. Levey (1980) argued that transformations ought only occur when they are justified by known or assumed characteristics of the system under investigation. That said, transformations of EDA data are typically based on statistical considerations (Boucsein 2012; Venables and Christie 1980) despite the commonality of skew. Since outliers were removed, I decided to present the analysis in raw form, without data transformation.<sup>20</sup>

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<sup>19</sup> Given the skewed distribution, there is concern about the influence of a small number of outliers on the relationships of interest. I used a systematic rule to identify and exclude highly variable observations: responses greater than  $\pm 3$  standard deviations from the mean were dropped from all analyses ( $n = 5$ ) (see Hein et al. 2011). Combined with the excluded control group, the effective sample size is  $n = 56$ .

<sup>20</sup> After processing and cleaning, the log-transformed data are correlated with the “raw” data at  $r > 0.73$ . Analyses using the log-transformed data revealed consistent results, though some effects are weaker. After removing outliers, both a Shapiro-Wilk and Shapiro-Francia normality test produce marginal significance ( $p < 0.10$ ), suggesting the distribution may still be non-normal.

- Political Knowledge -

For this study, several proxy measures of political sophistication were available, though the analyses presented here rely on an additive index of political knowledge questions, a key component to the broader concept of sophistication.<sup>21</sup> There were eight questions total, the topics span national and local politics, and the type of questions includes both multiple choice and open-ended responses. Here is the exact format:

*Here are a set of questions concerning various public figures and groups. We want to see how much information about them gets out to the public from television, newspapers, and the like.*

*[Randomly]*

- Who is currently Vice President of the United States?
- How many members are elected to the Michigan House of Representatives?
- How many justices are there on the U.S. Supreme Court?
- Who holds the position of Speaker of the House in the state of Michigan?
- Thinking now about the two major political parties in the United States. Which party would you say is more conservative than the other at the national level?  
{*Democratic Party, Republican Party*}
- What U.S. job or political office does Eric Holder now hold? {*Attorney General, Speaker of the House of Representatives, Secretary of Defense, Supreme Court Justice*}
- Which party currently controls the U.S. Senate? {*Democratic Party, Republican Party, Neither*}
- Which Michigan job or political office does Gretchen Whitmer now hold? {*Senate Minority Leader, Lieutenant Governor, Chief Justice of the Supreme Court, Secretary of State*}

Conceptualized in this way, the measure of political knowledge varies from zero to one continuously. However, to enable more interpretable data analyses, knowledge is transformed into an indicator variable of low, middle, and high political knowledge. Political knowledge scores < 0.5 are considered low, scores between 0.5 and 0.6 are considered middle, whereas

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<sup>21</sup> Five additional proxies for sophistication were also measured: media exposure, political interest, education, local knowledge only, and a combined scale of interest and knowledge (called engagement). Both the engagement (combined interest and knowledge) measure and interest measure performed similarly to the political knowledge battery alone (the results are available upon request). Media exposure measures are widely thought to suffer from social desirability pressures and over-reporting (Price and Zaller 1993; Prior 2009). Regarding education, since the sample was 50% students, there was limited variation in education level. Regarding local knowledge, 59% of the sample did not answer a single local question correctly and an additional 38% answered only one item correctly.

scores  $\geq 0.6$  are considered high. The cut-points chosen represent a near-tertile split (low  $n = 20$ , middle  $n = 24$ , high  $n = 24$ ).<sup>22</sup> Beyond ease of interpretation, dividing political knowledge in this manner enabled me to keep all respondents in the dataset, maximizing the ability to draw implications from a small number of observations.

Before reviewing the results, an important note on causality is warranted. This study takes advantage of the experimental method, which enables strong causal inferences. Given the growth of biological variables in political science research, there exists a natural inclination to ascribe causality to biology, since it is presumed to occur prior to cognition. Scholars ought to resist this temptation. In many cases, the causal arrow can, and likely does, run in both directions. As stated by Smith and Hibbing (2011), “psychology and physiology are often enmeshed in a reciprocal relationship” (227). For example, recent work demonstrates that cognition and emotion work together in a “feedforward” system whereby emotional appraisal serves to prioritize some information for further cognition at the expense of other information (Spezio and Adolphs 2007). The enduring characteristics to which I attribute causality with regard to arousal are theoretically derived; yet they likely re-enter the cognitive process and contribute to this reciprocal relationship.

## **Results**

I begin by examining the relationship between ad valence and arousal. Based on previous findings, I expect negative (i.e. attack) ads to elicit higher arousal than positive ads. Figure 1.2 presents the main effects of ad type and each treatment on arousal. A difference of means test between the positive and negative ads reveals no statistically significant difference, though the effects are in the expected direction. Therefore, based on the pooled means, it

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<sup>22</sup> The continuous measure results are included in the appendix.

appears that the negativity bias is unsupported. It is noteworthy that the means also reveal no significant differences within ad tone across the treatment conditions. Nonetheless, individual characteristics such as political knowledge and partisanship are expected to play a large role in determining arousal; thus, the pooled results may mask the effects across groups.

Multivariate analysis of the relationship between each key independent variable, including ad valence, while controlling for demographic characteristics of the sample allows for a more discerning test. To do so, I estimate the following model (1), which is consistent with the theoretical hypotheses outlined thus far:

$$Arousal = \beta_0 + \beta_1*PK + \beta_2*In-Party + \beta_3* PK X In-Party + \beta_4*Attack Ad + \beta_5*Age + \beta_6*Female + \beta_7*Partisanship + \beta_8*Education + \beta_9*Student + e$$

This model allows for the effect of in-party (versus out-party) appeals to vary by political knowledge (H2 and H3) whereas the effect of negative ads (versus positive) is theoretically constant (H1).<sup>23</sup>

The results are presented in Table 1.1. The coefficient on  $\beta_4 = 0.002$  and represents the effect of moving from a positive to a negative advertisement. Consistent with H1, the effect is positive and significant ( $p < 0.05$ ). For context, the arousal variable ranges from -0.005 to 0.01, with mean of 0.0015 (standard deviation = 0.0029). In other words, viewing an attack ad instead of (since the comparison is between subjects) a positive ad leads to a one standard deviation increase in arousal. Table 1.1 also presents the results of the same model with an additional control for the strength of partisanship (Model 2).<sup>24</sup> Doing so slightly weakens the magnitude of the effect, though the directionality and significance remain. Taken together, I find this to be evidence in favor of H1 and consistent with existing research that demonstrates a negativity bias

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<sup>23</sup> See the appendix for a discussion and tests of the model specification.

<sup>24</sup> PID Strength is the continuous difference between the participant's in- and out-party feeling thermometer ratings (pre-treatment), scaled from -1 (preference for out-party) to +1 (preference for in-party).

in physiological responses. Nonetheless, I do not wish to overstate the effect, as two different tests of the H1 produced conflicting results. Nonetheless, the small magnitude of the effect in the multivariate analysis is consistent with a single-exposure experiment that relies on between-subjects comparisons, an impressive result by some standards, as many physiology studies rely on repeated trials and within-subjects comparisons. Moreover, recall the ads were carefully designed to appear as similar as possible across ad tone. In this respect, the effect of ad valence will be muted, as unlike the ads seen on television or elsewhere, the negativity is rather mild. Therefore support for H1 is mixed but the effects are consistently in the predicted direction.

I turn now to the second hypothesis, which examines the relationship between political knowledge and arousal. Based on relevancy to citizen's engagement or interest in politics, I expect citizens at the high end of the political knowledge spectrum to be easier to arouse than those at either low or middle levels of knowledge (H2). In other words, I expect citizens with high levels of political knowledge to be more frequently aroused (relative to baseline) than citizens with less knowledge. Using the same model (2) and results from H1 (which controls for strength of partisan attachment) (in Table 1.1), H2 can be examined by focusing now on  $\beta_1$ , which represents the coefficient(s) for each level of political knowledge and  $\beta_3$ , which indicates how the effect of knowledge on arousal differs across in and out-party appeals. Political novices, or those with low knowledge comprise the excluded category. Since political knowledge is a categorical variable with an effect that is conditional on whether the ad is about the participant's in- or out-party, several coefficients determine the comparative effects. For example, the significant and negative coefficients on the interaction terms indicate that the effect of knowledge on arousal decreases as you move from an out-party ad to an in-party ad. To make the effects more interpretable, Figures 1.3 and 1.4 present the marginal effect of political knowledge on arousal for each treatment ad. In Figure 1.3, it is clear that a positive ad only significantly increases

arousal, relative to baseline, in one group and in one condition: among those high in knowledge in response to a positive ad about the out-party. Turning to Figure 1.4, arousal significantly increases from baseline in four of the six combinations. At low levels of knowledge, only an attack on the in-party significantly increases arousal. At high levels of knowledge, any attack ad significantly increases arousal. In the middle, only an attack on the out-party significantly increases arousal. To compare groups within treatment conditions, Wald tests further reveal those low in knowledge are significantly less aroused than those high in knowledge when facing either a positive or negative out-party ad ( $p = 0.06$ ), whereas individuals in the middle do not significantly differ from either other groups. Moreover, differences across groups are never significant when facing an in-party appeal. These results are consistent with H2 as those with the highest levels of knowledge demonstrate significant increases in arousal relative to baseline in 3 of the 4 conditions whereas both the low and middle categories do so only once. Moreover, the effects among novices and experts point to alternative motives or goals with regard to attention, as suggested by H3.

My third hypothesis expected ads about citizens' in-party to increase arousal, relative to out-party ads, with the strongest effect among those with low levels of political knowledge. The results for this hypothesis also derive from Table 1.1. The coefficient on In-Party ( $\beta_2 = 0.003$ ) indicates the effect of moving from an ad about the out-party to one about the in-party among participants with low knowledge. The effect is positive and significant ( $p < 0.10$ ). To determine the effect among those with middle and high levels of knowledge, the related terms should be added together. Figure 1.5 isolates the effect of an in-party (versus out-party) appeal averaging across ad types.<sup>25</sup> As is clear, the effect is null among those with middle and high levels of

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<sup>25</sup> The effects produced mirror those of Wald tests comparing each group to itself within ad valence (i.e. high knowledge arousal for an out-party positive (negative) ad versus an in-party positive (negative)).

knowledge. Therefore, H3 is partially supported; an in-party appeal is significantly more arousing than out-party appeal, irrespective of ad valence, only among those with low political knowledge.<sup>26</sup>

In sum, this set of results provide evidence that both stable characteristics such as partisanship and political knowledge, as well as properties of the ad such as valence, jointly influence citizens' degree of attention afforded to televised political ads. The results are consistent with the Limited Capacity Model of Mediated Message Processing (LC3M) and suggest that the ability of automatic and controlled processes to influence unconscious resource allocation extends to political predispositions. Therefore, we now have evidence that motivated processing based on partisanship occurs at an unconscious level, particularly among those with low levels of political information. Moreover, we also have evidence that those with high levels of political information are the most likely to “tune in” to political campaign ads. While the effects are not overwhelming in magnitude, small changes in arousal can have multiple downstream consequences.

## **Conclusion**

Political scientists have little insight into the conditions under which a televised political advertisement might win the “battle for attention.” Borrowing a framework from cognitive psychology and communication, this study finds evidence that differences in attention due to individual characteristics or dispositions are automatic and unconscious. To scholars outside of political science, these findings may seem unremarkable. Of course our brains (and bodies)

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<sup>26</sup> I also examined the possibility that the mechanism for this effect was not the topic of the ad (i.e. an in-party positive ad or an attack on the in-party) but rather, the congruence with existing attitudes (i.e. an in-party positive ad or an attack on the out-party). The results suggest this was not the case. Moreover, this topical explanation is consistent with Wang et al. (2014).

determine how our cognitive resources are allocated; there exists a good deal of research demonstrating the influence of existing attitudes on physiological responses in domains outside of politics. For example, variation in attitudes toward essentialism have been shown to influence arousal and how easily bicultural individuals navigate their identities (Chao et al. 2007). Alternatively, personality dimensions such as ego control are related to physiological responses to stress (Spangler 1997). Understanding the causal mechanism behind the political behaviors we care about is necessary. How can a fear-inducing ad lead to information search and thoughtful processing that is capable of altering an opinion if some citizens never pay attention to or cognitively engage with that ad?

Perhaps the key value in this study lies in identifying the effect of individual characteristics (political knowledge and partisanship) on the allocation of cognitive resources. Ultimately, these factors are crucial to determining how high the barrier to attention is set, even at an unconscious level. Returning to Figures 1.3 and 1.4, the influence of motivated processing is clear, albeit in sometimes unexpected ways. Those with low levels of political knowledge are drawn in by ads about their in-party, irrespective of ad valence. Among those with high knowledge, nearly all ads are given attention, with the exception being positive in-party ads. And among those in the middle with regard to knowledge, only an attack on the out-party elicits a significant increase in arousal.

Behaviorally, these findings imply that particular political behaviors and modes of citizenship are unlikely to be uniformly distributed across the population and, subsequently, the results may call into question whether all citizens are equally suited to and likely to engage in the normative ideals of democratic citizenship. The reception of political ads appears largely limited to those with the highest levels of political information. Notably however, reception of televised political ads among those with middling levels of political knowledge only occurs for attacks on

the opposition, which are reinforcing in their partisan content, thus limiting the likelihood of attitude change.

As with much experimental work, several limitations warrant consideration. First, future work ought to examine whether the effects of partisanship and political knowledge on physiology are unique to the medium (i.e. televised campaign ads) and whether viewing context (forced versus incidental exposure) has an influence over measures of attention. For this study, finding variation across attention and arousal is a “hard test” since the lab environment necessitates “forced attention” in an artificial manner. It seems reasonable to expect the differences in arousal to be magnified by exposure that occurs incidentally, as is often the case in the real-world.

Second, this study has a limited number of data points; while the sample size is relatively large for a lab study of physiology, it is small for a study that relies heavily on key interactions between individual characteristics and the treatment conditions. With a rising interest in work that relies upon physiology, future studies might have greater financial resources to obtain larger samples. As such, a related consideration and weakness of the current study is the need for balance across treatment conditions with respect to the key variables of interest. The current study did not balance the number of partisans or number of low, middle, and high knowledge respondents in each treatment condition. Future research of this type ought to consider stratifying or block randomizing based on pre-screening participants for key characteristics. This tradeoff reduces the “blindness” of the study by necessitating pre-screening but the advantages gained enable stronger causal claims since the treatment group sizes will be similar.

Third, this study opted for careful control of the stimuli, especially as concerns structural features of the advertisements, in order to enable stronger causal claims about the mechanisms that draw citizens’ attention. Thus, by design, the treatments were quite muted in their affective

content. An alternative approach might boost the tone (positive or negative content) of the ad or the partisan appeal within the ad, in an attempt to mimic real-world advertisements more closely, while still controlling other features of the treatments. Research has shown, for example, that dynamic imagery in advertising can increase attentiveness among viewers (Geiger and Reeves 1991).

Ultimately, this study finds the conditional nature of attention (and physiological arousal) perpetuates heuristic processing among so-called political novices, thus tuning them in when their in-group identity is activated. Nonetheless, the results are less problematic for novices than they could be since the impact on novices is not congruency-specific; rather, an attack on their in-party draws attention and allows for specific discrete emotions to guide their behavior. The story for those in the middle, however, is concerning, as they only seem to “tune in” when an ad is negative and congruent with their existing evaluations. If a sense of control enables appraisals to shift from fear to anger, as suggested by appraisal theories, these results suggest engagement or attentional patterns, as opposed to mere exposure, will lead to fear among novices but anger among those in the middle. Moreover, experts ease of tuning in to political stimuli, including televised ads, suggests they may continue to outpace their peers with respect to exposure and engagement with political information.

Table 1.1. Effect of Political Knowledge (PK) and Ad Type on Arousal

	(1)	(2)
PK (Middle)	0.001 (0.001)	0.001 (0.001)
PK (High)	0.003* (0.001)	0.003* (0.001)
In-Party	0.003* (0.001)	0.003* (0.002)
PK (Middle) X In-Party	-0.003* (0.002)	-0.004* (0.002)
PK (High) X In-Party	-0.004* (0.002)	-0.004* (0.002)
Attack Ad	0.002** (0.001)	0.002* (0.001)
PID Strength	-	-0.001 (0.001)
Age	0.002 (0.002)	0.002 (0.003)
Female	0.002* (0.001)	0.002* (0.001)
PID (R)	0.001 (0.001)	0.001 (0.002)
Education	0.007** (0.003)	0.007** (0.003)
Student	0.004* (0.002)	0.004* (0.002)
Constant	-0.009*** (0.003)	-0.009** (0.003)
Observations	51	50
R-squared	0.382	0.384

Standard errors in parentheses  
 \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

The dependent variable is physiological arousal (area), standardized within individuals. Political knowledge is categorized into low, middle, and high. In-Party (versus Out) and Attack Ad (versus Positive) are dummy indicators for the type of treatment advertisement. PID Strength is the continuous difference between the participant's in- and out-party feeling thermometer ratings (pre-treatment), scaled from -1 (preference for out-party) to +1 (preference for in-party).

Figure 1.1. Causal Model Schematic.

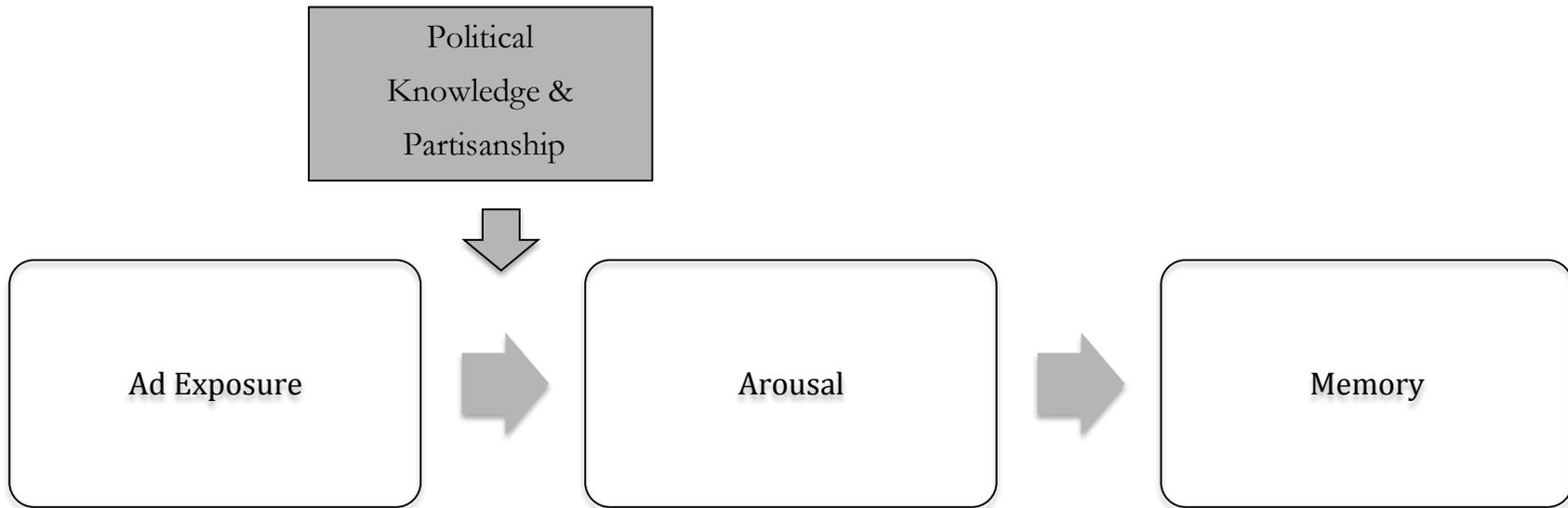


Figure 1.2. Mean Arousal (and St. Dev) for Treatment Ads and Pooled Effects by Valence.

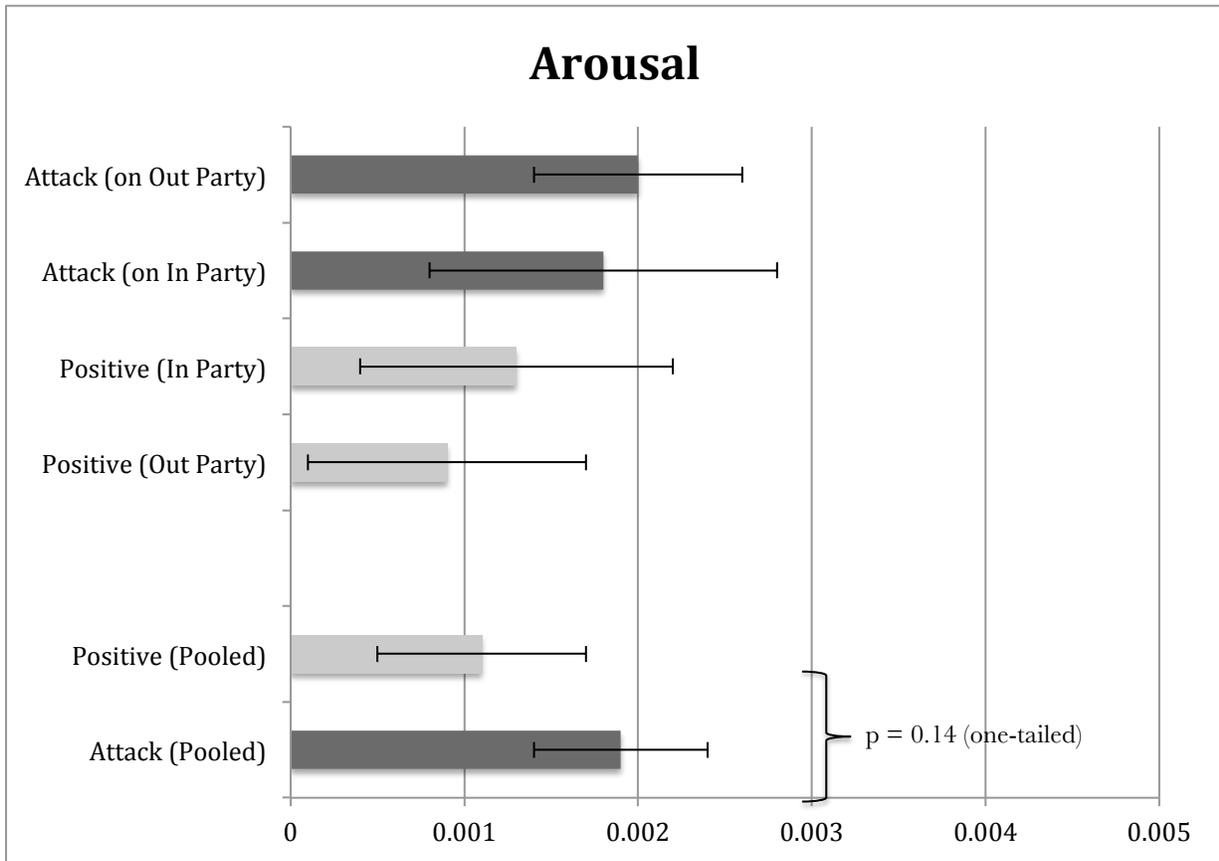


Figure 1.3. Predicted Marginal Effect of Political Knowledge and Ad Partisanship: Positive Ads.

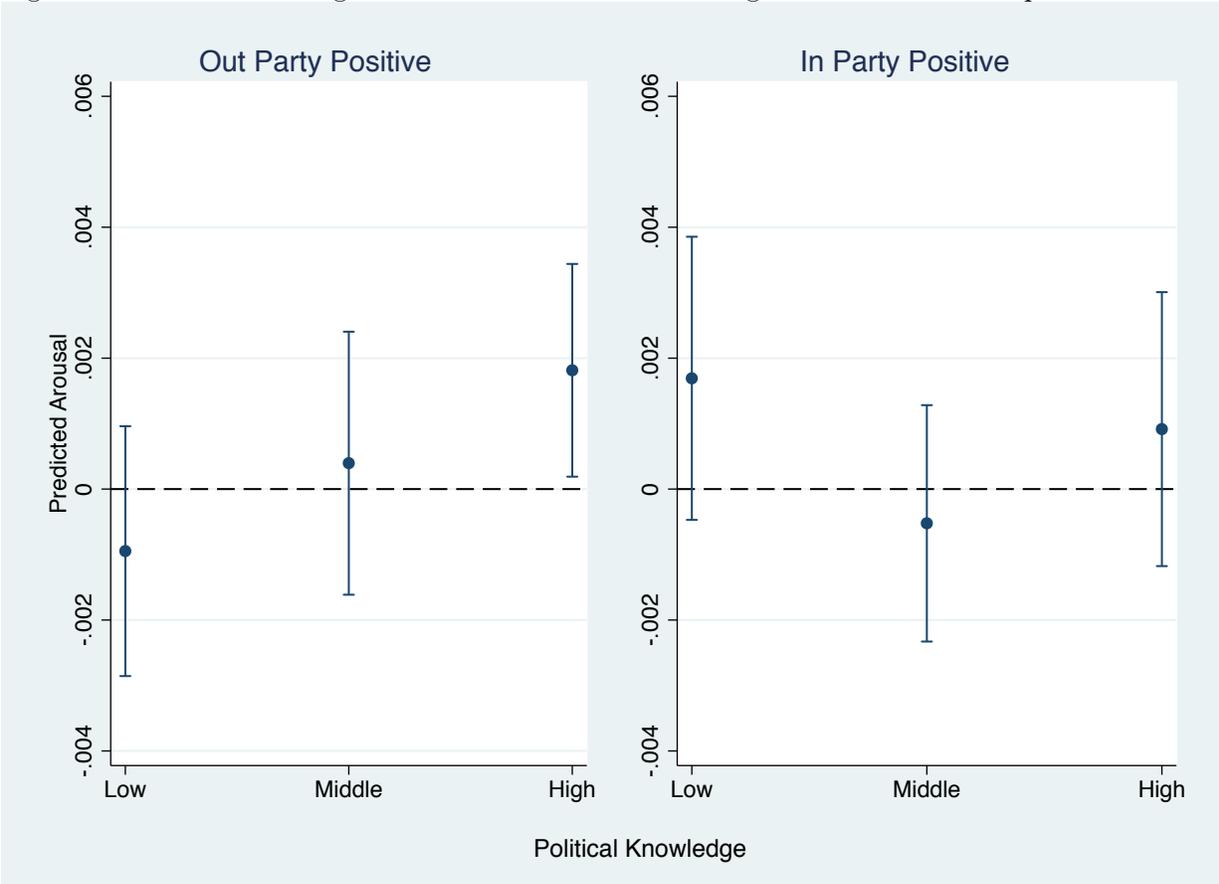


Figure 1.4. Predicted Marginal Effect of Political Knowledge and Ad Partisanship: Negative Ads.

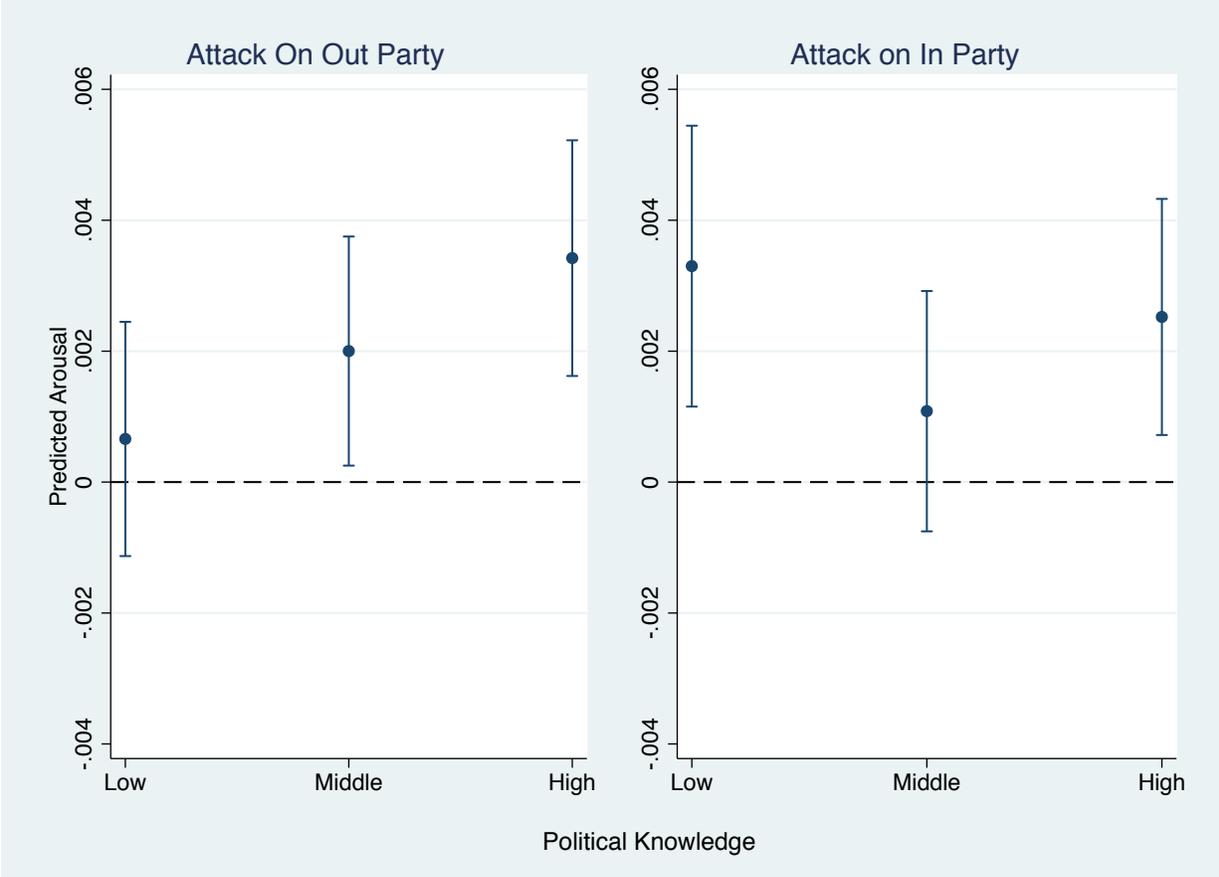
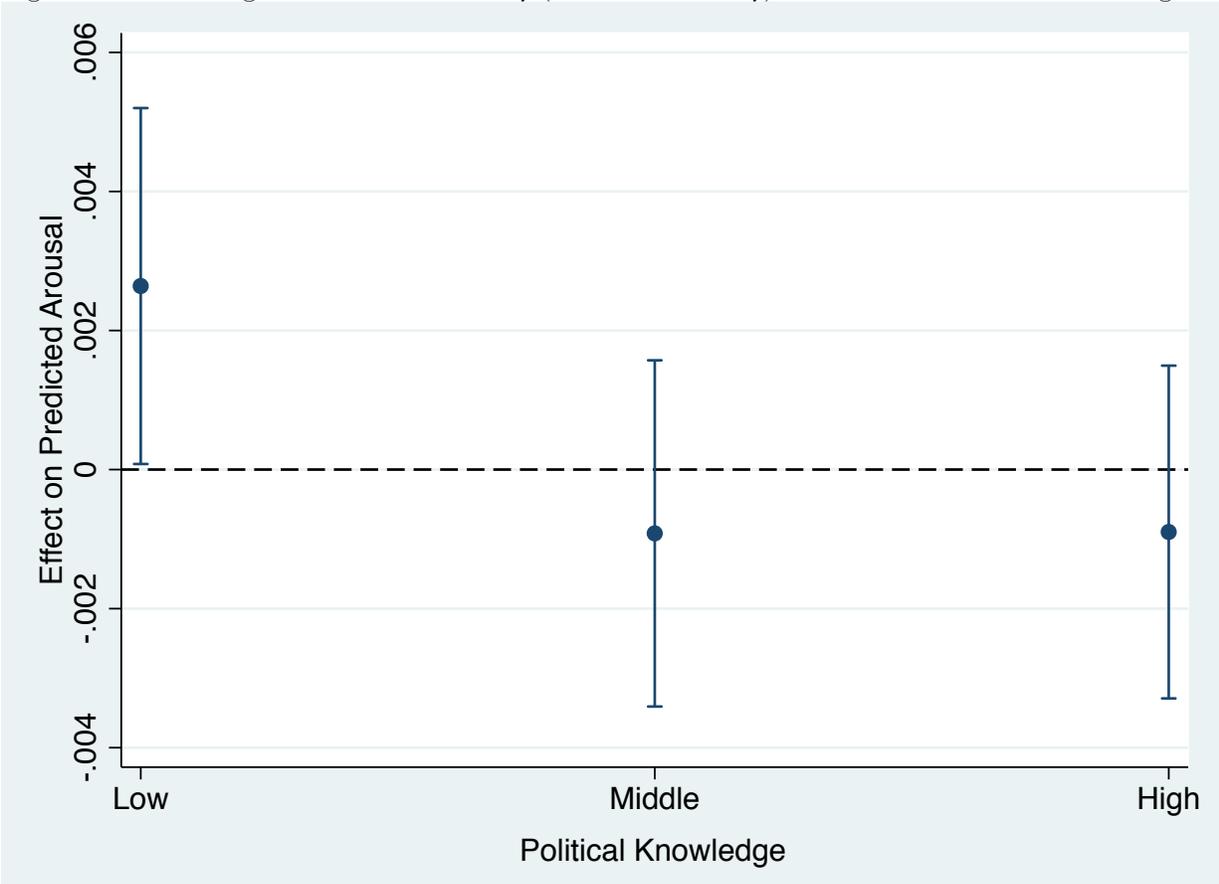


Figure 1.5. Isolating the Effect of In-Party (versus Out-Party) Ads Across Political Knowledge.



## **Chapter Two**

### **Motivating Participation Through Political Ads: Comparing the Effects of Arousal and Self-Reported Emotion**

#### Abstract

With numerous scholars expressing interest, and in some cases concern, over the impact of televised campaign ads on participation, it is vital that our understanding of the effects of political advertising be based on sound assumptions. Yet to date, research regarding emotion and politics relies almost exclusively upon self-reported measures. Using a randomized experiment with carefully manipulated campaign advertisements, I find evidence that an alternative measure of emotional response, physiological arousal, is a powerful and positive predictor of citizens' willingness to participate in politics. Importantly, the findings suggest that arousal is not simply a proxy for self-reported emotion, but rather, a different and complementary measure of the emotional experience.

Every two years, if not more often, citizens are faced with a barrage of campaign advertisements. Thanks in part to staggered election cycles, primaries, and the growth of ballot propositions, whether watching television, listening to the radio, or searching the Internet, political advertisements are everywhere. Despite their ubiquity, many citizens insist that political ads do not influence *their* behavior—it's only foolish people who let ads sway their behavior or beliefs. For many citizens, "swaying behavior or beliefs" implies that ads work by persuading in an overt manner. Yet ads are given scant deliberate attention and are rarely remembered. According to Schudson (1984), however, "This does not mean ads are ineffective. In fact...television ads may be more powerful precisely because people pay them so little heed"(4).

How so? Political ads typically carry an emotional appeal (Brader 2006; Ridout and Searles 2011). Due in part to the growth of experimental research in political science, we now have evidence that advertisements and the emotions they evoke are capable of influencing voter behavior (Brader 2005, 2006; Kaid, Leland, and Whitney 1992; Kern and Just 1995). For example, campaign ads that use music and imagery to motivate enthusiasm lead to increases in voters' willingness to volunteer for a campaign and their intent to register to vote, whereas ads appealing to fear increase interest in the campaign and intention to vote (Brader 2006).

With numerous scholars expressing interest, and in some cases, concern, over the impact of campaign ads on participation, it is vital that our understanding of the effects of political advertising be based on sound assumptions. Yet to date, research regarding emotion and politics relies almost exclusively upon self-reported measures.<sup>27</sup> Using a randomized experiment with carefully manipulated campaign advertisements, I argue that reliance on self-reported emotion leads political scientists to miss an important cause of participation, as physiological arousal proves to be a powerful and unbiased predictor of citizen's intent to participate in politics. Using a direct measure of emotional arousal, *skin conductance*, I find evidence that arousal and self-reported emotion capture different elements of the emotional experience. The results call attention to the need for greater investigation into the meaning and interpretation of self-reported emotion, as well as for greater inclusion of complementary measurement methods, including physiological response, in political science work.

In what follows, I begin by providing an overview of the relationship between political advertisements and participation, highlighting the impact of self-reported emotion. Then, I discuss measurement and the role of physiological arousal. Next, I put forth several hypotheses

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<sup>27</sup> A growing number of researchers have used emotion induction techniques, which do not suffer from this type of measurement challenge (e.g. Banks and Valentino 2012; Valentino et al. 2011).

about these relationships. Following this, I test these hypotheses using a lab-based experiment and review the results. Lastly, I conclude by discussing the implications for future research.

## **The Role of Arousal and Emotion in Participation**

In 2012, it was estimated that the total amount of money spent on political advertising would hit 9.8 billion dollars (Delo 2012). What is the purpose of all that spending? Ads have been shown to provide information regarding issue positions (Ansolabehere and Iyengar 1995; Patterson and McClure 1976; Zhao and Chaffee 1995), to impact participation (Lau et al. 1999), to increase the salience of particular issues (Holbert et al. 2002), and to boost interest and engagement (Pfau et al. 2001), among a host of other responses.

When it comes to political participation broadly, much of the literature emphasizes long-term forces such as resources, skills, and interest. Yet a spate of recent work has focused on the influence of emotion and/or affect as a short-term motivation for participation (see Valentino et al. 2011). Specifically, anger has been shown to be a particularly powerful motivational force, arguably to a greater extent than anxiety and/or enthusiasm (Valentino et al. 2011). Two perspectives most directly contribute to the literature on emotion and politics: Affective Intelligence Theory (AIT) (Marcus, Neuman, and MacKuen 2000) and cognitive appraisal theory (Lazarus 1991; Lerner and Keltner 2000, 2001). In terms of the link between emotion and participation, each theory takes a different approach; AIT focuses on the immediate, unconscious impact of emotional reactions whereas cognitive appraisal theory focuses on the cognitive evaluations of these embodied preconscious reactions. More specifically, AIT maintains that emotions enable people to alter their decision-making process dependent on the situation. On the one hand, the disposition system is active during familiar situations and leads to automatic processing and habitual routines; on the other hand, the surveillance system is active

when unexpected situations arise and leads to explicit and deliberative processing, a more time consuming and cognitively demanding task (Marcus, Neuman, and MacKuen 2000). “Most people, most of the time, handle political stimuli that require little fresh thinking with routine reactions that belong to their disposition system. But when the emotional mechanisms in their surveillance systems signal serious danger, higher-level decision-making capacities are activated” (Graber 2007, 269). From the AIT perspective, anxiety signals uncertainty or threat and thus, activates the surveillance system and produces deliberative thinking whereas the disposition system is marked by enthusiasm and anger based on the familiarity of a situation and produces automatic or heuristic thinking.

Alternatively, theories of emotion relying on cognitive appraisals posit a process wherein citizens use their emotional states to infer information about their environment and respond accordingly (Arnold 1960; Frijda 1986; Lerner and Keltner 2001). In other words, individuals are constantly scanning their environment to make sense of the world around them and prepare for action. In doing so, they are attempting to rapidly determine when a stimulus is relevant for their personal, physical, or psychological well-being. Emotions, according to appraisal theories, serve as “relevance detectors” that focus attention and a subjective evaluation leads to which type of discrete emotion is experienced (Frijda 1986). Importantly, these appraisals can, though they need not always, occur outside of conscious awareness. Some of the most commonly researched appraisal categories include: novelty, valence, certainty, and control. “Appraisal theorists argue that small variations in any of the appraisals—a feeling of slightly less certainty or slightly more control, for example—change the emotional experience through thousands of subtle, nameless variations” (Ellsworth 2013, 127).

Broadly speaking, theories of emotion have suggested that physiological reactions can be considered part of the emotion itself, an antecedent, a concurrent response, or an effect.

Importantly, both AIT and appraisal theories suggest a crucial role for arousal. The two differ in that arousal serves as an antecedent in appraisal theories of emotion whereas, for Affective Intelligence Theory, emotion is a functional response indicating approach or avoid behavior and arousal serves as the strength of response. Despite its significance in the emotional process, very few studies of political advertising and emotion include direct measurement of physiological arousal. While this study is not situated to test the role of arousal among these competing models, it is the first to directly examine the influence of both self-reported emotion and physiological arousal on political participation in response to televised campaign appeals. In light of what we know about the role of emotions in motivating participation, this study investigates three key questions, focusing on two of the most prominently studied negative emotions, fear and anger. First, under what conditions does a direct, unbiased measure of emotional arousal predict participation? Second, to what extent is emotional arousal reflective of self-reported negative emotion? Third, are the two elements distinct and unique in their explanatory power? Before outlining several hypotheses, I next discuss the role of measurement in the current study.

### **Physiology as a Measurement Tool**

Measures of self-reported emotion rely on asking people how they feel. This is a sensible approach, as it has a high degree of face validity and has produced meaningful findings. Yet research in psychology has long demonstrated that affect is often experienced quickly and without conscious awareness (Bargh and Chartrand 1999; Lodge and Taber 2005; Zajonc 1980). According to Brader (2006), “[c]ues like those in campaign ads often trigger emotional responses but not conscious awareness on the part of the individual” (142). Consistent with several prominent theories of emotion, this research assumes that unconscious processes and physiological arousal precedes the cognitive labeling of emotion.

In recent years, there has been a growth of work examining the relationship between biology and political attitudes. Psychophysiology suggests that changes in heart rate, respiration, and muscle contraction are related to our psychological states. More narrowly, emotions have physiological roots (Damasio 1994, 1999, 2003). This study uses skin conductance level (SCL), a measure of electrodermal activity (EDA) or the rate of movement of electricity across the surface of the skin. Higher skin conductance is attributable to increased activation in the sympathetic nervous system (the fight or flight system); specifically, arousal increases moisture, which in turn enhances conductivity. Previous work finds arousal ratings of emotional stimuli to be monotonically correlated with skin conductance (Greenwald, Cook, and Lang 1989; Lang et al. 1993). Skin conductance has been found to be a good measure of emotional arousal and attention (Hubert and de Jong-Meyer 1991; Dawson, Schell, and Filion. 2007).<sup>28</sup> Of crucial importance to the current study, skin conductance has not been found to be a reliable measure of specific discrete emotions (Cacioppo et al. 2000).

With the increased use of physiological measures in political science comes a host of new findings that point to the importance of unconscious processes in determining political behavior. For example, physiological reactions to political debate have been shown to impact levels of trust in government, recollection of arguments, and the perceived legitimacy of political actors (Mutz and Reeves 2005; Mutz 2007a). Moreover, Oxley and colleagues (2008) find evidence that variations in response to threatening stimuli correlate with political attitudes on social policies. Similar work has found a pattern of responsiveness to stimuli that are generically aversive versus appetitive based on political attitudes: individuals on the left were more responsive to appetitive relative to aversive stimuli whereas those on the right displayed the opposite pattern (Dodd et al.

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<sup>28</sup> For more background on EDA and psychophysiology, see Dawson, Schell, and Filion (2007) and Smith and Hibbing (2011).

2012). Further, recent work has shown that individuals with a general proclivity toward higher electrodermal responsiveness are likely to actively participate in politics (Gruszczyński et al. 2013).

Only three published studies to date have examined physiological responses to televised political campaign ads. A 2007 study by Bradley, Angelini and Lee, used eyeblink startle reflex in response to negative advertisements to demonstrate activation of the aversive motivational system. Wang and colleagues (2014) used a host of physiological measures and found individuals to be more responsive to ads about their favored candidate, irrespective of the ad's tone, suggesting attention might be selectively motivated. Most recently, work by Daignalt, Soroka, and Giasson (2013) demonstrated a negativity bias in physiological responses such that negative ads produced higher ongoing activation relative to positive ads. I now turn to outlining several hypotheses.

## **Hypotheses**

According to Bradley (2009), “[e]motion is considered fundamentally a disposition to act (Frijda, 1986; Lang, 1979, 1985)”(2). Consistent with a two-dimensional “circumplex” structure (Plutchik 1980) emphasizing (1) valence: positive or negative, and (2) arousal: low or high, variation in these dimensions reflect activation of the appetitive and defensive motivational systems. Specifically, increases in arousal are associated with anticipated action. Based on what we know about emotion, I expect that as physiological arousal increases, so too should citizens’ willingness to participate.

*H1: Arousal will positively predict intent to participate.*

This expectation is consistent with recent work demonstrating a link between an overall tendency to be more physiologically aroused and political participation (Gruszczyński et al.

2013). Yet it is novel in that the expectation is causal and the stimuli on which arousal depends is overtly political.

Following from this, and based largely on existing research, I also expect to find evidence of a relationship between self-reported negative emotion and political participation. Specifically,

*H2: Self-reported anger will increase political participation.*

*H3: Self-reported fear will decrease political participation.*

In other words, as a participant reports becoming increasingly angry, their willingness to participate in politics ought to increase. This is consistent with several theories of emotion and recent findings (see Valentino et al. 2011). Alternatively, as a participant reports becoming increasingly fearful, their willingness to participate in politics ought to decrease. While both anger and fear prepare the body to act, fearful individuals may “shrink from action” as their emotional appraisal indicates a lack of control (Lerner and Keltner 2000, 2001; Smith and Ellsworth 1985). Recent work has demonstrated some circumstances under which fear increases particular types of action, arguably those that are low cost or risk actions, such as deeper processing and information seeking (Valentino et al. 2009). This study focuses on participatory actions that are behavioral and do not necessarily function as adaptive attempts to neutralize the threat that produces fear. For instance, rather than focusing on information seeking that mitigates a specific threat, the behaviors of interest herein involve taking actions such as initiating a conversation or attending a meeting, rally, or demonstration. Therefore, I expect fear to decrease participants’ willingness to participate given the interest in participation.

Lastly, it is important to determine the extent to which physiological arousal captures variation distinct from self-reported emotion. According to Ellsworth (2013) “...emotional experience is not a state, but a process, with changes in the appraisals, the bodily responses, and the action tendencies all providing feedback to each other and transforming the emotional

experience”(127). In other words, physiology is one element of the emotional experience, but it is unlikely to capture the entirety of it. Based on the two-dimensional structure of emotion and the theories of emotion reviewed above, I hypothesize

*H4: The relationship between arousal and participation will not diminish when self-reported emotion is taken into account.*

In other words, I expect arousal and self-reported emotion to be distinct elements of the emotional process with each having its own unique predictive power.

## **Experimental Design and Data**

In order to test the above hypotheses, I conducted a laboratory experiment designed to capture physiological arousal and self-reported emotion in response to carefully manipulated campaign advertisements. The design was a 2 (Ad Tone: Positive, Attack)  $\times$  2 (Ad Partisanship: Democrat, Republican), such that each participant saw one randomly chosen treatment ad. Therefore, the treatment ads consisted of four 40-second political ads, each specifically crafted to enable careful control of tone, message content, and structural features. Unlike previous research that examines physiology and political ads, designing entirely novel ads allows control over the ad scripts, background music, and image content, which remained consistent across ad sponsors and as close as possible across tone, with the exception of key phrases and images.<sup>29</sup> Given evidence that variation in SCL could be due to changes in uncontrolled structural features of the messages, such as music and camera changes (see Potter and Choi 2006), each of the four ads created have the following structural design: sponsorship image (still with PID), two video clips, three still images, one video clip, four still images, sponsorship image (still with PID). Lastly, the ads were designed to mimic actual campaign advertisements: high quality images and sound files were

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<sup>29</sup> Storyboards for the ads are available in the instrumentation appendix, Figures A.2 and A.3. Video files are available from the author upon request.

used, research assistants trained in video processing created the ads, and the scripts were read and recorded by professional voice actors.

The experiment was conducted at a large, Midwestern university from March 19 through May 8, 2014, and had a sample size of 61 participants, all U.S. citizens aged 18 years or older. It is notable that this sample size is relatively large in comparison to other studies of physiological response to political advertisements (Daignalt, Soroka, and Giasson (2013) had  $n = 31$ ; Wang and colleagues' (2014) study had  $n = 15$ ; Bradley, Angelini, and Lee (2007) had  $n = 51$ ). The sample was split evenly among student and non-student populations. There was variation within the sample along race (24% nonwhite), age (mean = 36 years), and gender (59% women), though it was skewed young (35% under 20 years) and Democratic (26% Republican).<sup>30</sup> There were no significant differences across treatment cells in the proportion of these demographic and partisan variables; thus, the differences observed between conditions can be attributed to the stimuli.

Participants were recruited from two databases: students were drawn from an Introduction to Psychology subject pool and non-students were drawn from a Clinical Studies database affiliated with a large hospital system (HS). The HS database consists of more than 17,500 individuals, including healthy volunteers and individuals with existing medical conditions.<sup>31</sup> All participants responded to an online listing that called for participation in a study about "Attention to Advertisements." The listing intentionally failed to mention politics and remained vague about the topic of the advertisements, a deception designed to mask the political

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<sup>30</sup> Regarding partisanship, the sample included 16 self-identified Republicans, 38 self-identified Democrats (both including 'leaners'), and 7 self-identified Independents.

<sup>31</sup> Participants with existing medical diagnoses known to influence physiology were excluded (e.g. major depressive disorders, substance abuse, etc.). Further, no systematic differences in physiology between the student and non-student samples were found.

nature of the content to attract participants with varied interests.<sup>32</sup> In exchange for one hour of participation, the students were given course credit whereas the non-students were given \$20 cash.

- Procedures -

For each participant, the experiment was conducted individually in the lab. Upon arrival, participants were randomly assigned to an experimental condition and escorted to a small room where they were seated facing a computer.<sup>33</sup> After obtaining consent, a researcher told participants that the study would involve watching two political advertisements for “candidates running for office in the state of Michigan.” With Michigan residents comprising nearly 77% of the sample, this deception was intended to increase investment in the ads while adding realism to the study.

The experiment was administered through the Qualtrics survey platform and began with several pretest questions, including age, partisanship, and interest in politics. Notably, most demographic questions were asked at the end of the study to limit motivational processing; an exception was the inclusion of partisanship and ideology, which were asked during the pretest to ensure accurate pre-treatment measures and the strength of these attachments.<sup>34</sup> Following the pretest questionnaire, participants washed and thoroughly dried their hands before they were

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<sup>32</sup> In an effort to increase diversity in terms of partisan affiliation, seven adult participants were recruited after answering a pre-screening question regarding their partisanship. Analyses indicated they did not differ significantly from the rest of the sample on demographic and interest variables.

<sup>33</sup> Due to the size and layout of the room, viewing took place 28 to 36 inches away from an 18-inch monitor.

<sup>34</sup> Asking about partisan identity may have primed participants to react to the treatment in a partisan manner. This was a deliberate decision intended to enable the collection of several attitude measures prior to treatment exposure; doing so increases confidence in measures of the strength of one’s partisan attachments, at the expense of (potentially) increasing motivated processing. I’d argue, for many citizens, the mere mention of politics is likely to prime partisan predispositions, so pretest measures of attachment do more good than harm.

attached to the physiological monitoring equipment.<sup>35</sup> Once attached, participants were instructed to keep their measurement hand as still as possible and told the study would begin with a three-minute baseline video before proceeding with the advertisements. Participant interaction with the researcher was minimized throughout the study in an effort to limit interviewer bias; all physiological data collection and survey questions took place without the researcher present.<sup>36</sup>

Immediately following the baseline video, participants answered several questions about their current emotions and the video content, and then completed an unrelated word-search as a distractor task. Next, the treatment ad was viewed, followed by the post-ad questionnaire which included self-reported emotion, memory measures, and several participation questions. After a distractor task, the researcher returned and detached the physiological equipment. Finally, the participant answered several more survey questions before being debriefed on the purpose of the study and compensated.<sup>37</sup>

#### - Physiology: Measuring Arousal -

When capturing skin conductance level (SCL), higher values indicate greater conductivity; in practice, this translates as higher values equals greater arousal. For this study, the researcher used a keypress to flag the start and end of each video, isolating each treatment ad as a period of interest. To clean and prepare the data for analysis, each period was examined separately. The latency window for each time period was 3 seconds; in other words, data analysis for the treatment ads began 3 seconds after the start of the video and ended three seconds after

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<sup>35</sup> Measures of physiological arousal were collected using two disposable Biopac electrodes (Model: EL507) placed on the palm of the participant's nondominant hand (the thenar and hypothenar eminences) (Blascovich et al. 2011). The measurement equipment was a Biopac MP150 bioamplifier and data was recorded continuously using AcqKnowledge (v 3.9) software for Macintosh.

<sup>36</sup> One participant had trouble with a "drag and drop" ranking question in the pretest survey and the researcher was called in to show them how to respond using the computer mouse.

<sup>37</sup> In the appendix, Figure A.1 provides a schematic of the study procedures.

the conclusion of the video. For the baseline video, data was captured for 90 seconds of the three-minute period, beginning thirty seconds after the video began. This was done to eliminate variation at the start of the baseline video while retaining a common period for data collection. In order to isolate the physiological changes of interest, and consistent with best practice, two functions were used to process the data. First, a difference function reduced or eliminated the slow drift present in SCL signals (see Naqvi, Shiv, and Bechara 2006). Second, high frequency noise, such as electromagnetic disturbances from florescent lights, can cause error and were removed with a smoothing function (see Figner and Murphy 2010).

Ultimately, the current study emphasizes each individual's relative comparison between treatment and baseline levels, thus standardizing measures within each participant as a way to address potential individual differences in variability (see Ben-Shakhar 1985; Dawson, Schell, and Filion 2007). In other words, all physiological data for this study is a within-subjects difference from baseline. Within-subjects standardization adjusts for individual differences in responsiveness and relies upon the mean, a more stable and reliable statistic than measurements of maximum response (Ben-Shakhar 1985). Specifically, for each participant, difference scores were calculated using a measure of the area bounded by the curve during the time periods of interest. The area measure is "better suited for automated data analysis and captures both the amplitude and temporal characteristics of SCL, and therefore is likely to be a more valid indicator than either aspect alone" (Figner and Murphy 2010, 8). Operationalized in this manner, the measure captures the effect of each treatment ad on SCL while controlling for individual variation in baseline arousal and reactivity levels.

Skin conductance measures are often skewed, as is the case with this data (see Boucsein

2012).<sup>38</sup> Data transformations are common when using EDA because they serve as a statistical method to minimize skew. The usefulness of transformations, however, is controversial. There is a tradeoff between allowing the data to appear normally distributed yet arbitrarily reducing variance. Levey (1980) argued that transformations ought only occur when they are justified by known or assumed characteristics of the system under investigation. That said, transformations of EDA data are typically based on statistical considerations (Boucsein 2012; Venables and Christie 1980) despite the commonality of skew.<sup>39</sup> Descriptive statistics for these and all key variables are presented in Table 2.1.

#### - Self-Reported Emotion -

After each ad, participants were asked to indicate how much they felt each of ten emotions “right now.”<sup>40</sup> Self-reported emotion is operationalized as a continuous measure that combines two related questions into two equally weighted scales; anger consists of angry and outraged ( $\alpha = 0.82$ ) whereas fear consists of anxious and worried ( $\alpha = 0.53$ ).<sup>41</sup> The scores are standardized and scaled from zero to one. Manipulation checks confirm that ad type produced significantly different mean levels of self-reported emotion in the expected directions (see Table 2.2).

Before reviewing the results, an important note on causality is warranted. This study

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<sup>38</sup> Given the skewed distribution, there is concern about the influence of a small number of outliers on the relationships of interest. I used a systematic rule to identify and exclude highly variable observations: responses greater than  $\pm 3$  standard deviations from the mean were dropped from all analyses ( $n = 3$ ) (see Hein et al. 2011). This brings the effective sample size to  $n = 58$ .

<sup>39</sup> After removing outliers (see footnote 12), both a Shapiro-Wilk and Shapiro-Francia normality test produce marginal significance ( $p < 0.10$ ), suggesting the distribution may still be non-normal.

<sup>40</sup> The items were randomized and included: anxious, sad, angry, depressed, bored, enthusiastic, worried, proud, outraged, relaxed. Response options were a five-point, fully labeled scale: Not at all, slightly, somewhat, very, extremely. This study focuses on the two negative emotions of fear and anger, as they have been the focus and have the strongest relationship with participation in much of the current literature. Full question wording is provided in the appendix.

<sup>41</sup> Alternative weightings by factor analysis results were also analyzed. The results are equivalent under both specifications.

takes advantage of the experimental method, which enables strong causal inferences. Given the growth of biological variables in political science research, there exists a natural inclination to ascribe causality to biology, since it is presumed to occur prior to cognition. Scholars ought to resist this temptation. In many cases, the causal arrow can, and likely does, run in both directions. As stated by Smith and Hibbing (2011), “psychology and physiology are often enmeshed in a reciprocal relationship” (227). For example, recent work demonstrates that cognition and emotion work together in a “feedforward” system whereby emotional appraisal serves to prioritize some information for further cognition at the expense of other information (Spezio and Adolphs 2007). The causal claims put forward by this research are based on theoretical assumptions. As mentioned previously, this study assumes that arousal precedes the labeling or awareness of a discrete emotion; put differently, arousal occurs prior to a self-reported emotional response.

The results proceed as follows: I begin by establishing an alternative predictor of citizens’ willingness to participate in politics, emotional arousal (H1). Then, I examine the relationship between self-reported negative emotion and participation in the current sample (H2 and H3). Next, I briefly examine the link between arousal and self-reported emotion. Following this, I analyze the discriminant power of arousal to predict participation (H4). Lastly, I conclude by reviewing the implications.

## **Results**

Is arousal a significant predictor of intent to participate in politics? To begin, I estimate two simple linear models of political participation with arousal as the key independent variable. Unlike Model 1, Model 2 includes measures of self-reported negative emotion as additional

independent variables.<sup>42</sup> The dependent measure is a participation index of three questions that were asked after the treatment ad regarding likelihood to participate on a five-point scale. The specific items tapped willingness to: (1) sign a petition, (2) initiate a conversation on a political topic, and (3) attend a meeting, rally, or demonstration. Table 2.3 presents the results.<sup>43</sup> Due to the small sample size, all of the results presented throughout the study estimate 90% confidence intervals (Kam and Franzese 2007). Ad Type is an indicator variable which classifies each treatment ad as: Positive In-Party, Positive Out-Party, Attack on In-Party, and Attack on Out-Party.<sup>44</sup> As is evident by  $\beta_1$  in both models, arousal is a strong and positive predictor of political participation in response to televised campaign ads. The results provide evidence that arousal is a short term motivational force, in support of H1. In Model 2, it is noteworthy that neither fear nor anger achieves statistical significance, though they are in the expected directions with anger positively and fear negatively associated with participation; leaving H2 and H3 questionable.

As further examination of H2 and H3, Table 2.4 presents the results of several models predicting participation for each self-reported negative emotion. The models do not include arousal and directly test whether the impact of self-reported emotion depends on the treatment condition.<sup>45</sup> Recall from Table 2.2, the difference of means tests comparing self-reported emotion by ad valence were all significant (i.e. participants were more fearful and angry at negative ads than positive). Consistent with appraisal theory, self-reported emotion may depend in large part on the ad context; therefore, the models in Table 2.4 include an interaction term for self-reported emotion by an indicator variable for treatment condition. A Wald test for each model confirms

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<sup>42</sup>  $Participation = \beta_0 + \beta_1 * Arousal + \beta_2 * Emotion + \beta_3 * Ad\ Type + \beta_4 * Knowledge + \beta_5 * Age + \beta_6 * Female + \beta_7 * Partisanship + \beta_8 * Education + \beta_9 * Student + e$

<sup>43</sup> The appendix includes an examination of possible non-linearity in the relationships between the key independent variables and participation.

<sup>44</sup> Pure Independents are excluded from the analyses (n = 7).

<sup>45</sup>  $Participation = \beta_0 + \beta_1 * Emotion + \beta_2 * Ad\ Type + \beta_3 * Ad\ Type\ X\ Emotion + \beta_4 * Knowledge + \beta_5 * Age + \beta_6 * Female + \beta_7 * Partisanship + \beta_8 * Education + \beta_9 * Student + e$

the need for such an interaction for both anger ( $F(2, 38) = 4.84, p = 0.01$ ) and fear ( $F(3, 37) = 2.38, p = 0.09$ ).

Figure 2.1 presents only the significant marginal effects by treatment condition based on Wald tests examining if the effect of emotion on participation (as dependent on treatment condition) is significantly different from zero. For anger (on the left panel), it is first noteworthy that there is no reported anger to an in-party positive ad across the entire sample. Second, anger increasingly motivates participation after an out-party positive ad yet decreases intent to participate after an attack on the in-party; a Wald test reveals that the two effects are significantly different from each other ( $F(1, 38) = 7.01, p < 0.01$ ). Moreover, when pooled, the difference between in versus out-party appeals is significant ( $F(1, 38) = 5.25, p = 0.03$ ). Turning to fear (on the right panel), Wald tests reveal the effect of fear is significantly different from zero for both an in-party positive ad and an attack on the in-party; fear significantly decreases participation in both of these cases. Furthermore, the effect of fear in response to an appeal about the out-party cannot be distinguished from zero. However, when pooled, the difference between in versus out-party appeals is nearly significant ( $F(1, 37) = 2.40, p = 0.13$ ).

Taken together, the results make it clear that the effect of self-reported anger and fear on participants' willingness to participate is not constant across treatment conditions but rather, dependent upon whether the ad is about the in- or out-party, which significantly alters the direction of the effect. Ads about the out-party lead to a positive relationship between anger and willingness to participate whereas ads about the in-party lead to a negative relationship between both anger and fear with respect to willingness to participate. Ultimately, the positive effect of anger on participation is driven by participants who reported anger in response to an out-party positive ad whereas the negative effect of fear on participation is driven by participants who responded to any ad about the out-party with fear. Due to the small sample size, collinearity

problems arise with any attempts to investigate these effects more narrowly.

Nonetheless, a few descriptive statistics call for greater investigation into the meaning of self-reports. First, only three participants reported anger in response to an out-party positive ad and they had higher mean levels of political knowledge ( $p = 0.14$ , one-tailed) and stronger partisan ties than the rest of the sample ( $p = 0.18$ , one-tailed).<sup>46</sup> Moreover, 18 respondents reported fear to an out-party ad; they had lower mean levels of political knowledge ( $p = 0.13$ , one-tailed) and weaker partisan ties than the rest of the sample ( $p = 0.12$ , one-tailed). These results are by no means definitive: they are based on a small number of people and are statistically marginal at best. Yet they are suggestive that individuals with high levels of political knowledge and partisan ties are driving the positive effect of anger on participation in response to a positive ad about one's opposition party; alternatively, individuals with low levels of political knowledge and weaker partisan ties may be driving the negative relationship between fear and willingness to participate when responding to any out-party ad. I discuss the plausible theoretical implications of these findings after briefly examining the relationship between arousal and self-reported emotion.

In addition to the results presented, I conducted multiple tests of mediation using alternative statistical procedures to examine possible links between arousal and self-reported emotion (Imai et al. 2010; Preacher and Hayes 2004). I used pooled and treatment-sorted data and employed a host of alternative specifications (including moderated mediation) and various numbers of iterations, yet no evidence of mediation was found. One explanation, and arguably the most likely, is the sample size is simply too small for this sort of analysis. When pooled, multiple interactions are necessary and when sorted, the number of observations ranges from  $n = 10$  to  $n = 16$ .

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<sup>46</sup> Details on the measures of political knowledge and strength of partisanship can be found in the appendix.

An alternative explanation suggests the relationships are truly distinct; specifically, the impact of arousal on participation is not mediated by self-reported emotion. From a theoretical standpoint, this seems implausible given what decades of research in psychology has suggested. If emotions have physiological roots and self-reports are accurate measures of an individual's discrete emotional state, we would expect to find some evidence that ties them together. Table 2.5 directly examines the relationship between arousal and self-reported emotion for one treatment condition: an attack ad on the out-party.<sup>47</sup> This condition is chosen by necessity, as arousal failed to significantly predict negative emotion in all other treatment conditions and a pooled model. This, in and of itself, is revealing, as the link between physiological arousal and self-reported discrete emotions is muddled not only by the stimuli but also by an unknown (arguably infinite) number of individual characteristics. For example, work by Mondak and colleagues (2010) demonstrates a variety of interactions between broad personality traits and discrete, politically relevant situations that affect political participation. As indicated in the table, I chose to examine strength of partisanship as one such characteristic; there are undoubtedly others that equally warrant exploration. Strength of partisanship is a dummy variable indicating whether the participant is above or below the median (0.5) of the difference between an in-party feeling thermometer and an out-party feeling thermometer in the pre-treatment questionnaire. Higher values indicate a stronger preference for the in-party.

To make the effect of arousal on anger and fear more interpretable, Figure 2.2 presents the marginal effects of arousal by strength of partisanship. Among those with strong partisan ties, Wald tests confirm the effect of arousal on self-reported emotion in response to an attack on the out-party is never distinguishable from zero. Among those with weak ties, increases in arousal

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<sup>47</sup> *Self-Reported Emotion (Attack Ad on Out-Party)* =  $\beta_0 + \beta_1 * Arousal + \beta_2 * Strength\ of\ Partisanship + \beta_3 * Arousal\ X\ Strength\ of\ Partisanship + \beta_4 * Knowledge + \beta_5 * Age + \beta_6 * Female + \beta_7 * Partisanship + \beta_8 * Education + \beta_9 * Student + e$

significantly predict increases in fear. There are no significant effects identified with respect to anger, and the large confidence intervals suggest high variability among the weakly attached. Moreover, a difference of means test for arousal in response to an attack ad on the out-party by strength of partisanship is not significant ( $p = 0.31$ ) suggesting these effects are not attributable to arousal alone.

In sum, the set of analyses examining the link between arousal and self-reported emotion are largely inconclusive as there are few distinguishable patterns. Before turning to the final hypothesis, a bit of interpretation is warranted. If self-reported emotions are simply rationalizations of existing views, combining emotions toward opposing parties and candidates would produce scales that do not predict participation—an interpretation somewhat consistent with the findings regarding self-reported emotion and participation in this study (see Table 2.3 and 2.4). Yet the story is not entirely one-sided. Theoretically, appraisal theory predicts, for example, that individuals with greater certainty about a stimulus might interpret their arousal as anger whereas those with less certainty or ability to place blame might appraise their arousal as indicating fear. This explanation is consistent with the preliminary descriptive statistics about the role of political knowledge and strength of partisan attachments reviewed previously. Further, finding statistically significant relationships between arousal and discrete self-reported emotions has proven elusive within psychology for decades. Yet as demonstrated above, it is possible to find relationships that are both powerful and theoretically plausible, as is the case with strength of partisanship in response to an ad attacking the out-party (see Figure 2.2). The variability among weak partisans when it comes to anger may be reflective of true variability (not error), as weak partisans might have lower certainty or lack the willingness to place blame in comparison to their strongly attached counterparts. The current research cannot distinguish whether anger appears to be the most powerful motivator of political behavior in previous studies because it is arousing

versus whether it motivates behavior because of a spurious relationship with some alternative variable such as political knowledge, interest, or strength of partisanship. What's more, the types of behaviors studied by political scientists do not easily lend themselves to motivating behavior in response to fear because the behaviors are low-stakes: voting, signing a petition, or donating money (for example) cannot compare with a threat to one's life or well-being. Put differently, perhaps it is the behaviors associated with politics (and this study, more narrowly) that lend themselves to demonstrating fight over flight, or the power of anger over fear. Further experimental investigation into the individual attributes that influence self-reported emotion in response to political stimuli is encouraged, particularly with larger sample sizes.

As a final step in the analysis, I examine the extent to which arousal captures a different element of the emotional experience than self-reported emotion. To do so, I estimate two models that include arousal and self-reported negative emotion, one for anger and one for fear. The dependent variable is stated intent to participate in politics. If arousal were simply a proxy for self-reported emotion, or vice versa, only one of the two variables would retain statistical power. Table 2.6 presents the results.<sup>48</sup> Consistent with the previous analysis, an interaction between self-reported emotion and ad type is included. As with Table 2.3, the effect of arousal is positive and statistically significant; moreover, it is not diminished by the inclusion of self-reported emotion. Furthermore, the effect of each self-reported emotion mirrors the effects found in Table 2.4 when arousal was not included in the model. Ultimately, the results provide strong evidence in support of the notion that arousal is a positive predictor of citizens' intent to participate (H1) and arousal has independent predictive power from self-reported emotion (H4).

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<sup>48</sup>  $Participation = \beta_0 + \beta_1 * Arousal + \beta_2 * Emotion + \beta_3 * Ad\ Type + \beta_4 * Ad\ Type\ X\ Emotion + \beta_5 * Knowledge + \beta_6 * Age + \beta_7 * Female + \beta_8 * Partisanship + \beta_9 * Education + \beta_{10} * Student + e$

## **Conclusion**

This study has found arousal to be a reliable and unbiased predictor of citizens' willingness to participate in politics in response to televised campaign advertisements. From a theoretical perspective, the current results are short-term yet direct. In the real world, it is likely that a political stimulus such as a single ad, a conversation, or a newspaper article will have an immediate effect that quickly dissipates. Yet over time, it is unknown to what extent these effects accumulate and, in many instances, the stimulus could be encountered at a key moment in time. For example, an online ad might solicit an immediate donation to a campaign or an arousing political conversation might increase the likelihood a citizen signs a canvasser's petition.

Through the use of unconscious physiological indicators of emotional arousal, the results call attention to the need for a closer examination of what self-reported emotions capture as well as for greater inclusion of additional measures of emotional response. To be clear, self-reported measures of emotion are not invalidated by the current study. In fact, while definitive links between arousal and self-reported emotion are difficult to find, it is not impossible; and when found, the results are consistent with appraisal theories of emotion such that participants with weaker partisan ties report increases in fear as arousal increases (theoretically due to a lack of certainty in response to an attack ad on the out-party).

More than a century ago, the president of the American Political Science Association suggested that physiology might be suitable for the study of politics (Lowell 1910). Without the inclusion of such measures, our understanding of emotion is incomplete. As Mutz (2007b) notes,

...there is no easy solution, but it seems doubtful that post hoc self-reported emotion will continue to be defensible as the standard measure of emotional response. If political psychologists are convinced—as we seem to be—that automatic, preconscious emotional reactions precede and shape the kind of subsequent cognitive processing that transpires, then there is little choice but to pursue alternative approaches. (85)

To borrow an example from Smith and Hibbing (2011), physiological measures of disgust have served as a complement or validation tool for self-reported measures of disgust. Specifically, self-reported disgust has been shown to be predictive of some political attitudes (Inbar, Pizarro, and Bloom 2009), whereas physiological measures of disgust have predicted similar and additional attitudes; yet the two are seemingly uncorrelated. Thus providing evidence that disgust may have both “a socialized and a physiological dimension, meaning that using just one approach misses an important means to understand the origins of certain issue attitudes”(228). This interpretation is consistent with the results of this study, as arousal and self-reported emotions capture different elements of the emotional experience (correlations between them range from -0.06 to +0.06).

As opposed to suggesting one approach ought to trump another, however, this research intends to encourage more widespread use of alternative measures. Thus, current approaches are not devalued, as they constitute the core of the field. In fact, this study serves to validate self-reported anger. But future researchers would benefit by incorporating a more widespread approach.

Of course, conducting physiological analysis is not without its pitfalls. Foremost in this respect is the cost of data collection. There are monetary costs associated with laboratory setup, equipment, subject fees, and software. Moreover, there are high startup costs in terms of money and time when it comes to researcher training and hiring research assistants. Therefore, for some, these costs are prohibitory. Nonetheless, a viable alternative for many is to consider interdisciplinary work. By working with colleagues in related disciplines that have such training and resources—such as marketing, cognitive psychology, or economics—both parties stand to make gains by broadening their substantive influence. Should all researchers of emotion be using these types measurement tools? The short answer is probably not. But who should use them remains a challenge. I’d advocate for more widespread use of these measures from researchers

whose main interests lie in the influence of emotion. Not every study needs physiological data. Yet the over-reliance on self-reported measures is likely to lead scientists to miss important variation or to get the causal model wrong. Simply stated, the more researchers taking advantage of this type of data, the more likely it is that science broadly, and political science more narrowly, will be able to use all of the tools at our disposal to uncover the true nature of these relationships.

In sum, the importance of including alternative measures of emotional response in political science work cannot be overstated. While both physiology and self-reported emotion are consistent predictors of political participation, arousal appears, in this study, to be more powerful and less dependent upon in versus out- party dynamics.

Table 2.1. Descriptive statistics for key variables.

	Mean	SD	Range	Obs.
Arousal (Area)	0.002	0.003	-0.005 – 0.01	58
Anger	0.127	0.210	0 – 1	58
Fear	0.091	0.137	0 – 0.5	58
Willingness to Participate <sup>1</sup>	0.367	0.238	0 – 0.83	61

<sup>1</sup>The number of observations is largest for the participation measure since it includes a control group, which did not view a treatment ad but completed every other part of the study in the lab.

Table 2.2. Mean Comparison of Key Variables by Treatment Condition.

	Arousal <sup>1</sup>	Anger <sup>2</sup>	Fear <sup>3</sup>	Obs.
Positive In -Ad	0.001 (0.003)	0 0	0.038 (0.084)	10
Positive Out-Party Ad	0.001 (0.003)	0.038 (0.079)	0.029 (0.075)	13
Attack on In-Party Ad	0.002 (0.004)	0.192 (0.195)	0.135 (0.157)	13
Attack on Out-Party Ad	0.002 (0.003)	0.219 (0.217)	0.164 (0.169)	16

Standard errors in parentheses.

<sup>1</sup> There are no significant differences in arousal within and across both ad type (positive versus attack) and appeal (in versus out-party).

<sup>2</sup> For anger, the difference of means across ad type is significant (positive versus attack (pooled) ( $t = -4.13$ ,  $p < 0.001$ , two-tailed). The difference of means tests within ad type are not significant (i.e. positive (attack) in- versus out-party ads).

<sup>3</sup> For fear, the difference of means across ad type is significant (positive versus attack (pooled) ( $t = -3.58$ ,  $p < 0.001$ , two-tailed). The difference of means tests within ad type are not significant (i.e. positive (attack) in- versus out-party ads).

Table 2.3. Effect of Arousal on Willingness to Participate.

	(1)	(2)
Arousal	22.08** (10.46)	23.90** (10.59)
Anger	-	0.157 (0.202)
Fear	-	-0.182 (0.270)
Positive Out-Party Ad	0.007 (0.084)	0.007 (0.085)
Attack on In-Party Ad	-0.104 (0.083)	-0.142 (0.090)
Attack on Out-Party Ad	-0.057 (0.080)	-0.067 (0.089)
Political Knowledge	0.142 (0.180)	0.125 (0.182)
Age	-0.053 (0.164)	-0.076 (0.198)
Female	-0.063 (0.065)	-0.042 (0.069)
Partisanship (R)	-0.188* (0.100)	-0.193* (0.104)
Education	-0.338* (0.187)	-0.446** (0.200)
Student	-0.327** (0.146)	-0.386** (0.177)
Constant	0.841*** (0.258)	0.921*** (0.291)
Observations	51	50
R-squared	0.416	0.452

Standard errors in parentheses. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1  
 Note: Positive In-Party Ad is the excluded category.

Table 2.4. Effect of Self-Reported Emotion on Willingness to Participate.

	Anger	Fear
Emotion	0.368 <sup>^</sup> (0.231)	-1.23 <sup>+</sup> (0.834)
Positive Out-Party Ad	-0.025 (0.083)	-0.055 (0.098)
Attack on In-Party Ad	-0.014 (0.093)	-0.089 (0.099)
Attack on Out-Party Ad	-0.088 (0.088)	-0.119 (0.094)
Positive Out-Party Ad X Emotion	1.21 <sup>^</sup> (0.754)	1.807 <sup>∞</sup> (1.165)
Attack on In-Party Ad X Emotion	-0.823 <sup>**</sup> (0.359)	0.656 (0.917)
Attack on Out-Party Ad X Emotion	0 (0)	1.64 <sup>*</sup> (0.826)
Political Knowledge	0.246 (0.176)	0.184 (0.187)
Age	0.045 (0.160)	0.132 (0.223)
Female	0.031 (0.065)	-0.018 (0.068)
Partisanship (R)	-0.157 (0.100)	-0.240 <sup>**</sup> (0.103)
Education	-0.277 (0.179)	-0.305 (0.182)
Student	-0.223 <sup>^</sup> (0.138)	-0.187 (0.192)
Constant	0.509 <sup>**</sup> (0.234)	0.671 <sup>**</sup> (0.313)
Observations	51	51
R-squared	0.499	0.473

Standard errors in parentheses. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1, <sup>^</sup> p = 0.12, <sup>∞</sup> p = 0.13, <sup>+</sup> p = 0.14

Note: Positive In-Party Ad is the excluded category.

Table 2.5. Effect of Arousal on Self-Reported Emotion: Attack on Out-Party Ad.

	Anger	Fear
Arousal	-76.13 (142.2)	191.6** (60.38)
Strength of Partisanship	-0.0148 (0.234)	0.151 (0.0994)
Arousal X Strength of Partisanship	81.35 (137.6)	-180.0** (58.40)
Political Knowledge	-0.864* (0.404)	-0.466** (0.171)
Age	0.125 (0.229)	-0.601*** (0.0973)
Female	-0.478** (0.131)	-0.170** (0.0557)
Partisanship (R)	-0.0794 (0.147)	0.141* (0.0625)
Education	0.702 (0.443)	-0.123 (0.188)
Student	0.363 (0.247)	-0.491*** (0.105)
Constant	0.841* (0.397)	0.905*** (0.169)
Observations	16	16
R-squared	0.728	0.920

Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

\*Note: Strength of Partisanship is a dummy variable indicating whether the participant is above or below the median (0.5) of the difference between in-party feeling thermometer and out-party feeling thermometer in the pre-treatment questionnaire. Higher values indicate a stronger preference for the in-party.

Table 2.6. Effect of Arousal and Self-Reported Emotion on Willingness to Participate.

	Anger	Fear
Arousal	21.34** (9.68)	24.98** (9.98)
Emotion	0.338+ (0.221)	-1.40* (0.790)
Positive Out-Party Ad	-0.018 (0.079)	-0.059 (0.092)
Attack on In-Party Ad	-0.043 (0.091)	-0.134 (0.096)
Attack on Out-Party Ad	-0.106 (0.084)	-0.150* (0.089)
Positive Out-Party Ad X Emotion	1.23* (0.716)	2.06* (1.10)
Attack on In-Party Ad X Emotion	-0.733** (0.343)	0.907 (0.868)
Attack on Out-Party Ad X Emotion	0 (0)	1.75** (0.778)
Political Knowledge	0.205 (0.170)	0.136 (0.178)
Age	-0.001 (0.153)	0.059 (0.213)
Female	0.007 (0.065)	-0.054 (0.067)
Partisanship (R)	-0.172* (0.095)	-0.255** (0.097)
Education	-0.428** (0.181)	-0.481** (0.184)
Student	-0.303** (0.136)	-0.300 (0.187)
Constant	0.700*** (0.241)	0.930*** (0.317)
Observations	50	50
R-squared	0.560	0.546

Standard errors in parentheses. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1, ^ p = 0.12, + p = 0.14

Figure 2.1. Marginal Effect of Self-Reported Emotion on Willingness to Participate.

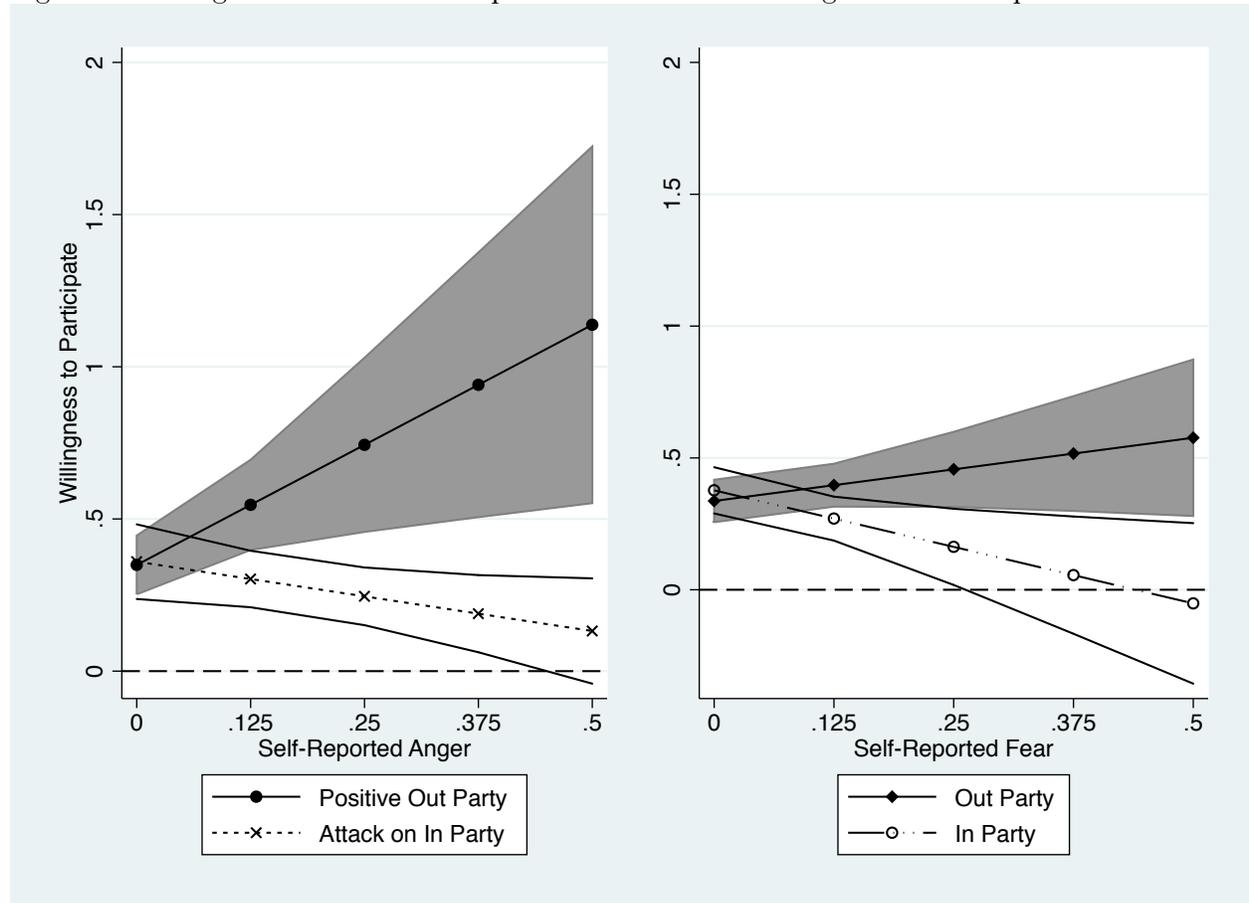
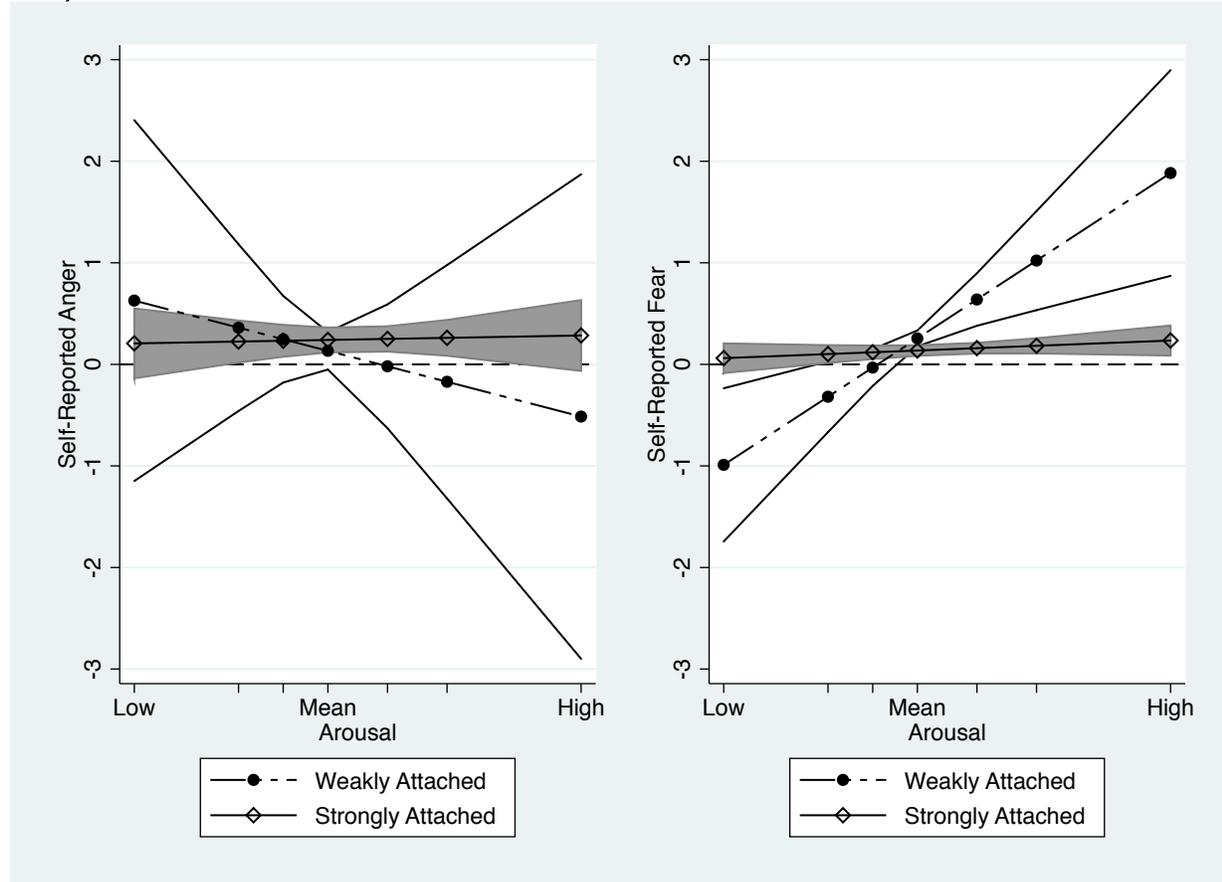


Figure 2.2. Marginal Effect of Arousal on Self-Reported Emotion to an Attack Ad on the Out-Party.



Note: These are the only significant effects of arousal on self-reported emotion across all treatment conditions. In the above figure, the effect of arousal on self-reported anger is not significant. The effects of arousal on both fear and enthusiasm are significant among weakly attached partisans but not those with strong attachments (see in text for further details).

**Chapter Three**  
**Incidental or Captive:**  
**The Effects of Viewing Context on**  
**Attention and Anger to Online Political Advertisements**

Abstract

U.S. adults now spend more time with digital media than with television. With this growth comes widespread exposure to online political advertisements. How well are these messages received? As ad clutter rises, many citizens provide only glancing attention to ads that appear in their online world. Yet repeated exposure and passive reception have been shown to impact behavior. What's more, in the modern media environment, an increasing number of online advertisers are turning to forced exposure with respect to ad delivery. How does the viewing context influence how well these messages are received and subsequently acted upon? Using a survey experiment that alters whether respondents are exposed to political ads incidentally or captively, I find evidence exposure context interacts with individual characteristics leading to significant shifts in both overall reception and on the self-reported anger of different segments of the population. Strong partisans "tune in" when their attention is not forced whereas forced attention benefits reception at the low end of political interest. Despite variation in "who is angry and when", self-reported anger is consistently a positive predictor of intent to participate across in- and out- party appeals and across incidental and forced exposure contexts.

The year 2013 marked a milestone in media consumption as US adults, for the first time ever, spent more time with digital media, which includes their mobile devices (nonvoice) and online activity, than with television (eMarketer 2014). In the same year, 50% of the American public

cited the internet as their main source of national and international news; a little over a decade ago, only 13% made such a claim (Pew 2013). Nearly \$40 billion dollars was spent on online advertising in the United States in 2012 (eMarketer 2012). The internet has undoubtedly transformed the way information is consumed, and the political world is no exception. For the average American, it is becoming increasingly difficult to avoid online political ads—they exist in your Google search results, while reading articles on the web, and even on your Facebook newsfeed. Digital ad spending for the 2016 campaign cycle is expected to top \$1 billion dollars, accounting for roughly 20% of the average campaign’s media budget (VandenDolder 2014).

Televised campaign advertisements have long been a focus of political science research but studies examining online political advertising are notably sparse. Indeed, online advertising is a relatively new phenomenon so it presents a unique set of questions and constraints. For one, browsing the internet is typically a goal-oriented process and advertisements divert attention from the task at hand. Ad clutter or the ubiquity of advertisements online has been shown to lead to cognitive ad avoidance, a subconscious behavior that enables consumers to avoid fixating on ads in their visual field (Chaterjee 2008). Furthermore, studies of click-through rates, one of the most widely used measure of effectiveness, show a steep decline starting at roughly 7% in 1996 and declining to 0.7% by 2003 (DoubleClick 2003). Nonetheless, effectiveness in online advertising extends beyond click-throughs. Several prominent theories of persuasion suggest repeated exposure to subtle messages is ideal (Lodge et al. 1995; Kam and Zechmeister 2013). Passive learning, for example, finds evidence that unmotivated exposure can lead to learning (Keeter and Wilson 1986; Zukin and Snyder 1984). In politics, several studies have found evidence that ads are particularly effective tools for learning (Patterson and McClure 1976; Brians and Wattenberg 1996). Since online advertisements are inexpensive and frequently employed, exposure in the real world is pervasive.

Politicians, political parties, and interest groups regularly appeal to the emotions of voters through advertisements. What's more, emotional reactions to televised political advertisements have been shown to lead to specific behaviors and attitudes. For example, research tells us anxiety can stimulate attention to new information and encourage citizens to set aside their reliance on habits (Brader 2005; Redlawsk, Civettini, and Lau 2007; Valentino et al. 2008). Anger, on the other hand, can lead to a continued reliance on one's convictions, such as partisanship, but also stimulate participation (Lerner and Tiedens 2006; Valentino et al. 2008, 2011). The current study looks at the conditional relationship between self-reported anger, the viewing context under which respondents were exposed to a political ad, and participation. The focus is on anger because recent political research has demonstrated that it, as opposed to anxiety, has a more consistent positive and significant relationship with participation (see Valentino et al. 2011).

This study focuses on three as yet unanswered questions about online political advertising. First, how well are online political advertisements received? In other words, do citizens ignore all ads or do some characteristics lead to increased processing and memory? Second, how does the viewing context influence who tunes in and retains information from an online political advertisement? Third, how does the viewing context and characteristics of the individual alter the behaviors we care about such as emotional response or intent to participate? Stated differently, do changes in the viewing context alter the positive relationship between self-reported anger and participation? The results suggest different segments of the population respond with anger to online political appeals under different conditions yet anger consistently leads to increases in citizens' willingness to participate. The remainder of this paper is organized as follows. First, I review what we know about political advertisements with specific attention to who tunes in, the role of emotion, specifically anger, and participation, and the impact of viewing context. I then

extend what we know about advertising on television to develop hypotheses about how online advertising might differ. Next, I describe the experiment used to test these expectations and the measures used in this study. Following this, I review the results. Lastly, I conclude with a discussion of online political advertising, focusing on the importance of viewing context.

### **Attention to Political Advertisements**

According to Zaller (1992), a citizen's likelihood of receiving a political message is a function of their cognitive engagement with politics. Specifically, individuals with higher levels of interest or knowledge are expected to receive more political messages.<sup>49</sup> Consistent with Zaller (1992), yet unlike much experimental work on political communication, this study does not assume reception is a given. Instead, exposure and reception are distinct and the current project focuses on the impact of a complex media environment in which both characteristics of the individual and the environment influence which advertisements are granted attention. An increasing amount of experimental political science focuses on appeals that rely on forced attention or so-called "captive audiences." Scholars typically design experiments that necessitate attention to stimuli. By heavily relying on these types of manipulations, researchers are focusing on a narrow set of circumstances wherein individuals afford much of their conscious attention to the task at hand, as opposed to having political stimuli compete with the daily activities of life for one's attention.

To date, only a few political communication studies have directly examined the impact of viewing context on outcomes. For example, Arceneaux and Johnson (2008) find that when attention is not forced and participants can choose whether to receive a communication, the

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<sup>49</sup> Zaller's RAS model goes on to make predictions about citizens' willingness to accept these communications and subsequently alter their beliefs; the focus of this study is on advertisement reception and subsequent behavior, not attitude change.

results about effects become less dramatic. Ultimately, they suggest that ignoring the contextual reality of incidental exposure is a threat to external validity. Relatedly, Barabas and Jerit (2009) compare the results from a survey experiment to those found in a study of actual news coverage and find evidence that the survey experiment vastly over-stated the effect, particularly among certain sub-groups. These findings are consistent with the widely held notion that experiments, due in large part to the captive audiences they artificially create, often overstate the magnitude of effects; rarely do studies suggest they alter the directionality of effects or substantive claims.

The current study manipulates the viewing (also called exposure) context such that some participants face incidental exposure whereas others are encouraged or “captive” with respect to their attention to the advertisements. Rather than only asking survey respondents to report their emotional reactions upon forced exposure to an advertisement, this design relies on one hand, on an environment that much like surfing the internet includes an advertisement as an element of a newspaper article without explicitly drawing attention to the ad. In other words, participants may react or ignore the political stimuli as they see fit. On the other hand, the forced exposure manipulation informs participants that the researchers are interested in their reaction to the advertisements, thus drawing attention to them in a manner consistent with experimentally captive audiences. In the real world, an increasing number of online advertisers are turning to forced exposure in terms of ad delivery. In these instances, an ad does not simply co-exist as the user completes some other task, but rather, interrupts browsing. For example, floating or flash ads move across users’ sightline, often blocking out a portion of the screen for a set period of time, whereas “roadblocks” require users to watch a particular ad prior to entering a website. These types of ads are becoming increasingly common, causing digital and online advertising to seemingly become more and more like television.

Much work in communication studies and consumer behavior focuses on the effect of viewing context on purchasing behavior and brand recognition; few studies address the influence of viewing context on emotional responses. For example, Edwards and colleagues have found forced exposure to “pop up” ads can cause feelings of irritation if the ad is thought to be intrusive; yet this is moderated by the receiver’s level of cognitive intensity and whether the ad is perceived as relevant or of value (Edwards et al. 2002). There is no known work that directly examines the comparison of forced and incidental exposure to political advertisements.

Whether or not you pay attention to politics is one factor that shapes the way in which you respond to political information (Fiske, Kinder, and Larter 1983; Zaller 1992), including advertising. Several existing studies of political communications emphasize the role of individual characteristics, such as interest, political sophistication, and strength of partisanship. For instance, Valentino and colleagues (2004) find evidence that ads provide information to individuals at all levels of political awareness, yet the most sophisticated have the added benefit of activating their existing network of information. In other words, the largest benefits of ads accrue to those at the highest level of awareness. In this tradition, Brader’s (2006) study of televised ads similarly shows that emotions act as a mechanism to signal relevance, leading to the largest effects among those for whom politics is most relevant. Notably, while both studies use televised political ads, these findings arise under different viewing contexts: the Valentino and colleagues study employs forced ad exposure whereas Brader’s study uses incidental exposure. Based on these results, I expect:

*H1: Respondents’ interest in following politics will be positively predictive of their reception of political advertisements, regardless of whether exposure is incidental or captive.*

Put differently, as a citizen becomes increasingly aware of political matters, they ought to demonstrate better memory for the political ads they encounter, holding all else constant. That

is, despite the near-infinite volume of information available that could fall under the category of “politics”, stating any interest in politics triggers a lower bar to the reception of all political information. Indeed, research in cognitive psychology has demonstrated that individuals with prior knowledge on a topic are more likely to form multiple connections in their brain that allow them to more easily access relevant information later ( Craik and Lockhart 1972; Jerit, Barabas, and Bolsen 2006). Converse (2000) notes “it takes information to get information.”

Aside from interest, I also examine strength of partisanship. Existing work on motivated reasoning and selective attention suggests partisans “tune in” based on their group identity (Wang et al. 2014). Therefore, unlike following politics, exposure context ought to play a role in determining reception. Strong partisans are typically more engaged by politics, therefore, I expect they will not demonstrate large shifts in reception based on exposure context. Stated differently, politics is usually “relevant” for strong partisans so they are apt to notice and afford resources to political advertisements under both viewing contexts. This is not true for those with weaker partisan ties. Following from this, I hypothesize:

*H2a: Partisan leaners (those with the weakest partisan ties) will demonstrate the largest gains in reception and memory when the exposure context shifts from incidental to captive.*

*H2b: Strong partisans will have significantly higher reception and memory than partisan leaners, irrespective of viewing context.*

As stated previously, existing studies on the effectiveness of online political advertising are limited. Broockman and Green (2014) use Facebook to conduct a field experiment and find online advertisements fail to play a meaningful role a candidate’s success or failure based on the lack of memory for the candidates nor updated opinions. Nonetheless, their measures assume persuasion occurs with respect to attitude change and/or recall, as opposed to short-term immediate effects on emotion and behavior. Using information-seeking as a measure of success, Ryan (2012) similarly uses Facebook advertising to demonstrate the impact of emotional appeals

on “click through” rates, finding anger to be particularly motivational. In other words, while online appeals are unlikely candidates to change existing beliefs, they might be effective in altering emotional responses and subsequently eliciting participation.

Existing research as demonstrated a strong motivational influence of anger in political domains. From a theoretical standpoint, the effect of anger on participation ought to be relatively stable and positive, irrespective of exposure context. It would be concerning if evidence is revealed that anger is motivational under some circumstances but demobilizing under others. This study examines this possibility explicitly. Specifically, I expect:

*H3: The effect of anger on participation will be positive for all ads, irrespective of viewing context, with particularly strong effects when anger is highest (in response to counter-attitudinal ads).*

## **Design**

I created a survey experiment that was fielded during the 2014 midterm elections, from November 3rd – November 6th, 2014.<sup>50</sup> It included 1,896 respondents, and took on average 16 minutes to complete.<sup>51</sup> Respondents were recruited through Survey Sampling International (SSI), a firm that maintains a diverse national panel of research subjects through targeted recruitment in various online communities.<sup>52</sup> The final sample was 58% female, 49% Democratic, and 19% nonwhite.<sup>53</sup> There was variation across education, income, and age; the median respondent completed “some college”, was 58 years old (with a range from 18 to 91

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<sup>50</sup> There were no significant differences in the variables of interest from pre- to post- election.

<sup>51</sup> The full sample size was 2,114. A total of 218 respondents were dropped from all analyses for problems such as a failure of the treatment to load (n = 41), an extremely fast overall response time of less than 5 minutes (n = 75), and treatment timing that was less than 5 seconds or greater than 30 minutes (n = 102). This left an effective sample size of 1,896.

<sup>52</sup> SSI samples are becoming more prominent in political science publications (e.g. Berinsky et al. 2013; Bullock 2011; Kam 2012; Malhotra et al. 2013).

<sup>53</sup> On partisanship, the sample included 921 Democrats, 183 Independents, and 792 Republicans (the partisan categories include “Leaners”).

years), and earned \$50k - \$59k per year. The survey began by asking about several independent variables including partisanship, ideology, how closely respondents follow politics, and media use which was based on the frequency at which respondents get news from television, radio, print (newspaper), and the Internet in a typical week.

Following this, respondents were randomly assigned to one of eight treatment conditions and one of two exposure contexts. The treatment manipulation was a 2 (Exposure: Incidental, Captive) X 4 (Ad Type: Non-Political, Non-Partisan, In-Party, Out-Party) X 2 (Emotion: Neutral, Attack). Each of the ads was placed on the right-hand side of a newspaper article. The article was the same throughout all conditions and was chosen to minimize emotional response. The topic of the article was the history of the Aeron chair, the popular desk chair that has risen in prominence since the tech industry boom.<sup>54</sup> The non-political ads referenced Internet security whereas the political ads referred either to politics generally (non-partisan) or partisan politics specifically (Democrat or Republican).<sup>55</sup> The emotional manipulation was based on the title of the ad which when neutral simply stated “Democratic Politics” and when an attack, it stated “Worried about Democratic Politics?” As shown in the appendix, the treatment manipulation combines imagery and, in the case of an attack ad, clearly indicates sponsorship that does not match the headline. For instance, “Worried about Democratic Politics?” would be accompanied by the image of a Democratic donkey with an overlaid “no sign” (i.e. circle backslash) and the Republican party would be listed as the sponsor. Thus, while the title seemingly appeals to anxiety or fear, it is also likely to prompt anger from out-partisans.

Prior to reading the article, respondents encountered the exposure or viewing context manipulation. It read:

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<sup>54</sup> The exact article with a sample ad can be found in the appendix, Figure A14.

<sup>55</sup> Figure A.15 in the appendix provides images of all 8 treatment advertisements.

As we mentioned earlier, this is a survey about how people behave online: what you find interesting and why. We are specifically interested in *what type of news (what type of advertisements)* people find interesting. We will now ask you to read a recent article from a website, (taking note of the advertisements on the screen). Then, we will ask you some questions about it.

Thus, when the exposure context was incidental, respondents were told we were interested in the “type of news” whereas the captive exposure manipulation revealed that we were interested in the “type of advertisements” people find interesting and asked respondents to take note of ads that appear on the screen. After reading the article, respondents were asked several distractor questions or foils, including what the topic of the article was, how interesting they found it, whether they would read it on their own if they were to come across it online, the name of the designer of the chair, and the name of the newspaper that the article appeared in. Next, the survey shifted to measuring several dependent variables.

An important assumption for the current project is that people are information processors and an individual’s ability to process information is limited. In other words, mental resources are needed in order to perceive a stimulus, to represent it somehow, and to reproduce it in the brain and, perhaps most importantly, these resources have a limited, arguably fixed, capacity.

Cognitive psychologists have identified three subprocesses that must occur for information to be thoroughly processed: encoding, consolidation (also called storage), and retrieval.<sup>56</sup> A crucial component of the project not yet discussed in detail involves memory. Scholars in cognitive psychology and communications have identified three measures of memory that map on to differing degrees of processing based on the “thoroughness” of each subprocess (Columbo and D’Amato 1986; Craik and Lockhart 1972; Hasher and Zacks 1979; Lang 2000; Metcalfe 1991; Spear and Riccio 1994; Tulving and Thompson, 1973; Zechmeister and Nyberg, 1982). As Lang (2000) notes,

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<sup>56</sup> For more details on these three subprocesses, see Lang (2000).

... recognition (the most sensitive measure of memory) can be interpreted as indexing whether a specific bit of information was encoded. Recognition is the most sensitive measure because the item to be recognized is presented to the subject and contains myriad cues to help the subject retrieve the information (Tulving, 1972; Tulving and Thompson, 1973). Cued recall (the next most sensitive measure of memory) can be interpreted as an index of how thoroughly a specific bit of information was stored. In cued recall, only a single cue is presented to the subject to help the subject retrieve an item from memory (Tulving and Osler, 1968). Finally, free recall (the least sensitive measure of memory) indexes the retrieval process, that is, how well a subject can retrieve a piece of information without any cues at all. (56)

To date, these multiple memory measures have gained little use in the political science literature, despite providing a powerful tool for understanding the degree to which political information is processed.<sup>57</sup> For the current project, respondents were randomly placed in one of two memory groups, cued or free recall. Then, all respondents were asked recognition memory questions. This mixed design with regard to memory allows respondents to complete the more demanding form of memory first, thus limiting any risk associated with priming and spreading activation in later recall. Here is the exact question wording for the recall measures:

*{Randomly Cued or Free Recall}*

*If Cued:*

- Can you recall the sponsor of this ad? What was his name?
- From which party was the sponsor?
- Below, please describe the content of this ad. What was it about?
- Were there particular political issues it discussed?
- How about the images and video clips? Do you recall what they were?
- How would you describe the tone of the ad?
- Are there any additional details about the ad that you wish to mention?

*If Free:*

- What do you recall about this ad? Please write everything you can remember about the ad you just watched.

The recognition memory questions were multiple choice and asked respondents to identify the content, sponsor, and photo among several alternatives (see the Appendix for the full recognition memory questions).

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<sup>57</sup> One exception is Civettini and Redlawsk (2009).

After the memory measures, respondents were asked about their emotional reaction to the ad. Emotions were measured on a five-point scale from “not at all” to “very” and included: anxious, angry, sad, enthusiastic, depressed, worried, outraged, and happy. Next respondents were asked how likely it was on a five-point scale from “not at all” to “extremely” that they would engage in several activities regarding politics. The actions included: 1) signing a petition, 2) contacting an elected official, 3) wearing or displaying a button or sticker, 4) donating to a political party or campaign, 5) attending a meeting, or 6) initiating a conversation on a political topic.

Before moving on to the results, it is worth noting how these items were translated for data analysis. Where appropriate, all items were scaled from zero to one in an effort to make direct comparisons across variables interpretable. A key dependent measure includes reception of the ad, as indicated by two measures: recognition memory and recall memory. First, recognition memory is thought to capture a measure of encoding and involved three multiple-choice questions with 6 response options each. The measure is an additive scale of correct responses and ranges continuously from zero to one with a mean of 0.40 (standard deviation = 0.42). It is noteworthy that this scale ought to be considered the least burdensome measure of reception available in the data. That said, it is noteworthy that 830 respondents (46%) did not get a single recognition memory question correct, despite 589 of those 833 stating that they do recall seeing an advertisement. In all, 363 respondents (19%) stated that they did not recall seeing an advertisement. The median recognition score is 0.333, suggesting that the average respondent got only one of the three recognition questions correct. This is all despite a manipulation that explicitly called half of the respondents’ attention to the ad. Second, recall memory combines open-ended responses from the cued and free memory questions, measuring consolidation and retrieval. For each, respondents were coded as having correctly identified the

topic, sponsor, and image (matching the recognition items) and an additive scale was created which ranges from zero to one with a mean of 0.21 (standard deviation = 0.33).<sup>58</sup> Taken together, it is evident that reception of the advertisement was quite limited across the full sample, which is not wholly unsurprising given what we know about online advertisements. I review the main effects in further detail below.

For the emotions items, this study focuses solely on anger, as it has the most consistent effect on participation in the literature.<sup>59</sup> A scale was created wherein angry and outraged comprised “anger”, which ranged continuously from zero to one ( $\alpha = 0.836$ ). Similarly, the third dependent measure was intent to participate; it is an index of responses to all six participation questions, also ranging continuously from zero to one ( $\alpha = 0.865$ ). With regard to independent variables, this study relies heavily on a five-point scale of following politics. The question wording stated:

Some people seem to follow what's going on in government and public affairs most of the time, whether there's an election going on or not. Others aren't that interested. Would you say you follow what's going on in government and public affairs hardly at all, only now and then, some of the time, most of the time, or all of the time?

This measure ranges from zero to one and has a mean of 0.63 (standard deviation = 0.26) and median of 0.75. A second independent variable is a categorical indicator of strength of partisanship. It simply uses the 7-point partisanship question stem to identify four groups: true independents, partisan leaners, weak partisans, and strong partisans. Finally, several control variables are included in the analysis; these include a dummy variable for gender (female), categorical variables for education and income (as provided by SSI's panel demographics), a

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<sup>58</sup> Coding was completed using the “regular expression” command in Stata to identify any mention of the correct responses.

<sup>59</sup> As indicated in the study procedures, additional measures of self-reported emotion were captured but they have not yet been analyzed; the focus on anger was chosen for theoretical reasons.

continuous measure of age (scaled from zero to one), and partisanship (zero indicates strong Democrat whereas 1 indicates strong Republican). I turn now to the results.

## **Results**

I begin with the main effects of treatment condition and viewing context on reception. Figures 3.1 and 3.2 provide the mean level of recognition and recall memory for each treatment condition across viewing context. As is evident, reception is significantly higher in nearly all conditions when the audience is captive. This fits with expectations and serves as a good manipulation check, as respondents “tune-in” to these ads when asked to do so. Moreover, comparing Figures 3.1 and 3.2 reveals markedly lower levels of recall memory than recognition, another finding that fits with expectations since recall is a more demanding form of memory. Notably, two patterns arise when focusing on the partisan appeals (i.e. the in- and out- party ads). First, a partisan appeal elicits greater reception, irrespective of in- or out-group status, than a non-political or non-partisan appeal. In other words, merely mentioning a partisan identity (Democrat or Republican) leads to significantly higher recognition ( $p < 0.001$ ) and recall ( $p < 0.001$ ) than non-political and non-partisan ads.

Second, attack ads generally produce lower levels of reception than neutral ones, both in terms of recognition and recall memory. However, this effect is not evident when both viewers are captive and the ads are non-political or non-partisan. Stated differently, citizens generally receive less information from non-political and non-partisan online ads, regardless of the emotional appeal or viewing context. Furthermore, when their attention is not forced, they retain less information from attack ads in comparison to neutral ones.

Lastly, when citizens are captive, attack ads are still given less attention than neutral ones but only when partisan identities are evoked. Together, these main effects highlight marked

differences in ad reception based largely on viewing context. Citizens seem more likely to ignore non-political and non-partisan ads, instead tuning in to ads that draw on their group identities. Moreover, despite their emotional appeal, attack ads (especially partisan ones), face lower levels of reception than neutral ones. One plausible explanation suggests citizens may be drawn in by their group identities but their reception of the ad suffers due to the ability to counterargue or cognitively elaborate, eliminating resources available for memory. An alternative explanation suggests citizens are turned off by any political attack ad and, whether attention is incidental or forced, opt (perhaps subconsciously) to give the ad little cognitive resources. The current project cannot distinguish between these competing explanations for why partisan attack ads suffer from lower reception than neutral ads.

For some insight into these differences, however, I turn now to examining two individual characteristics thought to play a role in determining reception. Recall H1 suggested that a citizen's interest in following politics ought to improve reception of partisan appeals regardless of whether exposure is incidental or captive. In other words, as a citizen becomes increasingly likely to follow politics, so too should their reception of online political ads. Table 3.1 presents the results of a multivariate model predicting both types of reception.<sup>60</sup> The coefficient on "Follow Politics" is positive and significant, in support of H1.<sup>61</sup> H2a suggested partisan leaners ought to have the largest gain in reception when exposure shifts from incidental to forced. H2b expected strong partisans to have greater reception or memory for both in- and out- group appeals than partisan leaners, irrespective of viewing context. The coefficient on "Captive" represents the marginal effect of moving from incidental to forced attention among partisan leaners; it is

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<sup>60</sup> Throughout the analyses, I present the results from the fully interactive multivariate models. Where appropriate, split sample analyses were also completed and the substantive results are identical. Using the split sample results implies the variable on which the split occurs has an impact on every variable in the model, including control variables, an unrealistic assumption.

<sup>61</sup> I also modeled this as an interaction with exposure context; Wald tests revealed the interaction was not significant.

positive and significant. Adding the constituent terms together for weak and strong partisans reveals marginal effect magnitudes close to zero. To make the results clearer, Figure 3.3 isolates the marginal effect of going from incidental to forced attention for each category of partisan strength. As is evident, a significant increase in both recognition and recall is only apparent among partisan leaners, consistent with H2a.

To compare partisan leaners to strong partisans (H2b), I conducted several Wald tests. For recognition, strong partisans have significantly higher memory than partisan leaners when exposure is incidental ( $p = 0.07$ ) (consistent with H2b) and significantly lower memory when exposure is captive ( $p = 0.002$ ) (inconsistent with H2b). For recall, when exposure is incidental strong partisans are indistinguishable from partisan leaners ( $p = 0.39$ ); when exposure is captive, strong partisans again have significantly lower recall ( $p = 0.02$ ) (inconsistent with H2b). For context, Figure 3.4 provides the predicted marginal effects for each category of partisan strength by exposure context.<sup>62</sup> Together, these results imply that strong partisans “tune in” and encode partisan appeals to a greater extent than partisan leaners when their attention is not forced. The difference between the two groups, however, is not significant when it comes to recall. When captive, partisan leaners surpass strong partisans (who remain constant in their degree of memory) and have greater encoding and storage. Ultimately, H2b is not supported.

While unexpected, the results are not illogical. If you are someone who only mildly prefers one party to the other, your in-group identity may not signal relevance when a partisan political ad appears, thus limiting reception of the ad when exposure is incidental. Nonetheless, when your attention to that ad is encouraged, you are likely to invest greater cognitive resources into thinking about the message than someone with strong ties who has the ability to process the

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<sup>62</sup> Figure 3 can be derived from Figure 4 by comparing the shift from an incidental to captive audience for each subgroup.

ad with relatively little cognitive effort (see Schreiber 2007). Therefore, I'd speculate that forced attention benefits reception at the low end whereas the exposure context has no effect at the high end of political engagement. Indeed, those with a high level of interest or engagement are likely to be encountering ads that simply reinforce their existing beliefs and fail to provide any reason to engage with the stimulus in a manner that would enable elaboration and memory consolidation. While these explanations are inductively reasoned from the evidence, future work ought to examine these mechanisms specifically.

Thus far, the results highlight the impact of viewing or exposure context on the reception of online political ads. I turn now to examining the impact of exposure context on two outcomes, self-reported anger and intent to participate. Recall H3 did not expect viewing context to alter the relationship between anger and intent to participate due to theoretical expectations that the effect of anger ought to be stable. However, when anger itself is the dependent measure, I expect various segments of the population to respond differently across viewing contexts; this necessitates modeling the outcome as conditional on treatment condition and individual characteristics. Doing so enables a clearer understanding of when and why political scientists might be missing important variation and/or drawing the wrong conclusions with respect to the impact of online political appeals. To simplify the analyses, I focus on the four partisan ads, since they garnered the most reception and more closely mimic advertisements that citizens might encounter during a campaign.<sup>63</sup> So the question being asked is: how does one's interest in following politics interact with viewing context to determine self-reported anger over various types of partisan ads? Notably, I do not make specific predictions about the nature of these relationships. Nonetheless, I generally expect the exposure context to alter "who tunes in" such

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<sup>63</sup> Restricting the analyses to partisan ads, while improving external validity and realism, may fail to accurately generalize to nonpartisan ads. It is logical to expect nonpartisan ads to be received differently, especially as concerns the conditional relationships between ad reception and individual characteristics such as strength of partisanship.

that the relationship between following politics and reporting anger will significantly change within treatment conditions, especially for those advertisements that are counter-attitudinal, which are any out-party ad or an attack on the in-party.

Table 3.2 presents the marginal effect of following politics on self-reported anger by treatment and exposure context. Moreover, Figures 3.5 and 3.6 present the predicted effects graphically for in- and out- party ads respectively. The full model is available in the appendix, Table A.2. In two conditions, in-party neutral and out-party attack, respondents' interest in following politics had no relationship with self-reported anger and was not significantly altered by exposure context. The remaining ads tell a more conditional story however, as respondents' exposure context played a significant role in determining the strength and directionality of the relationship between following politics and anger for both an attack on the in-party or an out-party neutral ad. Specifically, for an attack on the in-party, as interest in following politics increases, so too does self-reported anger only if attention is forced ( $p = 0.012$ ). Moreover, the difference in the two effects (i.e. the slope) by exposure context is statistically significant ( $p = 0.04$ ). As a result, under forced attention to an attack on the in-party, following politics has a significant positive effect on self-reported anger whereas the effect is indistinguishable from zero when attention is incidental. Lastly, for out-party neutral ad, as interest in following politics increases, so too does self-reported anger only if attention is forced, similar to an in-party attack ( $p = 0.001$ ). Unlike any other treatment condition, however, this effect is reversed when exposure to the ad is incidental; that is, as following politics increases, self-reported anger decreases ( $p = 0.04$ ). Unsurprisingly, the difference in the two effects (i.e. the slope) by exposure context is also statistically significant ( $p = 0.001$ ).

To summarize, these results suggest there is no discernable effect of following politics on self-reported anger, irrespective of whether exposure is incidental or captive, when respondents

were exposed to in-party neutral or out-party attack ads. However, when forced to watch either an in-party attack or an out-party neutral ad, following politics is positively associated with self-reported anger. When attention is incidental, this relationship shifts to zero for an in-party attack or becomes negative for an out-party neutral ad. Thus, for both ads, researchers would draw wholly different conclusions based on the exposure context. What might explain this variation? I'd conjecture that an in-party neutral and out-party attack ad are relatively "easy" to process in terms of understanding and emotional response. With this set of analyses limited to partisans, it is likely that respondents immediately know how they feel about an ad supporting their preferred party or attacking the opposition;<sup>64</sup> that is, their emotional response is unlikely to change based on their interest in following politics or viewing context. Alternatively, ads attacking their preferred party or supporting the opposition require a bit more cognitive engagement and effort to process, thus when the viewing context is captive, we see the expected positive relationship between following politics and self-reported anger. This line of thought is consistent with evidence that counter-attitudinal/uncongenial messages are remembered as well as pro-attitudinal/congenial messages due to thoughtful counter-arguing (Eagly et al. 2000). Isolating the effect of captive attention on self-reported emotion for the two more demanding ads demonstrates a consistent and significant relationship whereby individuals that rarely follow politics decrease their stated level of anger when their attention is forced whereas those that often or always follow politics reported significantly increased anger when their attention is forced (see Figure 3.7). As with the previous unexpected finding, future work ought to examine this pattern and proposed mechanism more narrowly.

As a final step in the analyses, I turn now to respondents' intent to participate in politics. The previous set of results found self-reported anger to be conditional on treatment ad, viewing

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<sup>64</sup> Since I focus on the four partisan appeals, in and out-party status requires dropping true independents.

context, and one's interest in following politics. How does this translate into behavior? As suggested by H3, theoretically, the effect of anger on participation ought to be relatively consistent and positive, irrespective of treatment ad and viewing context. Table 3.3 presents the marginal effect of self-reported anger on intent to participate by treatment and exposure context. The full model is available in the appendix, Table A.3. Moreover, Figures 3.8 and 3.9 present the predicted effects graphically for in- and out-party ads respectively. For out-party ads, the effect of anger on intent to participate is positive and significant irrespective of viewing context. This is consistent with H3. For in-party ads, both a captive attack on one's preferred party or an incidental neutral in-party appeal produce a statistically significant positive relationship between anger and participation, again consistent with H3. In the remaining two conditions, the effect of anger is indistinguishable from zero. Notably, Wald tests reveal that within all four treatment conditions the effect of anger on intent to participate is not significantly different across exposure context. This is a key finding and provides strong evidence in support of H3. Together, this set of results suggests self-reported anger is a positive predictor of intent to participate across in and out-party appeals and incidental and forced exposure contexts.

## **Conclusion**

We now have evidence that viewing context plays a key role in determining both citizens' reception of online political advertisements and their subsequent emotional response. As anticipated, citizens grant far less attention to political advertisements to which they are exposed incidentally and to those that do not cue a partisan identity. Unlike any existing work, the current study directly manipulates the exposure context to online political advertisements. In doing so, I gain the ability to make strong causal claims about the influence of forced or incidental attention, which proves to have a significant impact on both who tunes in and receives the message, as well

as which subgroups respond with anger. For reception, if a campaign is trying to reach individuals toward the middle of the partisan spectrum, their best approach is to use digital advertising that mimics forced exposure. In doing so, they significantly increase the likelihood that partisan leaners will pay attention to and receive the message in the ad, a necessary precursor to any behavioral impact. Alternatively, online ads attempting to rally the base of strong partisans will have a similar-sized effect whether viewing is incidental or forced.

As suggested, the effect of viewing context on self-reported emotion impacts different segments of the population in different ways. Specifically, anger rises and falls in subgroups of the electorate based on characteristics of the individual and the context in which the ads are encountered. From a practical standpoint, if a campaign needs to fire up parts of the electorate that are typically uninterested in politics, the best way to significantly increase their anger is to step back and let them encounter opposition ads (which support their out-party or attack their in-party) incidentally. In other words, the uninterested report significantly higher levels of anger when they encounter an ad with a counter-attitudinal message naturalistically; the same cannot be said of those who follow politics regularly as they are more influenced by these counter-attitudinal messages when their attention is explicitly drawn to them, suggesting they may be selectively avoiding (even unconsciously) these messages when viewing is not demanded or, perhaps more likely, reacting in a habitualized manner since their interest enables them to have far greater exposure to these ads on a regular basis.

Several limitations are noteworthy and deserve attention in future work. First, as indicated in the text, this work did not make specific predictions about the direction of the effect of exposure context on particular subgroups' self-reported anger. While it was anticipated that different parts of the population would react with anger to each ad based on both exposure context and existing attitudes, some of the more complicated findings arose from the data. With

the rise of digital media and new technology for ad exposure, I expect attention to the influence of viewing context to grow; with such growth, future researchers ought to use the evidence from this study to more formally develop and test specific hypotheses about the nature of these subgroup relationships. More broadly, this study, while having a large sample size, also had a large number of treatment conditions. As a result, replication of the key findings under more narrow specifications is warranted.

Second, it is difficult for political scientists to keep up with the rapid pace of technological growth. Yet researchers in the fields of marketing, communication, and internet advertising likely have a more narrow interest in doing so; thus, I'd encourage greater interdisciplinary research into questions about online political advertising. For example, the current project deems an online political ad as having forced or captive exposure simply because the respondent's attention was drawn to the ad. Nonetheless, a "pop-up" ad is quite different in many ways, despite both types classifying as forced exposure. As campaigns become increasingly tech-savvy, so too should researchers, at least with respect to collaborative endeavors.

Lastly, this work can be cast in two lights for emotions researchers: on the one hand, attention to context proves crucial because viewing context and individual attributes interact in a way that alters the answer to "who responds with anger to an online political ad?"; on the other hand, no matter who is angry, anger leads to increased participation, a reassuring result for researchers using self-reported measures of emotion. Future work ought to examine additional discrete emotions to determine whether they have similar properties.

Ultimately, failure to include both the viewing context and individual attributes proves to mask key variation in terms of who reacts to online political advertisements. In some cases, drawing conclusions from one viewing context over another would lead political scientists to miss important relationships and in others it might lead them to draw the wrong conclusions. Despite

these findings, however, I'd caution against using these results to suggest experiments using incidental exposure reflect the real world and those using forced exposure are inaccurate. As mentioned previously, the rapid pace of technological advances has enabled advertisers to mimic the "forced exposure" paradigm typically critiqued by scholars as lacking external validity. Zaller (1992) convincingly demonstrated that political awareness moderates exposure and reception to new information. Yet in the new world of online advertising, exposure is becoming increasingly common, with or without intent on the part of citizens. Given the consistent and significant effect of exposure context on both reception and self-reported emotion, researchers generally, and experimentalists specifically, ought to pay particular attention to the conditions under which citizens encounter political advertisements and the assumptions being made when one context is chosen over another.

Table 3.1. Individual Characteristics and Reception of Partisan Online Political Advertisements.

	Recognition	Recall
In-Party Attack	-0.203*** (0.041)	-0.088** (0.037)
Out-Party Neutral	0.023 (0.041)	-0.008 (0.037)
Out-Party Attack	-0.123*** (0.040)	-0.085** (0.037)
Follow Politics	0.244*** (0.061)	0.133** (0.056)
Weak Partisan	0.120 (0.074)	0.065 (0.067)
Strong Partisan	0.132* (0.072)	0.056 (0.066)
Captive	0.281*** (0.088)	0.184** (0.079)
Weak Partisan X Captive	-0.200** (0.099)	-0.109 (0.090)
Strong Partisan X Captive	-0.283*** (0.097)	-0.167* (0.088)
Republican (PID)	0.027 (0.035)	0.019 (0.032)
Education	0.076 (0.072)	0.205*** (0.067)
Income	0.012 (0.052)	0.013 (0.048)
Female	-0.002 (0.031)	0.042 (0.028)
Age	-0.264*** (0.074)	-0.108 (0.070)
Constant	0.335*** (0.097)	0.078 (0.088)
Observations	824	742
R-squared	0.099	0.058

Note: In-Party Neutral and Partisan Leaners are the excluded categories. Standard errors in parentheses.

\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

Table 3.2. Conditional Marginal Effect of Follow Politics on Self-Reported Anger.

	Incidental	Forced
In-Party Neutral	-0.062 (0.072)	-0.028 (0.074)
In-Party Attack	-0.033 (0.082)	0.192** (0.076)
Out-Party Neutral	-0.161** (0.078)	0.261*** (0.076)
Out-Party Attack	-0.011 (0.072)	-0.051 (0.078)
Observations		823
R-Squared		0.084

Note: These are the marginal effects of following politics (i.e. the slope) on self-reported anger for each treatment condition, derived from Table A.2.

Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 3.3. Conditional Marginal Effect of Anger on Intent to Participate.

	Incidental	Forced
In-Party Neutral	0.554*** (0.198)	0.202 (0.223)
In-Party Attack	-0.017 (0.085)	0.184** (0.091)
Out-Party Neutral	0.171* (0.091)	0.249*** (0.076)
Out-Party Attack	0.518*** (0.128)	0.351*** (0.124)
Observations		823
R-Squared		0.236

Note: These are the marginal effects of anger (i.e. the slope) on likelihood to participate derived from Table A.3. Standard errors in parentheses \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

Figure 3.1. Recognition Memory by Treatment Condition and Viewing Context.

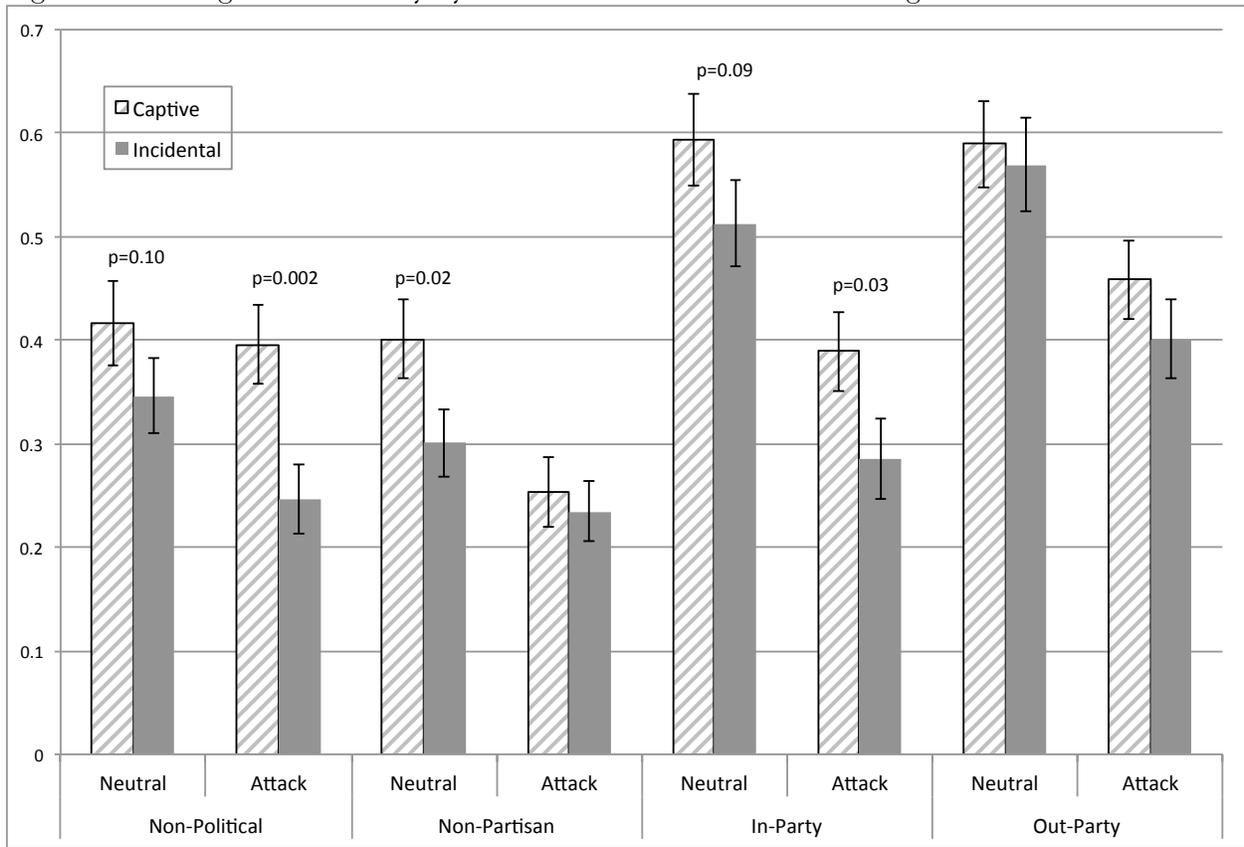


Figure 3.2. Recall Memory by Treatment Condition and Viewing Context.

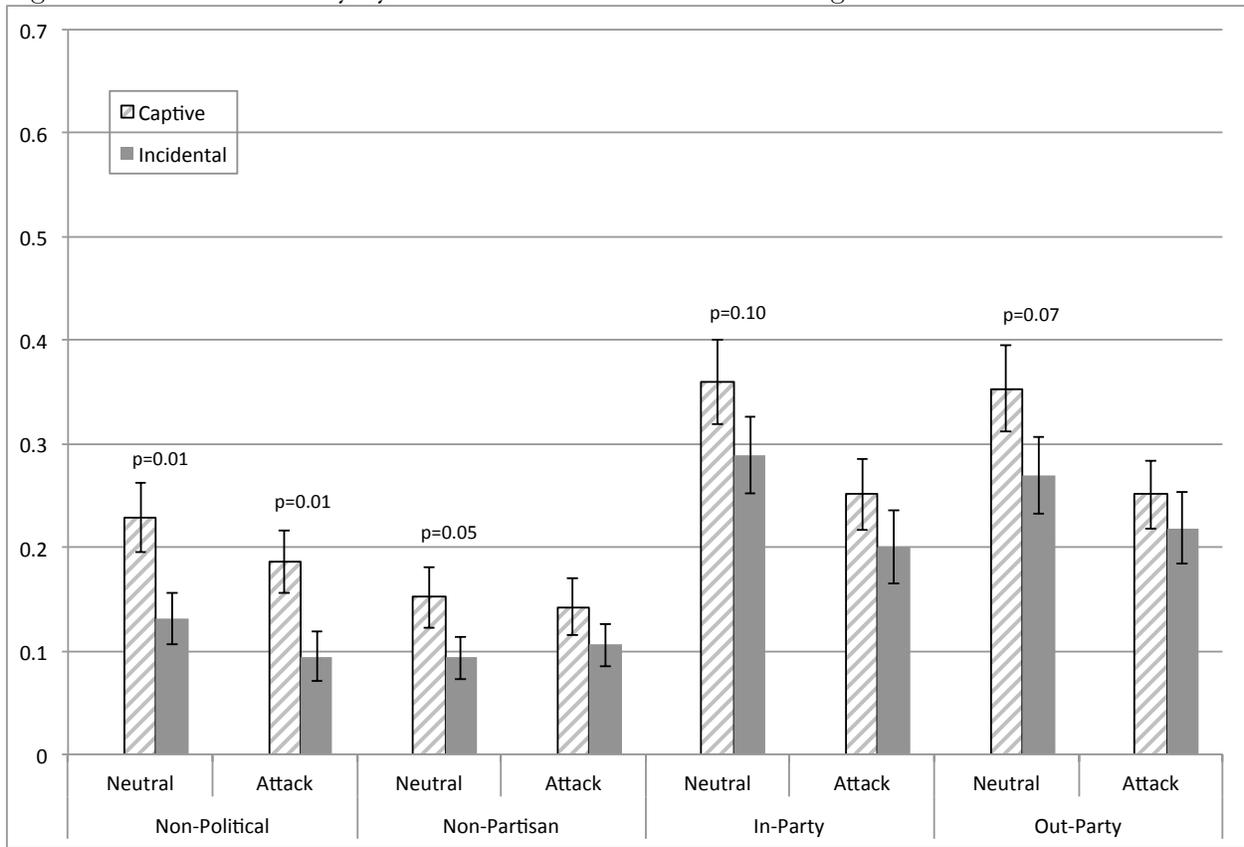


Figure 3.3. Isolated Marginal Effect of Captive Attention on Ad Reception by Strength of Partisanship.

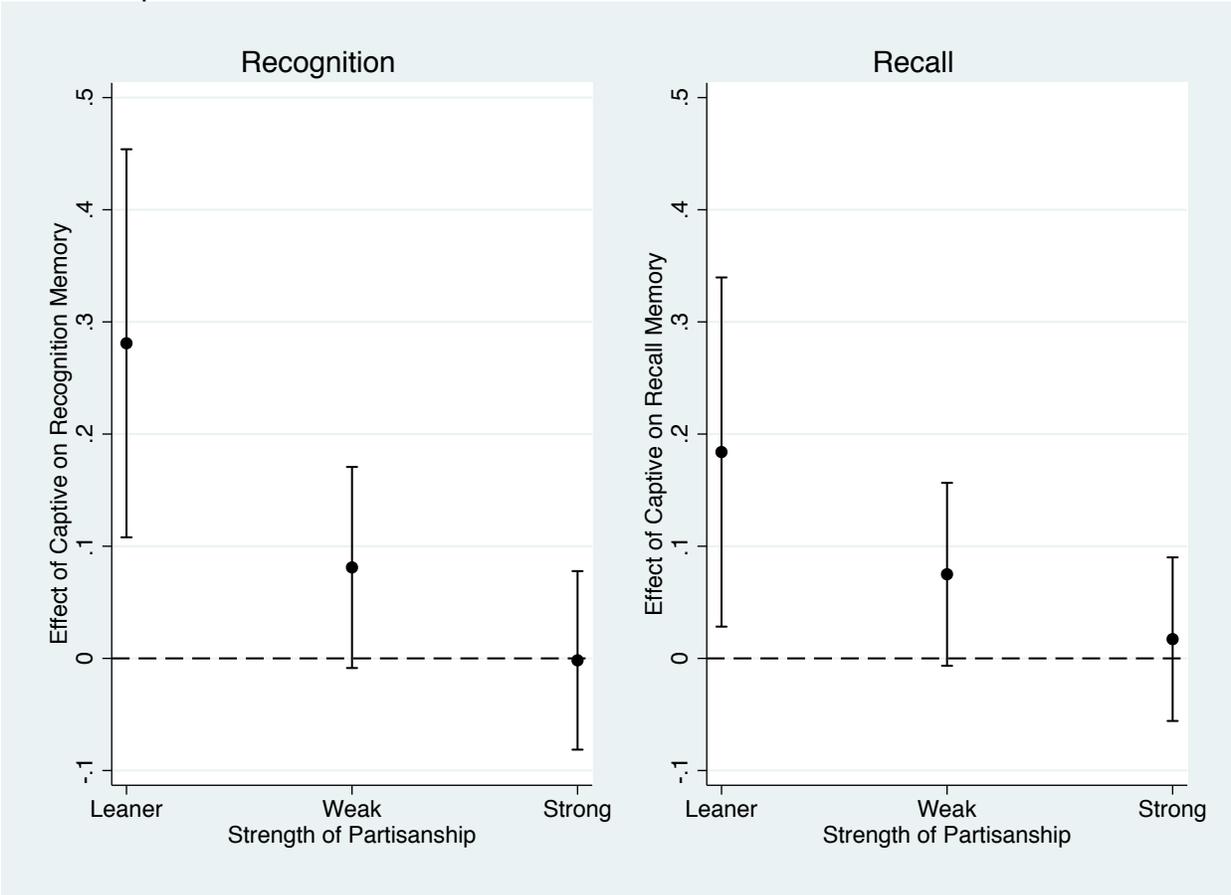


Figure 3.4. Predicted Marginal Effect of Exposure Context and Strength of Partisanship on Ad Reception.

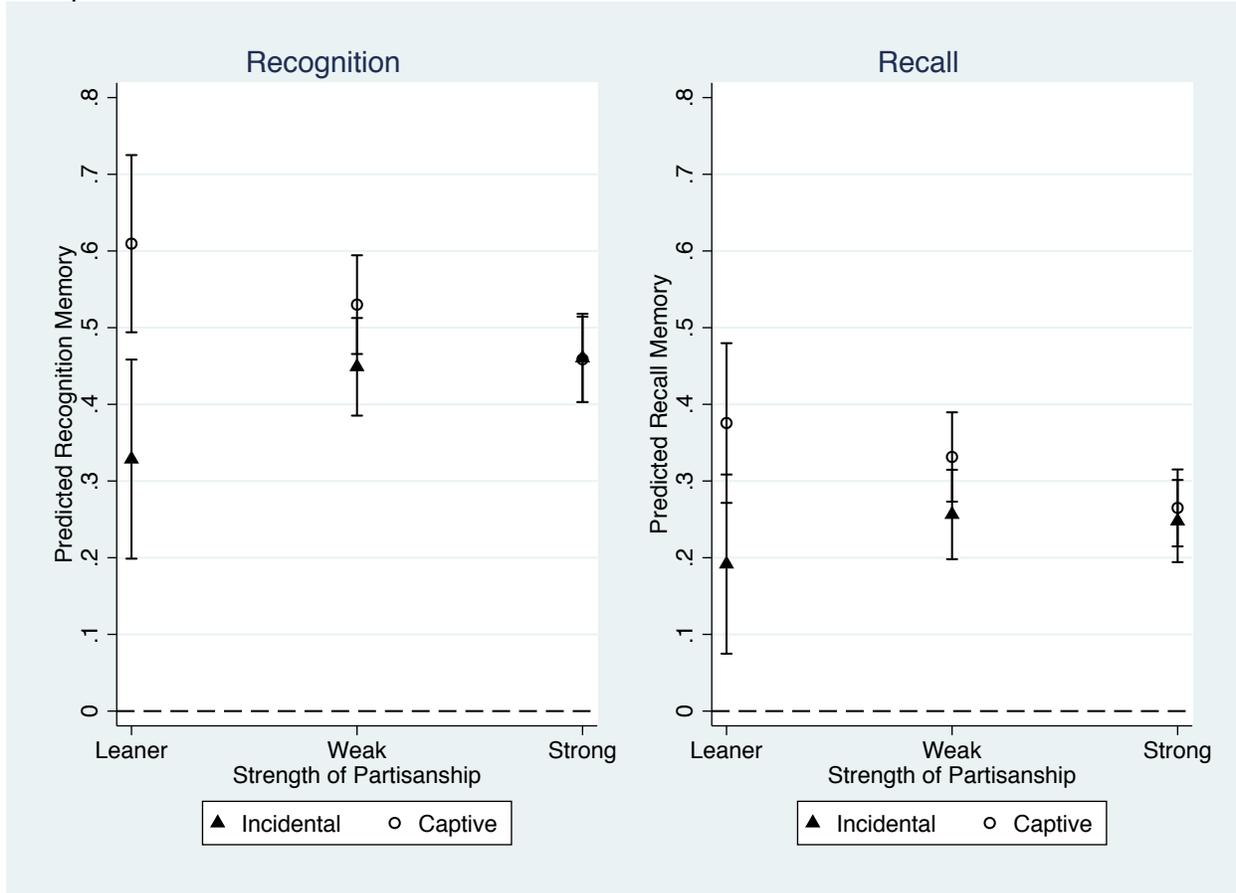


Figure 3.5. Predicted Marginal Effect of Following Politics on Self-Reported Anger by Exposure Context for In-Party Ads.

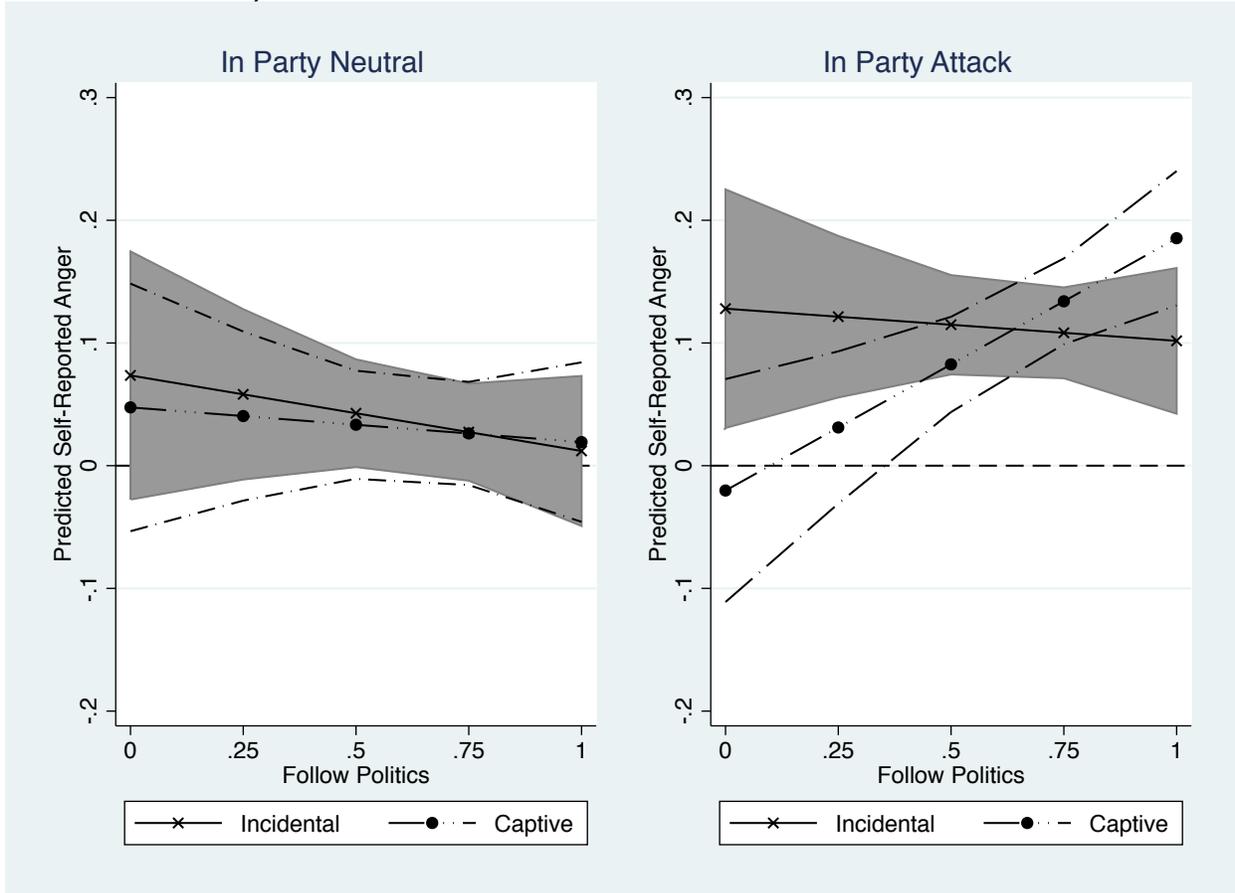


Figure 3.6. Predicted Marginal Effect of Following Politics on Self-Reported Anger by Exposure Context for Out-Party Ads.

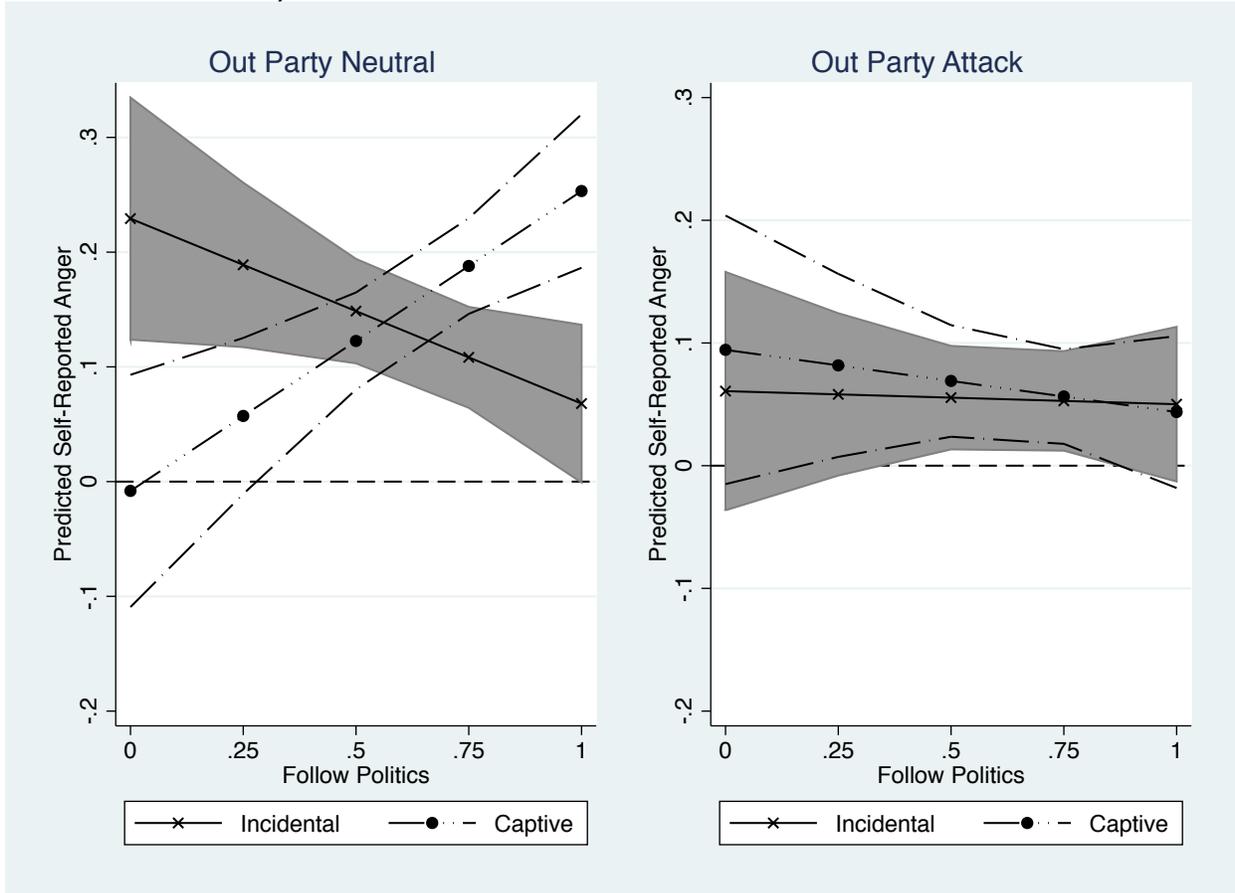


Figure 3.7. Isolated Marginal Effect of Captive Attention on Self-Reported Anger by Following Politics.

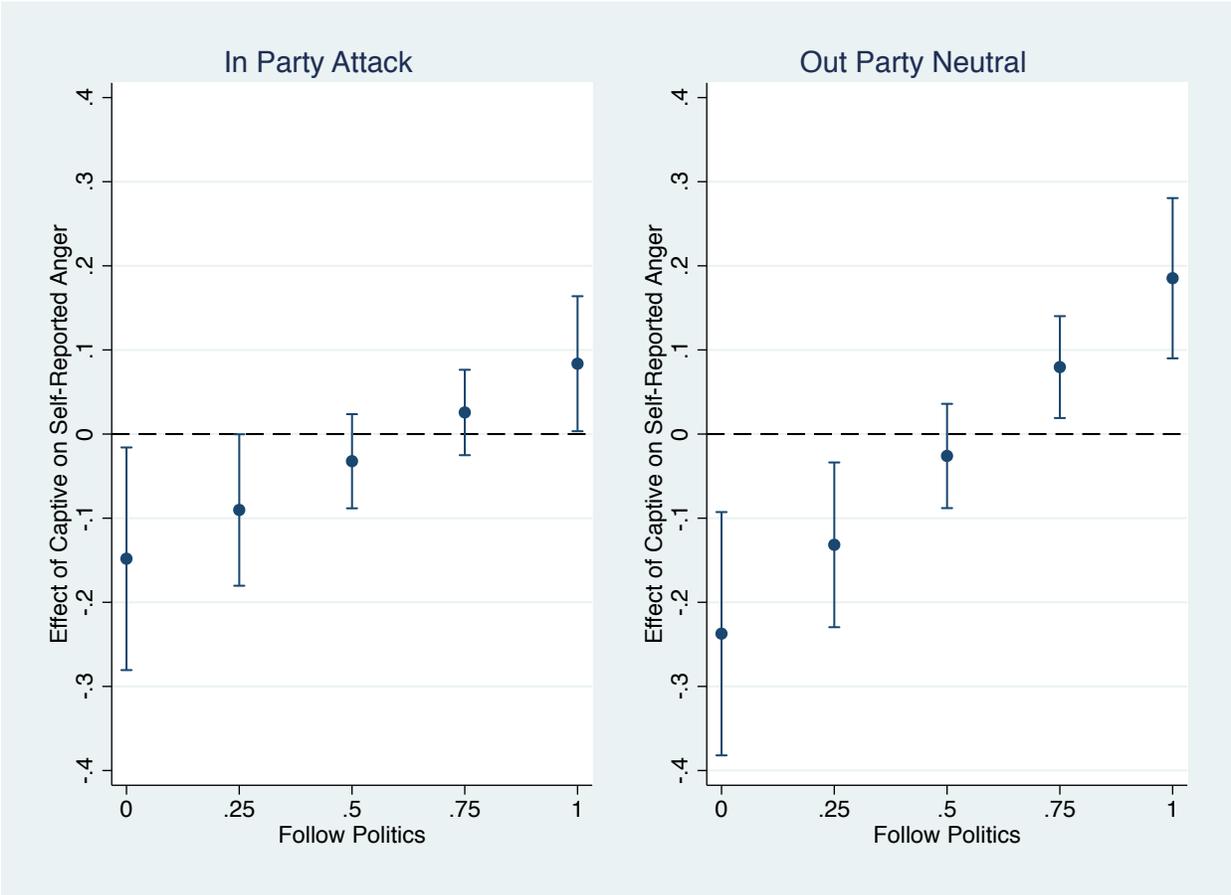


Figure 3.8. Predicted Marginal Effect of Self-Reported Anger on Intent to Participate by Exposure Context for In-Party Ads.

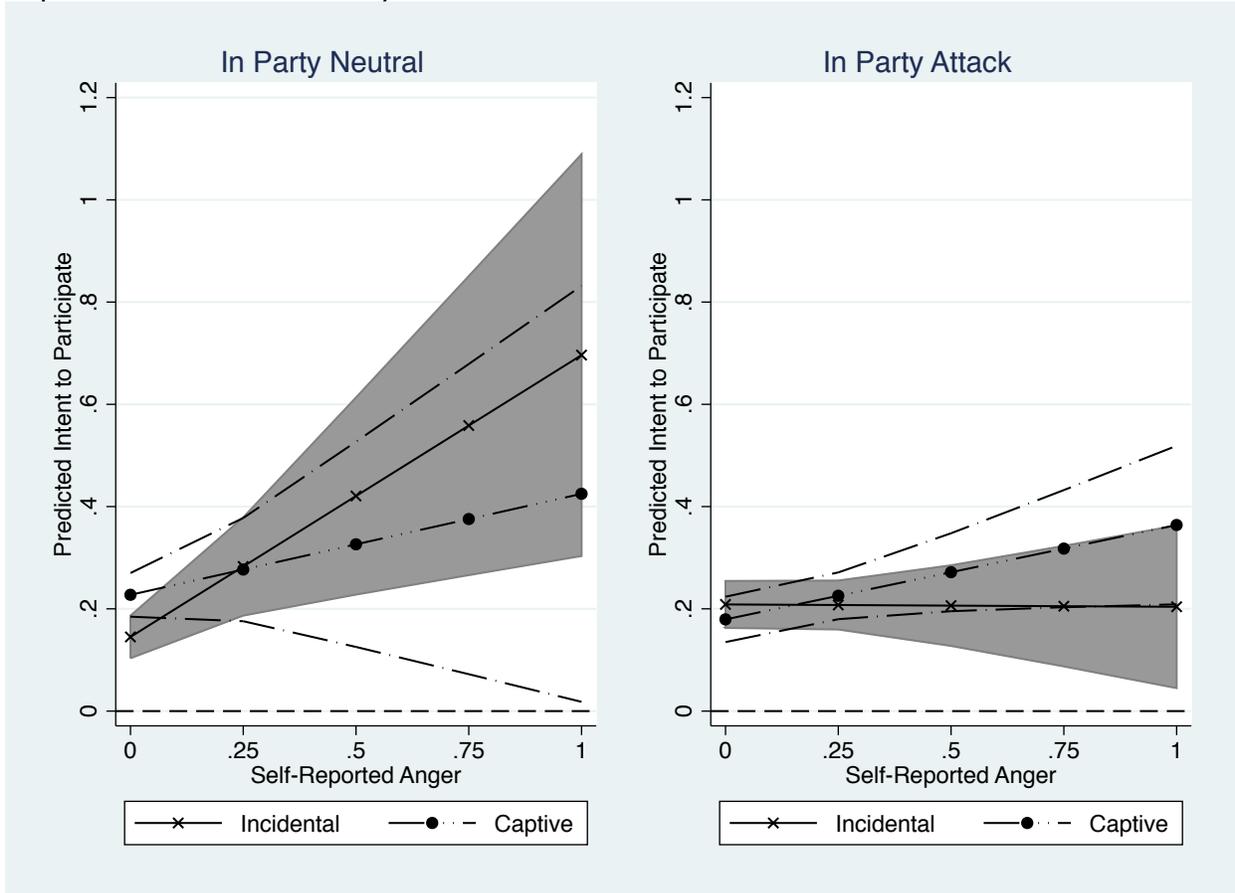
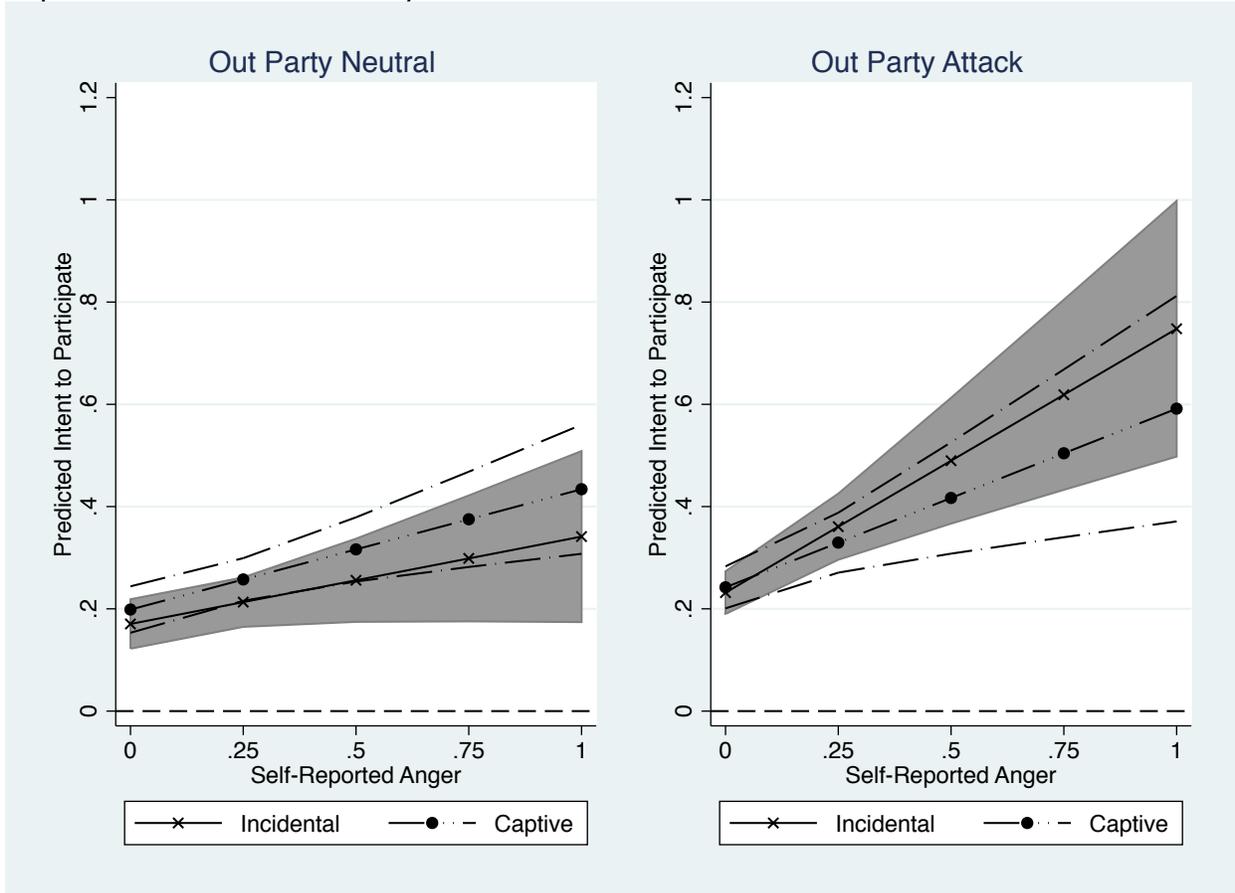


Figure 3.9. Predicted Marginal Effect of Self-Reported Anger on Intent to Participate by Exposure Context for Out-Party Ads.



## Appendix

### Instrumentation for Laboratory Experiment

This section includes is the question wording for all relevant items for both “Tuned Out” and “Motivating Participation” (i.e. Chapters One and Two). Figure A.1 provides the study procedures. Figures A.2 and A.3 provide the storyboards for the televised ads.

- Question Wording -

#### Self-Reported Emotion

Please indicate to what extent you feel each of the following emotions right now.

*[Randomized]*

- Anxious
- Sad
- Angry
- Depressed
- Bored
- Enthusiastic
- Worried
- Proud
- Outraged
- Relaxed

*(Not at all, Slightly, Somewhat, Very, Extremely)*

#### Political Knowledge

Here are a set of questions concerning various public figures and groups. We want to see how much information about them gets out to the public from television, newspapers, and the like.

Who is currently Vice President of the United States?

How many members are elected to the Michigan House of Representatives?

How many justices are there on the U.S. Supreme Court?

Who holds the position of Speaker of the House In the state of Michigan?

Thinking now about the two major political parties in the United States. Which party would you say is more conservative than the other at the national level? {*Democratic Party, Republican Party*}

What U.S. job or political office does Eric Holder now hold? {*Attorney General, Speaker of the House of Representatives, Secretary of Defense, Supreme Court Justice*}

Which party currently controls the U.S. Senate? {*Democratic Party, Republican Party, Neither*}

Which Michigan job or political office does Gretchen Whitmer now hold? {*Senate Minority Leader, Lieutenant Governor, Chief Justice of the Supreme Court, Secretary of State*}

### Memory

First: {*Randomly Cued or Free Recall*}

Cued:

- Can you recall the sponsor of this ad? What was his name?
- From which party was the sponsor?
- Below, please describe the content of this ad. What was it about?
- Were there particular political issues it discussed?
- How about the images and video clips? Do you recall what they were?
- How would you describe the tone of the ad?
- Are there any additional details about the ad that you wish to mention?

Free:

- What do you recall about this ad? Please write everything you can remember about the ad you just watched.

Second: {*All*}

Recognition:

- Still thinking about the advertisement, please choose all issues below that were mentioned:
  - *Prioritizing job growth*
  - *Enhancing student safety*
  - *Falling levels of unemployment*
  - *Low violent crime rate*
  - *Decreasing foreign oil dependency*
  - *Lowering taxes*
  - *Support for wasteful spending*
  - *No plan to address student safety*
  - *Rising unemployment*
  - *Increase in violent crime*
  - *Promoting clean energy*
  - *Raising taxes*

- Regarding the advertisement, among the following alternatives, please select the sponsor of the ad.
  - *Tom Peterson*
  - *Charles Muller*
  - *Steven Higgins*
  - *David Richards*
  
- From which party does the sponsor belong?
  - *Democrat*
  - *Republican*
  - *No party mentioned*
  - *Other*
  
- Would you describe the tone of the ad as positive or negative?
  - *Positive*
  - *Negative*

### Willingness to Participate

Thinking about politics, how likely are you to do each of the following before this year's November elections?

{*Randomized*}

- Sign a petition
- Initiate a conversation on a political topic
- Attend a meeting, rally, or demonstration.

(*Not at all, Slightly, Somewhat, Very, Extremely*)

### Strength of Partisanship

Now we would like to get your feelings toward various political leaders, people in the news, and groups in society. Please rate each person or group using something we call the feeling thermometer.

Ratings between 50 degrees and 100 degrees mean that you feel favorable and warm toward the person or group.

Ratings between 0 degrees and 50 degrees mean that you don't feel favorable toward the person or group and that you don't care too much for that person or group.

You would rate the person or group at the 50 degree mark if you don't feel particularly warm or cold toward that person or group.

If we come to a person or group whose name you do not recognize, you do not need to rate them. Otherwise, use the slider to choose any number from zero to one00, indicating how you feel about the person or group.

*{Randomized}*

- Occupy Wall Street members
- Hilary Clinton
- Barack Obama
- Mitt Romney
- Democrats
- Tea Party members
- Independents
- Republicans

### **Additional Analyses for “Tuned Out”**

For Table 1.1, which predicts arousal, I tested several key assumptions of linear regression models statistically (i.e. linearity assumption, heteroskedastic errors, and for multicollinearity); the model does not violate any of the assumptions. I also ran the model with the continuous version of political knowledge (presented in Table A.1.

Examining the model form, I included an interaction between political knowledge and in-party status, thus allowing for a non-additive relationship such that each group can have a different slope. I looked for non-linearity between political knowledge and arousal with two plots. First, I plotted the partial regression residuals overlaying an observed pattern line. This plot isolates the effect of political knowledge on arousal in the model and plots the data with the observed pattern line against the predicted linear pattern. Second, I examined how well the overall model predicts arousal by plotting the predicted effects against the observed effects (i.e. testing the model fit). In this plot, a good fit would return a 45-degree pattern in the data. Both plots are in Figure A.4. As is indicated by the left panel, the observed pattern has a slight curve at the left tail that the linear model underestimates. Nonetheless, the observed line is close to the regression line and does not clearly indicate a nonlinear pattern. The right panel demonstrates the overall fit of the model; as shown, the 45-degree pattern demonstrates that the current model specification predicts arousal well.

Overall, the results of the additional model specification analyses for Chapter One (“Tuned Out”) suggest each key variable is linearly related to the dependent measures and the model fit is reasonable. Moreover, the relationships described appear robust to alternative specifications and operationalization.

### **Additional Analyses for “Motivating Participation”**

As with the previous section, the main substantive results from Chapter Two (“Motivating Participation”) make a number of assumptions about the model form. Where indicated, some models shift from linear additive to include an interaction that allows for a non-additive relationship such that the impact of self-reported negative emotion on participation can vary by treatment condition (see Tables 2.4 and 2.6). Wald tests confirm the need for these interactions (details in text). However, to more closely examine the possibility of nonlinear relationships between the key dependent and independent variables, I again rely on two types of plots. First, for each model presented, I plotted the partial regression residuals of the key independent variable while overlaying an observed pattern line; doing so isolates the effect of the independent variable on the dependent variable and plots the data with the observed pattern line against the predicted linear pattern. In each figure, this is referred to as “Residuals Plot (Partial).” Second, I examined how well the overall model predicts the dependent variable by plotting the predicted effects against the observed effects (i.e. testing the model fit). In this type of plot, a good fit would return a 45-degree pattern in the data; these are titled “Observed v. Predicted Plot.”

To begin, Table 2.3 and 2.4 predict participants’ willingness to participate based on arousal and self-reported negative emotion, respectively. Figure A.5 provides an examination of nonlinearity for arousal whereas Figures A.6 does the same for fear and anger. In all three, the observed pattern is close to the linear regression line and does not clearly indicate a nonlinear

pattern. The effects for arousal and anger have a mild polynomial appearance but it moves around the regression line and does not appear to drastically over- or under-estimate particular effects. It is noteworthy that the relationship between self-reported emotion and participation appears to cluster together far less than other variables and some data points may have a stronger influence on the predicted regression line than others. However, recall from the results section that the relationship between both negative emotions and participation were significantly altered by treatment condition, thus explaining the spread of data (and this is corrected in subsequent models with a treatment interaction).

Turning to the models predicting self-reported emotion from arousal in response to an ad attacking the out-party, Figures A.7 and A.8 present both the residuals plot which examines the data for nonlinearity and the observed versus predicted plot which examines the model fit for fear and anger respectively. The left panel in both plots shows no evidence of nonlinearity between arousal and self-reported emotion. The right panel in both plots, however, demonstrates for the first time, a fairly poor overall fit of the model as indicated by the lack of a 45-degree pattern. Recall from the text that the ad attacking the out-party was the only treatment condition for which arousal was a significant predictor of emotion. Given this, it is not surprising that these two relationships were linear, allowing the functional form of the specified model to accurately reflect the data. Further examination of the other three treatment conditions suggests a non-linear specification for the relationship between arousal and self-reported emotions might be more appropriate, though there is no systematic appearance to the plots (results not shown). Ultimately, the poor overall fit, despite linearity in the relationship between the key variables of interest, is not wholly surprising given the difficulty discussed in text of finding patterns between physiology and self-reported discrete emotions. Since this paper does not make significant

contributions or claims about the nature of these relationships, I did not conduct any further tests.

Lastly, Figure A.9 examines the fit of the full models predicting participation from both arousal and self-reported negative emotion, which includes the non-additive interaction with treatment condition. As is clear, the overall model fit is good. With evidence of linearity in the key variables of interest and a final model that fits the data well, use of the current functional form is supported.

### **Instrumentation for “Incidental or Captive”**

This section includes is the question wording for “Incidental or Captive” (i.e. Chapter Three). Figure A.10 provides a sample of the article that participants read and Figure A.11 provides all treatment ads.

- Question Wording -

#### Emotion

When thinking about the advertisement, how much do you feel:

{*Randomly*}

- Enthusiastic
- Anxious
- Sad
- Angry
- Outraged
- Happy
- Depressed
- Worried

[*Not at all, A little, Somewhat, A good deal, Very*]

#### Follow Politics

Some people seem to follow what's going on in government and public affairs most of the time, whether there's an election going on or not. Others aren't that interested. Would you say you

follow what's going on in government and public affairs hardly at all, only now and then, some of the time, most of the time, or all of the time?

*[Hardly at all, Only now and then, Some of the time, Most of the time, All of the time]*

## Memory

First: Cued or Free Recall {*Randomly*}

Cued:

- Do you recall what the ad was about? Below, please describe any details you can remember regarding the topic of the ad.
- Do you recall who sponsored the ad? Below, please provide the name of the ad's sponsor.
- There was a photo in the ad. Below, please describe the image that accompanied the ad.
- Still thinking about the advertisement, please describe what emotion it appealed to, if any.
- Are there any other details that you can recall about the ad? Please list them below.

Free:

- There was an advertisement that accompanied the article. Below, provide all of the details you can recall about the ad. Please be specific.

Second: Recognition {*All*}

- Still thinking about the advertisement that accompanied the article you read, which of the following topics best describes the content of the ad? Please choose one of the below, even if you have listed it earlier.
  - *Internet security*
  - *Food services*
  - *Don't recall*
  - *Cleaning supplies*
  - *Lawnmowers*
  - *Politics*
- Regarding the advertisement, among the following alternatives, please select the sponsor of the ad.
  - *John Deere*
  - *SecureNet*
  - *Institute for Politics*
  - *Don't recall*
  - *Democratic Party*
  - *Republican Party*
- Still thinking about the advertisement, which of the following best describes the photo that was part of the ad?
  - *Don't recall*

- *Push lawnmower*
- *Elephant*
- *Donkey*
- *U.S. Capitol Building*
- *Padlock*

### Participation

Thinking about politics, how likely are you to do each of the following in the next six months?

*[Randomly]*

- Wear or display a button or sticker
- Contact an elected official, candidate, or political group
- Sign a petition
- Attend a meeting, rally, or demonstration
- Donate to a political campaign, party, or group
- Initiate a conversation on a political topic

*[Not at all likely, Slightly likely, Somewhat likely, Very likely, Extremely likely]*

### Partisanship (Strength)

Generally speaking, do you usually think of yourself as a Republican, a Democrat, an independent, or what? *[Republican; Democrat; Independent; Other / Don't Know]*

Would you call yourself a strong [Democrat/Republican] or a not very strong [Democrat/Republican]? *[Strong; Not very strong]*

Do you think of yourself as closer to the Republican Party or to the Democratic Party? *[Closer to the Democratic Party, Closer to the Republican Party, Neither]*

### **Additional Analyses for “Incidental or Captive”**

Consistent with the previous analyses, this section is designed to statistically examine the possibility of nonlinearity in the relationships between the key variables of interest and to examine overall model fit for all of the models in Chapter Three.

Table 3.1 predicts recognition and recall memory as a function of treatment condition, exposure context and two individual characteristics, following politics (which is presumed to have a linear relationship with memory) and strength of partisanship (which is also assumed to have a linear yet non-additive relationship with memory such that strong and weak partisans may have

different slopes based on whether their attention was captive or incidental). Figure A.12 provides an examination of possible nonlinearity between following politics and both recognition and recall memory. Recognition memory is the left panel whereas recall memory is in the middle and right panels. As indicated by the middle plot, the original recall model demonstrated a quadratic relationship, thus, the right panel corrects for this. Specifically, when the new squared measure of following politics is included in the model for recall (see Table A.4), none of the results change substantively and the effect of following politics becomes greater in magnitude, suggesting the misspecification may have underestimated the impact of following politics on memory.

Turning to Table 3.2 (full version is Table A.2), the dependent variable becomes self-reported anger. The model allows for each treatment condition to produce different intercepts by including a dummy indicator for each. It also allows for the effect of following politics on self-reported anger to be dependent upon both the treatment condition and the viewing context. In other words, where following politics was expected to have a consistent effect on memory in the previous analysis, it is now expected to condition the relationship between ad type, viewing context, and stated level of anger. Wald tests confirm the need for such an interaction. I plot for possible non-linearity between following politics and self-reported anger and examine the model fit in Figure A.13. The left panel suggests there are no problems with nonlinearity whereas the right panel shows that the overall fit of the model is not as good as several previous models but not unreasonable in terms of nearly producing a 45-degree pattern.

Lastly, Table 3.3 (full version is Table A.3) predicts participation from self-reported anger. Since anger was predicted based on a conditional relationship with following politics, that dependency is dropped and following politics becomes a control variable. The impact of anger on participation remains dependent on treatment condition and viewing context. This was a

deliberate choice to determine whether self-reported anger violates a theoretical assumption that its influence on participation ought to be unchanged by experimental context. In other words, while experimental context ought to have an influence over the amount or degree of anger, it should not substantively alter the positive relationship between anger and participation. This model specification explicitly tests that assumption. Consistent with the previous analyses, Figure A.14 provides plots for nonlinearity and overall model fit, both of which do not indicate any problems with the model specification.

Table A.1. Effect of Political Knowledge (PK) and Ad Type on Arousal

	(1)	(2)
PK (Continuous))	0.004 (0.003)	0.004 (0.003)
In-Party	0.003* (0.002)	0.003* (0.002)
PK (Continuous) X In-Party	-0.008* (0.004)	-0.009* (0.004)
Attack Ad	0.001* (0.001)	0.001 (0.001)
PID Strength	-	-0.001 (0.001)
Age	0.003 (0.002)	0.001 (0.001)
Female	0.001 (0.001)	0.001 (0.001)
PID (R)	0.001 (0.001)	-0.001 (0.002)
Education	0.007** (0.003)	0.007** (0.003)
Student	0.004* (0.002)	0.004* (0.002)
Constant	-0.008*** (0.002)	-0.008** (0.003)
Observations	51	50
R-squared	0.337	0.344

Standard errors in parentheses  
\*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

The dependent variable is physiological arousal (area), standardized within individuals. Political knowledge is a continuous additive index ranging from zero to one. In-Party (versus Out) and Attack Ad (versus Positive) are dummy indicators for the type of treatment advertisement. PID Strength is the continuous difference between the participant's in- and out-party feeling thermometer ratings (pre-treatment), scaled from -1 (preference for out-party) to +1 (preference for in-party).

Table A.2. Conditional Effect of Following Politics on Self-Reported Anger.

	Self-Reported Anger
In-Party Attack	0.059 (0.079)
Out-Party Neutral	0.156** (0.074)
Out-Party Attack	-0.013 (0.071)
Follow Politics	-0.062 (0.073)
In-Party Attack X Follow Politics	0.029 (0.109)
Out-Party Neutral X Follow Politics	-0.100 (0.105)
Out-Party Attack X Follow Politics	0.051 (0.101)
Captive	-0.026 (0.072)
In-Party Attack X Captive	-0.118 (0.106)
Out-Party Neutral X Captive	-0.211** (0.103)
Out-Party Attack X Captive	0.060 (0.103)
Captive X Follow Politics	0.033 (0.102)
In-Party Attack X Captive X Follow Politics	0.192 (0.150)
Out-Party Neutral X Captive X Follow Politics	0.389*** (0.148)
Out-Party Attack X Captive X Follow Politics	-0.073 (0.146)
Strength of PID	0.004 (0.010)
Republican (PID)	-0.003 (0.017)
Education	0.023 (0.035)
Income	0.016 (0.025)
Female	-0.016 (0.015)
Age	0.041 (0.036)
Constant	0.036 (0.064)
Observations	823
R-squared	0.084

Standard errors in parentheses \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

Table A.3. Conditional Effect of Anger on Likelihood to Participate.

	Intent to Participate
In-Party Attack	0.064** (0.032)
Out-Party Neutral	0.025 (0.033)
Out-Party Attack	0.087*** (0.030)
Anger	0.551*** (0.206)
In-Party Attack X Anger	-0.556** (0.224)
Out-Party Neutral X Anger	-0.380* (0.227)
Out-Party Attack X Anger	-0.035 (0.245)
Captive	0.082*** (0.030)
In-Party Attack X Captive	-0.112** (0.045)
Out-Party Neutral X Captive	-0.054 (0.045)
Out-Party Attack X Captive	-0.072* (0.043)
Captive X Anger	-0.354 (0.295)
In-Party Attack X Captive X Anger	0.543* (0.320)
Out-Party Neutral X Captive X Anger	0.418 (0.318)
Out-Party Attack X Captive X Anger	0.187 (0.344)
Follow Politics	0.296*** (0.031)
Strength of PID	0.041*** (0.011)
Republican (PID)	-0.025 (0.018)
Education	0.082** (0.037)
Income	0.049* (0.026)
Female	0.002 (0.016)
Age	-0.118*** (0.038)
Constant	-0.133*** (0.048)
Observations	823
R-squared	0.236

Table A.4. Revised Individual Characteristics and Recall Memory .

	Recall
In-Party Attack	-0.090** (0.037)
Out-Party Neutral	-0.009 (0.037)
Out-Party Attack	-0.085** (0.037)
Follow Politics	0.395** (0.191)
Follow Politics ^ 2	-0.229 (0.159)
Weak Partisan	0.068 (0.067)
Strong Partisan	0.061 (0.066)
Captive	0.186** (0.079)
Weak Partisan X Captive	-0.114 (0.090)
Strong Partisan X Captive	-0.171* (0.088)
Republican (PID)	0.021 (0.032)
Education	0.216*** (0.067)
Income	0.009 (0.048)
Female	0.040 (0.028)
Age	-0.116* (0.070)
Constant	0.019 (0.097)
Observations	742
R-squared	0.061

Figure A.1. Study Procedures for the Laboratory Experiment.

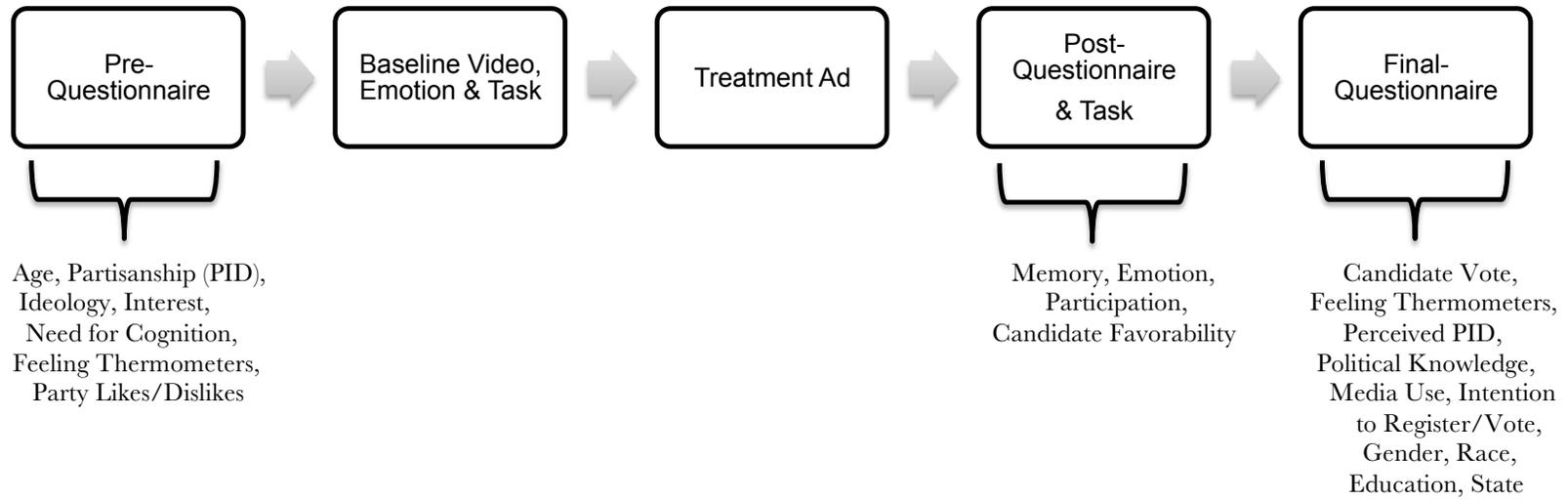


Figure A.2. Attack Ad Storyboard.



I'm {Sponsor}  
and I approved  
this message.

{Opponent} is  
**damaging**  
our neighborhood.



He has **hindered**  
job growth **failed to**  
**protect** small businesses.

In fact, his actions  
have **led to** millions  
of dollars in wasteful  
spending.



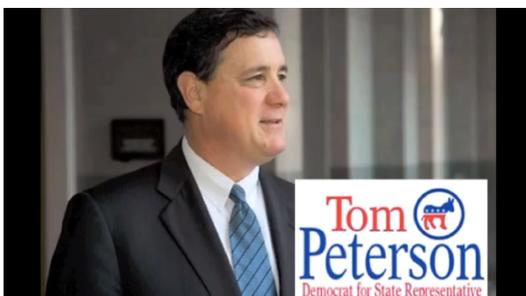
What's more, {Opponent}'s  
policies will **hurt**  
our schools and  
**do nothing** to protect  
our children.

Teachers and parents  
have **questioned** his plan,  
which **undervalues**  
our rankings and  
**does little to address**  
student safety.



We **don't** need more  
{Opposition Party} like  
{Opponent} in office.

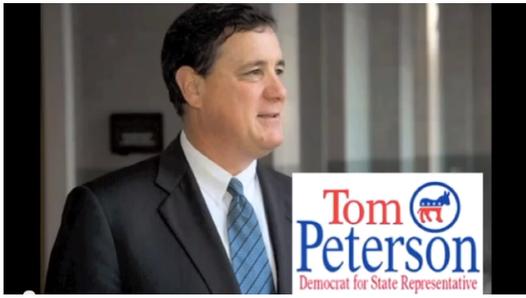
It's time for a  
representative that  
has your best  
interest in mind.



Vote for {Sponsor}.



Figure A.3. Positive Ad Storyboard.



I'm {Sponsor}  
and I approved  
this message.

{Sponsor} is  
**improving**  
our neighborhood.



He has **prioritized**  
job growth and  
**provided aid for**  
small businesses.

In fact, his actions  
have **saved** millions  
of dollars in wasteful  
spending.



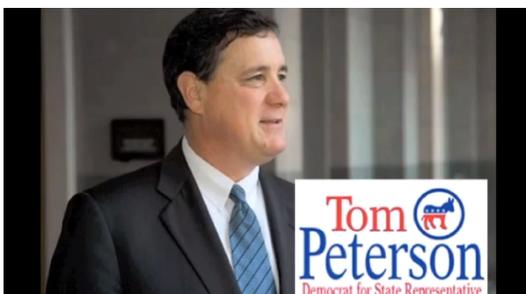
What's more, {Sponsor}'s  
policies will **improve**  
our schools and  
**take steps** to protect  
our children.

Teachers and parents  
have **endorsed** his plan,  
which **seeks to boost**  
our rankings and  
**prioritizes enhancing**  
student safety.



We need more  
{Sponsor Party}  
like {Sponsor} in office.

It's time for a  
representative that  
has your best  
interest in mind.



Vote for {Name}.



Figure A.4. Plots for Non-Linearity in Political Knowledge and Arousal.

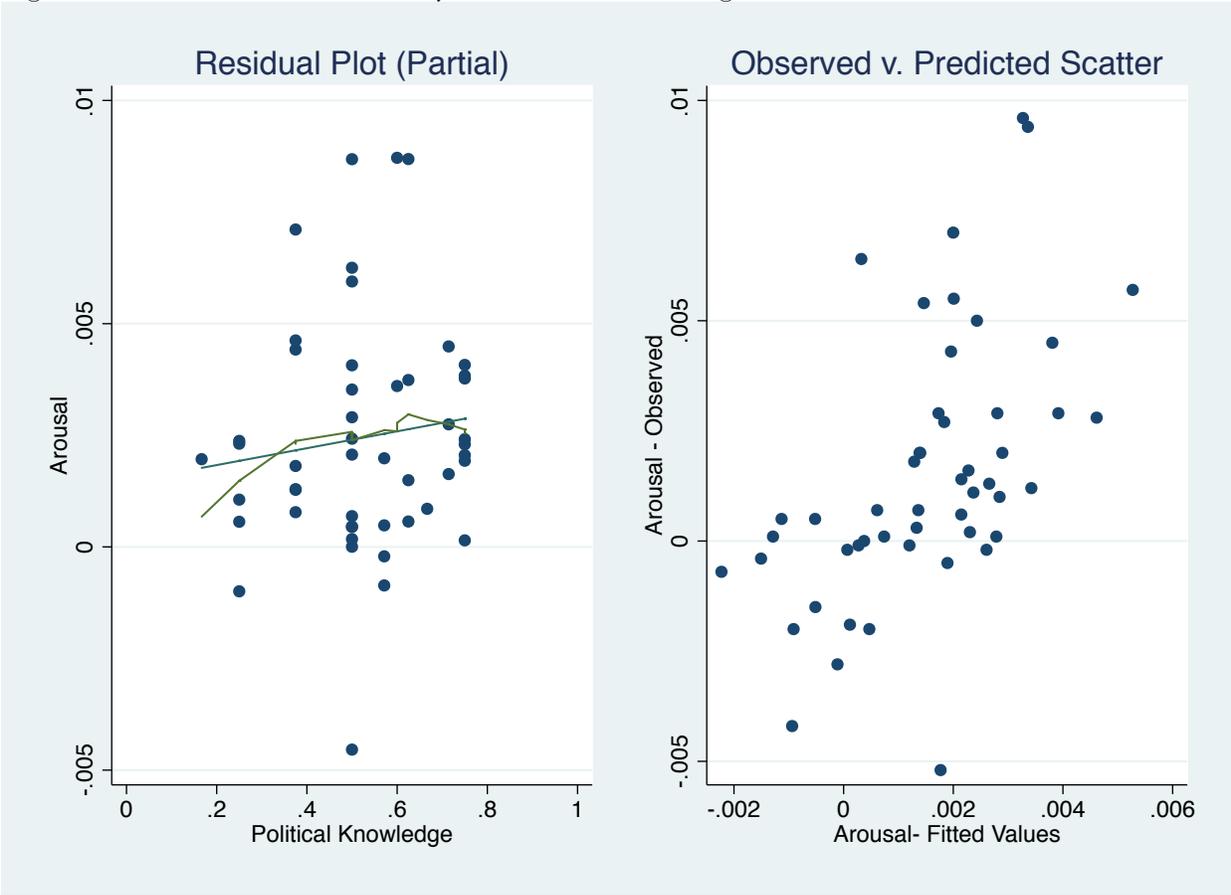


Figure A.5. Plot for Non-Linearity between Arousal and Participation.

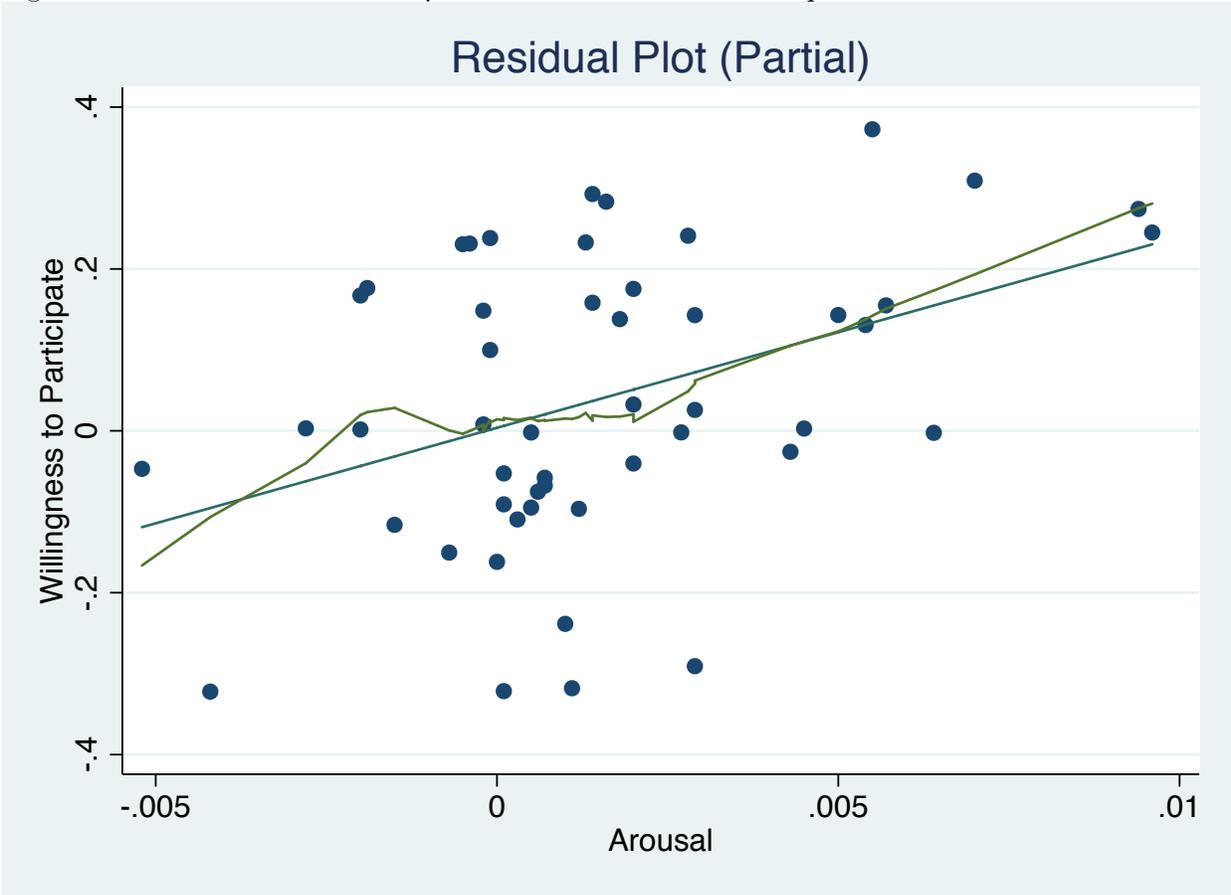


Figure A.6. Plots for Non-Linearity between Self-Reported Negative Emotion and Participation.

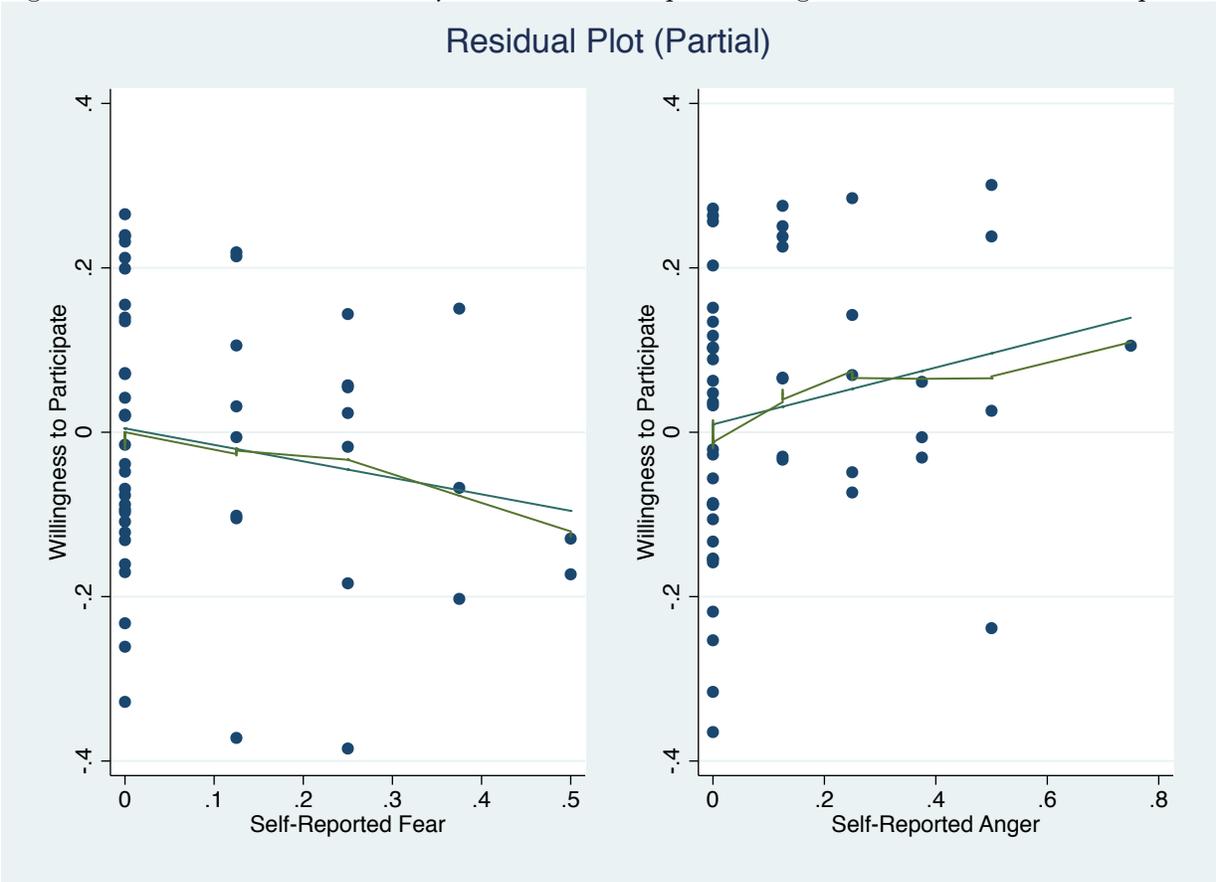


Figure A.7. Plots for Non-Linearity and Model Fit: Predicting Fear from Arousal to Attack Ad on Out-Party.

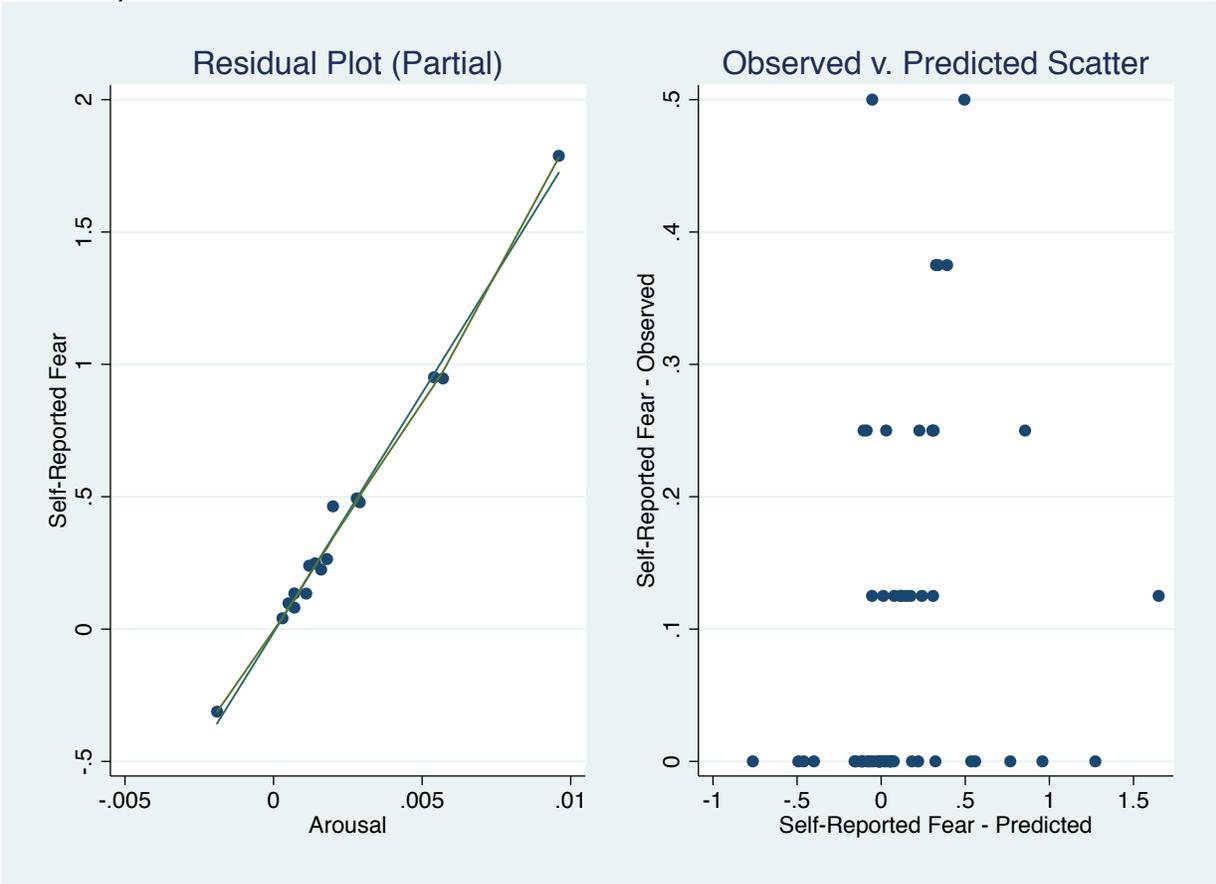


Figure A.8. Plots for Non-Linearity and Model Fit: Predicting Anger from Arousal to Attack Ad on Out-Party.

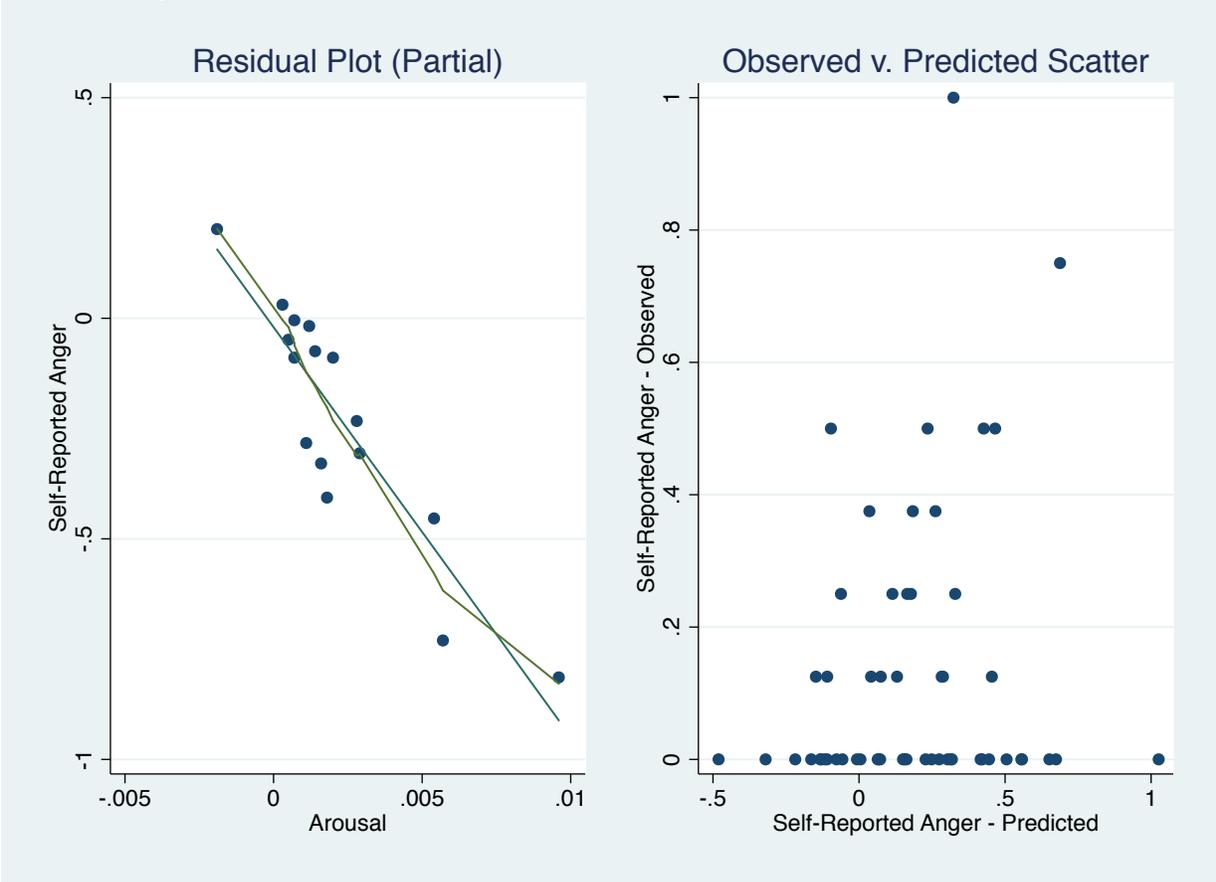


Figure A.9. Examining Model Fit: Full Model Predicting Participation.

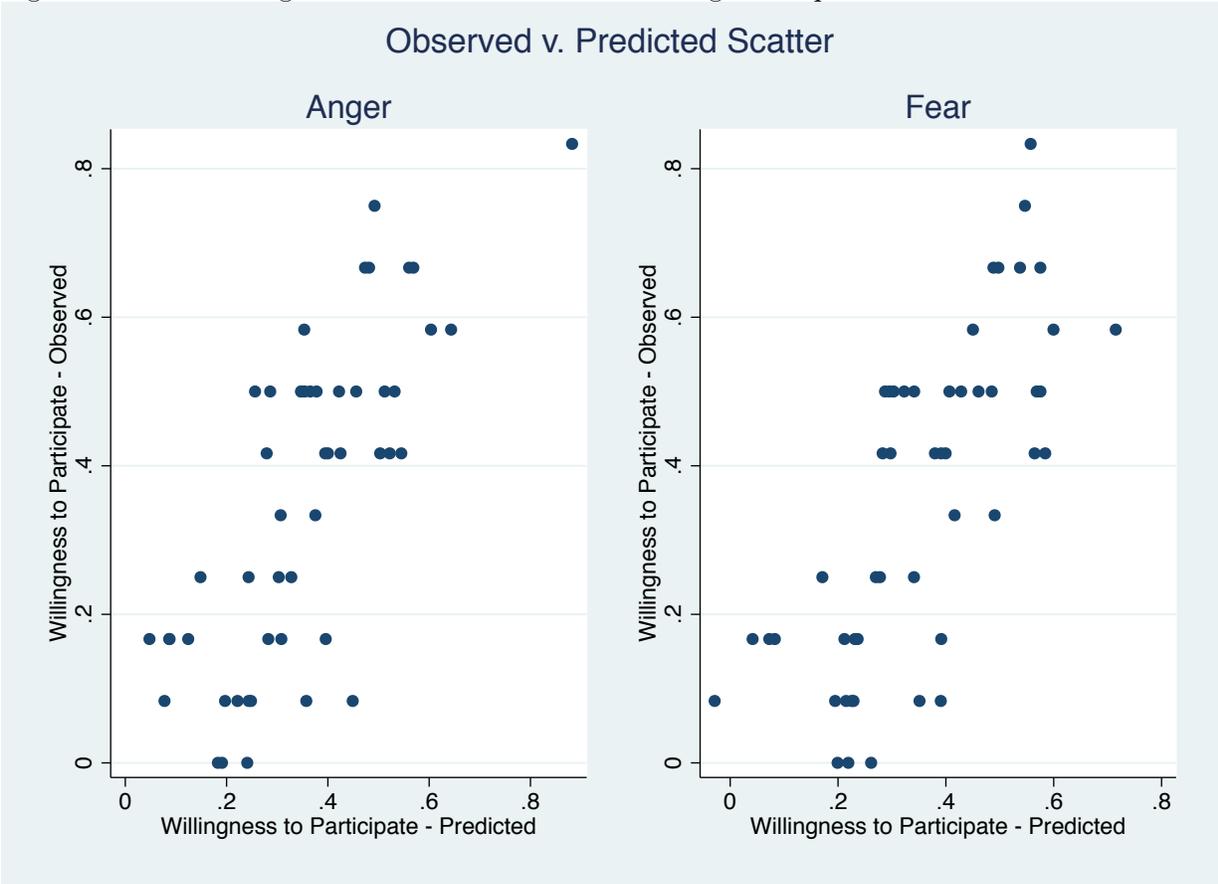


Figure A.10. Online Advertisements: Sample Article.

## The Secret History of the Aeron Chair

It wasn't originally designed for office warriors. It was intended for the elderly.

By Cliff Kuang



After the great dot-com bust of 2000, there was one lasting crash: Herman Miller's Aeron chair. The ergonomic, mesh-based office chair was launched in 1994, at the start of the bubble. At a cost of more than \$1,000 at a time, it quickly became a status symbol in Silicon Valley. Then, as the dot-coms failed, the chairs went empty. It was the best engineering money could buy, and it seemed purpose-built for squeaky-voiced billionaires inventing the future at a computer. But the Aeron's origin isn't so simple.

The pinnacle of the office chair was actually an unexpected fruit of a 10-year effort to create better furniture for the elderly. One of Aeron's designers was Bill Stumpf, the son of a gerontology nurse. When the American furniture company Herman Miller began investigating designs for the elderly, they hired Stumpf and he saw a market opportunity. The American populace was

aging quickly and hospitals lacked ergonomic furniture, often opting instead for a La-Z-Boy.

The La-Z-Boy, however, was terribly suited to how it was being put to use. The elderly, with weakened legs, had to back up to it and would simply fall backward. The lever for reclining was awkward to reach and hard to engage. And, worst of all, the foam stuffing, often upholstered in vinyl, spread the sitter's weight unevenly while retaining body heat and moisture—potentially causing bedsores. By 1988, Stumpf presented an alternative. The design solved all of the problems associated with other chairs, yet its greatest innovation was that its foam cushions were supported not by an upholstered wooden box, as was typical at the time, but by a span of plastic fabric stretched across the frame. Unfortunately, management balked at how futuristic it was and the chair never made it to the market.

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By 1992, Stumpf had a new concept geared more directly to the office. "I realized that people were interacting with computers and keyboards in all sorts of positions. They'd have the keyboard in their lap. Or they'd be at their desk slouching back, semi-reclined," says Stumpf. So he proposed a reclining mechanism that allowed the seat pan and chair to move in concert. And, most importantly, he came up with the idea of getting rid of the commonly used foam altogether. The right fabric mesh, he argued, would mold to any person's shape. Thus, what prevented bedsores would also keep people comfortable. In the end, the chair's oddball looks would be a direct expression of its engineering. By 1996, orders for the Aeron were already dwarfing expectations. Pop culture had made it a phenomenon: Will, on *Will and Grace*, spent an entire episode trying to get an Aeron.

Then the crash came. But the dot-com-era profits helped keep Herman Miller alive through the early 2000s, and sales eventually bounced back. Nearly 7 million Aerons have been sold to date, and another one comes off of Herman Miller's lines every 17 seconds.



- Bill Stumpf -

Figure A.11. Online Advertisement Treatments.

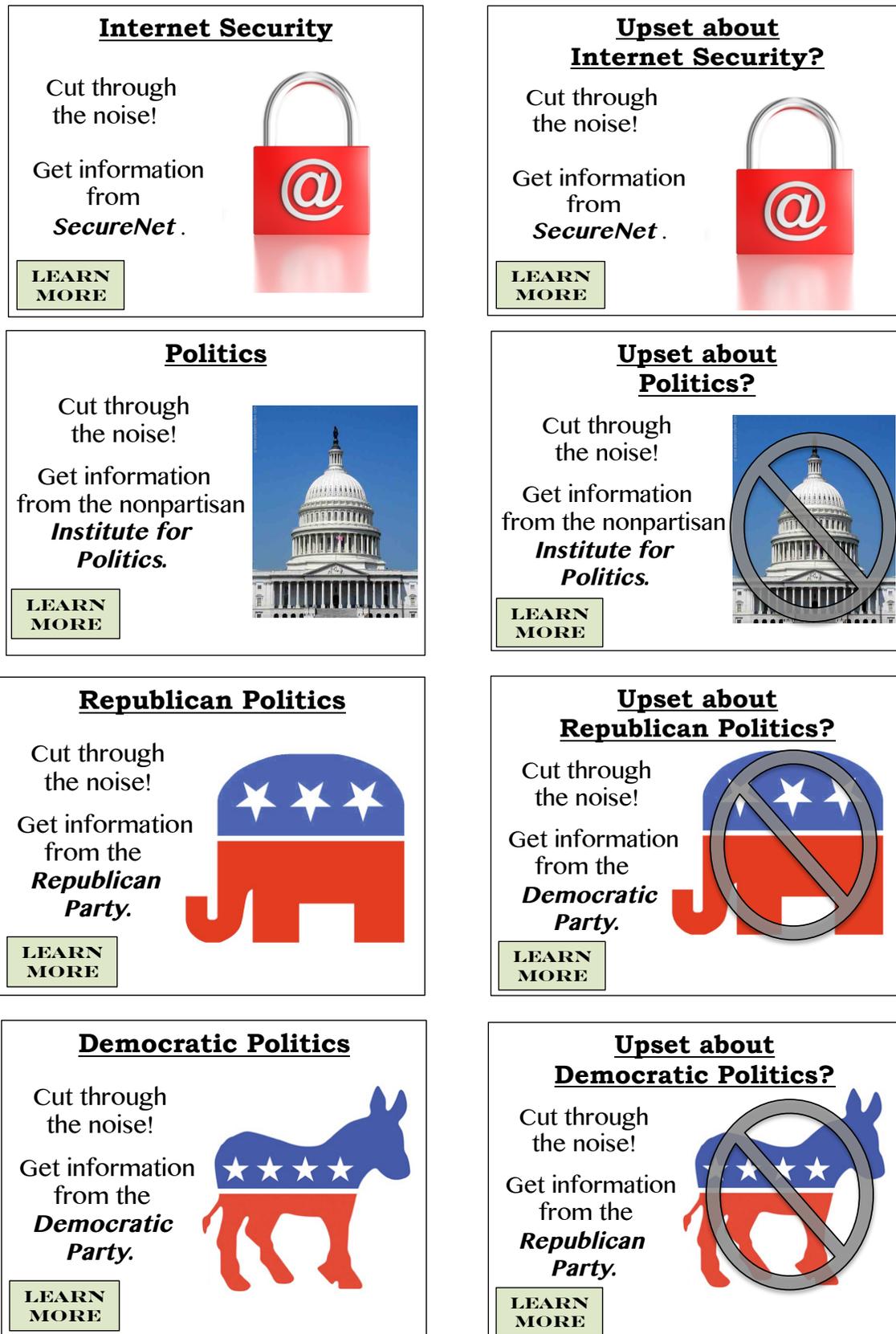


Figure A.12. Plots for Non-Linearity in Relationship between Following Politics and Memory.

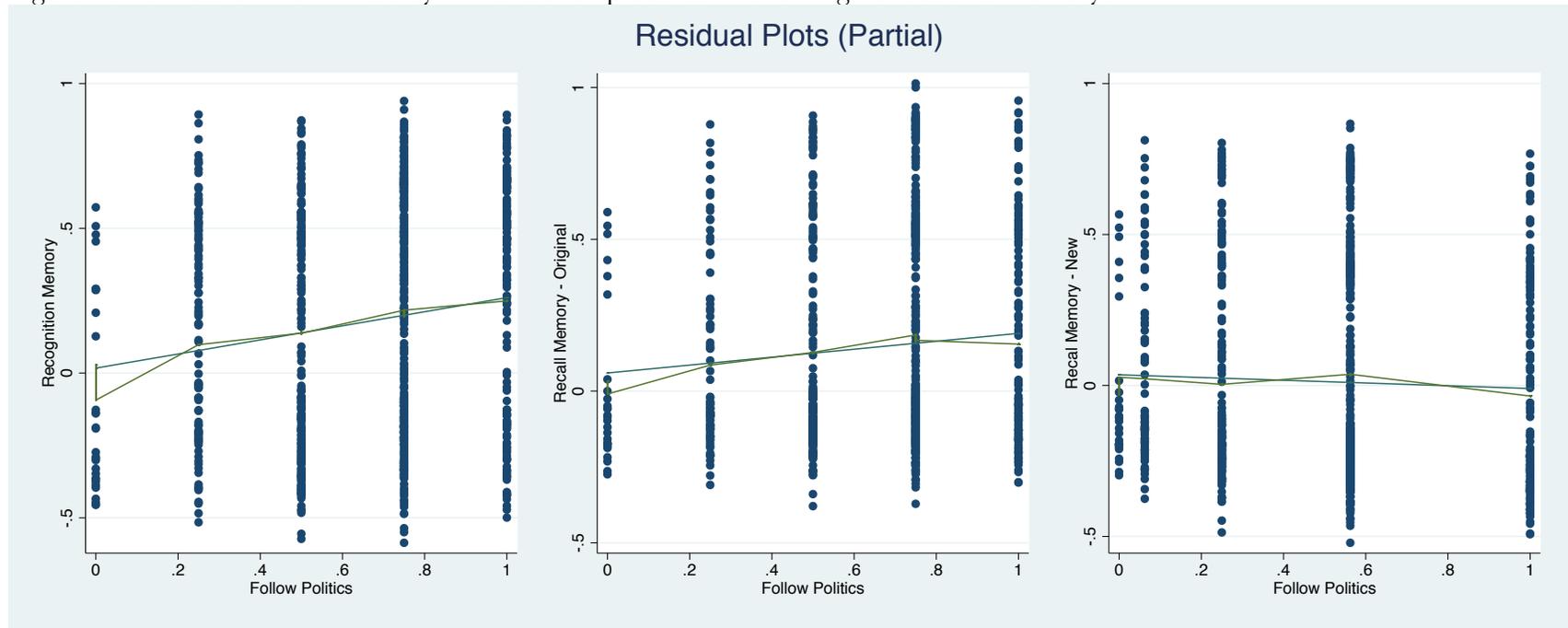


Figure A.13 Plots for Non-Linearity and Model Fit: Predicting Anger from Following Politics.

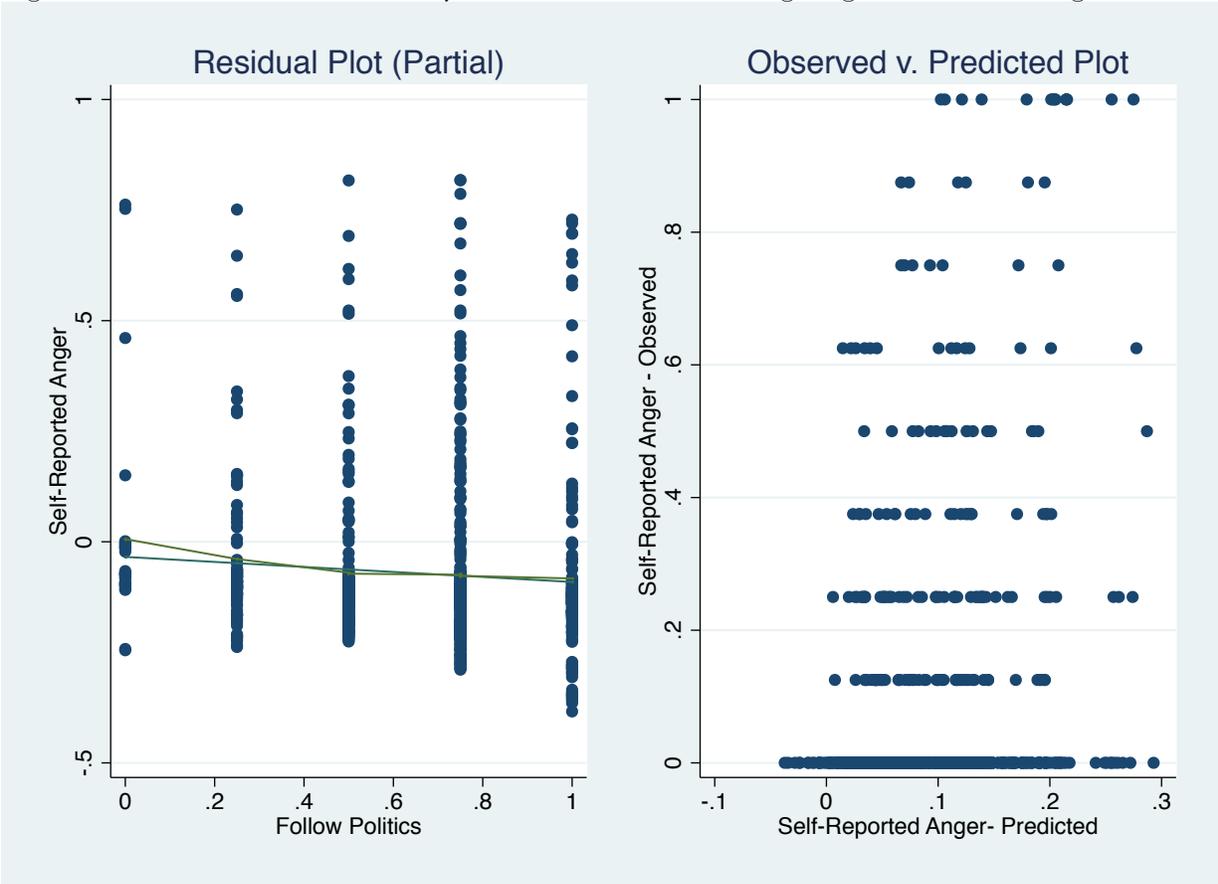
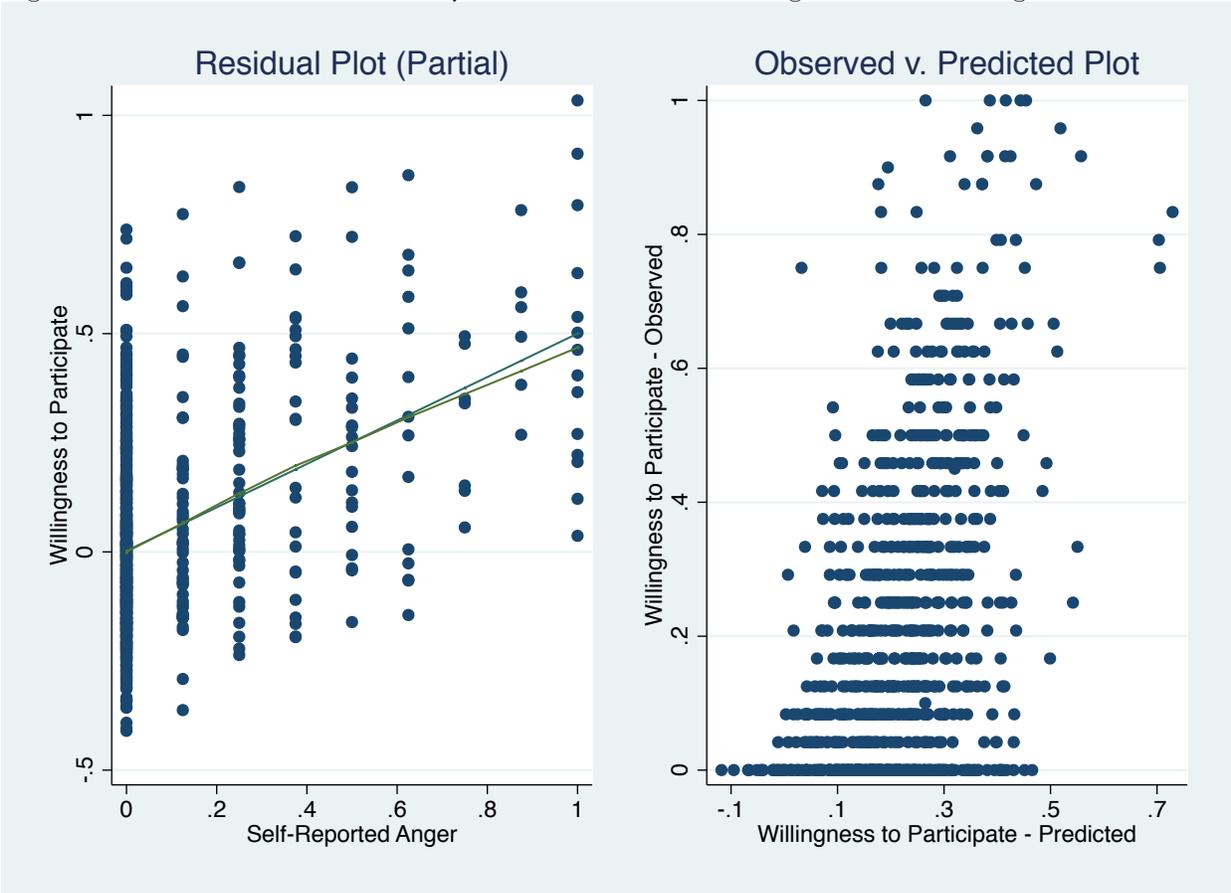


Figure A.14. Plots for Non-Linearity and Model Fit: Predicting Action from Anger.



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