Anger and Political Information: Evidence from Digital-Age Field Experiments*

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Abstract

Recent work on emotions in politics has the potential to clarify what the explosion of new media sources means for the strategies politicians use and the information citizens receive. Past scholarship finds anxiety to increase information seeking, but has inconsistent expectations for a separate emotion common in politics: anger. In a new type of field experiment, I induce feelings of anger and anxiety and passively measure the effects on information seeking. Across three studies, I find anger to increase information seeking, a result inconsistent with some standing theories. When anger is evoked along with anxiety, however, information seeking does not increase relative to an emotion-neutral control, a result at odds with past findings that anxiety motivates attention and interest.

Introduction

Suppose the brain worked like a pasta maker. If we wanted to understand the nature of its outputs – citizens' opinions, participation, votes – it would be essential to understand the working machinery, but also the raw inputs and how the two interact. Political scientists have long known this. John Zaller's (1992) Receive-Accept-Sample model points to the complementary importance of information streams, political engagement, and cognitive processing, for example. Analyses of so-called motivated reasoning (e.g. Taber and Lodge, 2006; Kunda, 1990) find people to be responsive to new information, but in a way that reflects their preconceptions and biases.

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Despite past work, our understanding of this crucial intersection is in a state of rapid change. There are two reasons. First, the inputs available today are much different from the inputs available in the past. Not long ago, a complete list of media sources would include a handful of regional newspapers, a few radio stations, three centrist television networks, and little else (Prior, 2007). Today, consumers choose from a much wider array of round-the-clock cable news networks – some tailored to appeal to specific political viewpoints – and the panoply of newspapers, magazines, blogs, listserves, wikis, podcasts, bulletin boards, social networks, and rumor mills accessible online. These "new media" outlets reflect every shade of credibility and bias, allowing today's citizen to play a far more active role in tailoring consumption to match tastes (Prior, 2005; Nie et al., 2010).

Second, although efforts to understand which inputs people consume have long turned out weak or even inconsistent results (Sears and Freedman, 1967; Stroud, 2008), advances in cognitive psychology have begun to clarify the conditions under which citizens prefer different types of information. In particular, Marcus, Neuman, and MacKuen's theory of Affective Intelligence (AIT) focused on how emotions regulate attention, interest, learning, and reliance on predispositions (Marcus and MacKuen, 1993; Marcus, Neuman and MacKuen, 2000; Marcus, 2002). Continuing in a similar vein, Brader (2005; 2006*b*) demonstrates how the emotional cues politicians embed in campaign communications might serve to mobilize segments of the electorate and persuade voters. Game theoreticians have begun to incorporate these theories into models of strategic communication in an exciting synthesis (Lupia and Menning, 2009).

Understanding what makes people consume some bits of information and not others is important because information importantly determines attitudes. Although large gaps in citizen knowledge are well known (Delli-Carpini and Keeter, 1997), small amounts of the right kind of information can change preferences over issues (Lupia, 1994) or the considerations people rely on to evaluate candidates (Iyengar and Kinder, 1989). Moreover, strategic campaign information, when presented well, is durable, persisting despite correction (Nyhan and Reifler, 2010; Nyhan, 2010). How can political actors use emotions to make these facts work to their advantage?

Here, I am concerned with a specific emotion that is central to politics, but poorly understood: anger. Politicians often organize their campaigns around attacks of political opponents (West, 2006) and employ violent rhetoric in their campaign communication (Kalmoe, 2011), for instance. Anger is a common theme in political communication – according to some measures, the most common negative emotion evoked.[1]

[1]See Brader (2006*b*), Table 6.1, which is a content analysis of 1,425 ads aired in the 1999 and 2000 elections. Anger is a theme more often than fear, compassion, sadness, and amusement. (It occurs less often than the positive emotions of

Anger certainly seemed to play a role in the decision of thousands of Egyptians to take to the streets of Cairo demanding the ouster of Hosni Mubarak and was a central theme of the Tea Party movement that sought to mobilize conservative votes in the 2010 midterm elections. Yet past work on emotion in politics focuses first and foremost on fear responses, which cognitive psychology tells us might be very different in nature. Where past political science work has studied anger, expectations and results are inconsistent.

Below, I review past work on anger in politics and show that, in contrast with the expectations of AIT, but in keeping with other work in cognitive psychology, anger can play a mobilizing role, making individuals more likely to expose themselves to information. Three separate experiments converge on the same substantive conclusion: contrary to previous work, anger evokes low-cost information seeking, while anxiety – contrary to previous work – dampens it.

The tests below also present a new style of field experiment in which I expose Internet users to emotionally evocative ads during the course of routine web browsing and then passively monitor their information seeking behavior, a truly naturalistic measure of information seeking. Where past studies rely on self reports of news exposure or behavior monitored in an artificial context, it is a capacity that, despite at least five decades of interest in selective exposure, is to my knowledge new.

Affective Intelligence and the Dimensional Model

Early political science work on emotion placed emotions *late* in a series of events leading to the formation of an opinion. Affect transfer hypotheses, for instance, suppose the emotional tenor of political appeals to "rub off" on the subject of the advertisement (Brader, 2006*b*, 32-35, 69; Ladd and Lenz, 2008, 276). Roseman et al. (1986), on the other hand, suggested that effective candidate appeals might be the ones whose tenor matches a voter's existing state of mind. In these early models, decisions apparently based on emotion were pitted against those based on reason and deliberation, which were usually taken to be preferable (e.g. Habermas, 1984).

Marcus, Neuman, and MacKuen's (2000) pioneering theory of Affective Intelligence (AIT) represents a significant reconsideration of this paradigm. In contrast to previous work, AIT looks for emotions' role where extant work in social and neuro psychology (e.g. Gray, 1987, 1994; Panksepp, 1998; Zajonc, 1998) long said it could be found, *early* in the sequence of events leading to opinion formation and

enthusiasm and pride.) Similarly, Kinder examines four presidential candidates who ran from 1980 to 1988 and finds three of them to evoke more anger than fear (Kinder, 1994, Table 9.1).

political action. Marcus, Neuman, and MacKuen (2000) remind us of Robert Zajonc's (1980) thesis that emotions, perhaps counterintuitively, are *pre*conscious and largely *un*conscious. Not only that; rather than being only an end-state – the perceived feeling – emotions are highly functional mechanisms that guide subsequent mental processing. They evolved to regulate attention and reliance on habit, as well as to allow humans to respond more quickly to sensory input than the slower, more effortful processes we usually think of as consciousness would allow (Marcus, Neuman and MacKuen, 2000, Chapter 3). They are the attention regulators that allow us to cope with the overwhelming stream of information our senses constantly collect.

AIT sees emotions as arising from a small number of precognitive appraisals. Making reference to neuroscience literature, its proponents remind us that a primary function of human emotions is to regulate attention, allowing us quickly to switch from reliance on habits, which preserves cognitive resources, to coping with novel or threatening circumstances. They focus on two emotional subsystems in the limbic region of the brain, the disposition system and the surveillance system. The former of these generates enthusiasm and narrows awareness when appraisals indicate reasonable progress with respect to a task, but feelings of sadness or frustration when progress is frustrated. The surveillance system, on the other hand, monitors sensory feedback for unusual or threatening stimuli. When it encounters the same, it instantly and automatically interrupts routine processing, heightens awareness, and prepares the body for quick response (Marcus, Neuman and MacKuen, 2000, ch. 4). In politics, it discourages reliance on predispositions such as partisanship, opening doors to learning and persuasion that are usually closed. Perhaps counterintuitively, the anxious citizen thus better fulfills the democratic ideal of thoughtfully gathering information about both candidates and making reflective judgments about their policies (Marcus, Neuman and MacKuen, 2000, ch. 4).

AIT's most resounding successes center on its treatment of the surveillance system. The surveillance system is the powerful switch that transforms the disinterested citizen into one with a motivation "to learn, to gather contemporary information, to know more about the issues and where candidates stand on the issues" (Marcus, Neuman and MacKuen, 2000, 61). Its primary emotional output, anxiety, drives the most powerful, most consistent, and most widespread empirical results showing how emotions mold information gathering processes. Thus, the arousal of anxiety has been shown to promote information seeking in a number of contexts and circumstances (Redlawsk, Civettini and Lau, 2007; Brader, Valentino and Suhay, 2008; Valentino et al., 2008; MacKuen et al., 2010; Gadarian, 2010). Anxiety's effects on

attention appear even more consistent (e.g. Marcus, Neuman and MacKuen, 2000; Brader, 2005; Huddy, Feldman and Cassese, 2007; Brader, 2006*a*, for a review).

While AIT has much to say about anxiety, applications of the theory to anger are less developed. Applying its dimensional logic, AIT classifies anger as an "aversive" emotion – one likely to arise when there is a recurring or "familiar" threat (MacKuen et al., 2010, 441). While anxiety signals that habits are not adequate to deal with an obstacle and thus encourages information seeking, AIT expects something different of emotions in the aversion category. Aversive emotions signal that existing habits are adequate to cope with an obstacle and spur a desire to confront an understood adversary (MacKuen et al., 2010, 441-442). Information is not very useful for this task, so scholars working in the AIT framework "expect that those who feel aversion will limit their search for information and any search for information will be biased" (MacKuen et al., 2010, 442).[2]

Discrete emotions, discrete functions

Although AIT's dimensional model is appealingly parsimonious, other work in psychology suggests a more fine-grained relationship between emotion and behavior. In particular, some of the relationships it predicts appear to be conditional. Valentino and colleagues (Valentino et al., 2009) find anxiety not to be sufficient to elicit information search, but rather that the information available must additionally be useful, a result consistent with Witte and Allen's (2000) meta-analysis of public health campaigns, which concludes that fear appeals most successfully evoke danger control actions when incorporated into high-efficacy, as opposed to low-efficacy messages. Marks (1987) notes that although fear directs physiological responses in patterned ways, it at different times leads to behavioral responses of withdrawal, freezing, defensive aggression, and submission. Nabi (2003) finds the effects of anxiety to depend on the type of behavioral outlets (e.g. protective as opposed to retributive) available. Still other scholars find the emotions evoked by equivalently threatening information about immigration to depend on racial cues about who the immigrants are (Brader, Valentino and Suhay, 2008).

[2]AIT's precise predictions are somewhat difficult to parse. In keeping with the quote above, the authors say, "The emotions of the surveillance system spur attention to novel information, while aversion *suppresses* the inclination to seek out new information" (448, emphasis mine). Further, Figure 1 therein indicates that anxiety causes citizens to "read more," while aversion causes them to "read less." But on the other hand, the authors also write, "[People encountering aversive stimuli] often simply ignore uncomfortable information or, alternatively, bolster their own views *by seeking* conforming information" (441, emphasis mine). I interpret these statements as making two separate predictions. First, holding the confirming/disconfirming nature of available information constant, aversion should decrease information seeking. Second, any information seeking that does occur will serve to confirm existing beliefs. In this article, I am primarily concerned with the first prediction.

Where the dimensional view predicts fixed action patterns, these findings are more consistent with the view that emotions are best viewed not as lying along underlying dimensions, but rather as a set of discrete programs, each with unique characteristics. This view is widespread in psychology (Smith and Ellsworth, 1985; Lerner and Keltner, 2001; Cosmides and Tooby, 1997, 2000; Carver and Harmon-Jones, 2009; LeDoux, 1995, 1996; Lazarus, 1991; Roseman, 1991). Emotions are functional such that they influence behavior "in diverse yet functionally patterned ways, rather than in a single, aggregate way" (Cosmides and Tooby, 2000, 98).[3] As predicted by cognitive tuning theories (Isbell, Ottati and Burns, 2006; Schwarz, 2002) as well as theories of problem-focused coping (Folkman et al., 1986), the influence of emotions appears to differ depending on *complex* appraisals of their causes, as well as the available coping outlets.

Anger and motivation reconsidered

A specific point of departure is AIT's understanding of anger. As noted above, a major contribution of AIT is to focus on the motivational role of emotions. AIT coincides with alternative views insofar as it understands emotions to serve a directive function, coordinating a host of perceptual and physiological functions (cf. Cosmides and Tooby, 2000). The dimensional view, however, constrains AIT to an inflexible set of motivational tendencies, all of which occur in tandem. For instance, because anger is aversive, it simultaneously increases the desire to act, to confront a foe, and decreases the desire to acquire new information. When anger is viewed as a discrete emotion with its own unique mixture of behavioral tendencies, on the other hand, the expectations about both its causes and effects become more finely grained.

With respect to causes, anger would not necessarily arise from a familiar threat, but might require additional components such as appraisals of *intentional* harm (Frijda, 1986; Lazarus, 1991), blameworthiness (Ortony, Clore and Collins, 1988), a violation of what "ought" to be (Mascolo, Harkins and Harakal, 2000), or some other facet of controllability (Lerner and Keltner, 2001; Roseman, 1991; Roseman, Antoniou and Jose, 1996; Mackie, Devos and Smith, 2000). For instance Brader et al. (2010), holding familiarity constant, find the threat of an infectious disease to evoke more anger when its release stemmed from government incompetence than when it arose from a natural mutation.

[3] AIT also sees emotions as evolutionarily functional, but it is a blunter sort of functionality where behavioral tendencies follow more or less deterministically from the emotion aroused.

On the effects side, the discrete view would not necessarily expect action, confrontation, and appetite for information to go hand in hand. If emotions represent goal-oriented motivations, as much work suggests they do (Gray, 1987; Carver, 2004), then the effect of anger on information seeking would depend on the fit between the information available and the goal. In other words, rather than decrease the appetite for information, as AIT predicts, anger might *increase* the appetite for information useful for coping with the anger. Indeed, Carver and Harmon-Jones (2009) review a broad literature suggesting that anger motivates approach and not aversion.[4]

While there is now substantial evidence of the effects that AIT predicts for anxiety (Brader, 2006*a*, 2011, for reviews), its predictions for anger have been born out with less consistency. Both Redlawsk et al. (2007) and Valentino and colleagues find a mixture of negative and null effects (Valentino et al., 2008, 2009) for information seeking, but Huddy et al. find anger to increase consumption of news media related to the Iraq War (Huddy, Feldman and Cassese, 2007) and more recent studies by Valentino and colleagues find internal efficacy combined with threat to evoke anger and, subsequently, habitual political participation (Valentino, Gregorowicz and Groenendyk, 2009) and mobilization (Valentino et al., 2011). Weber (2008), moreover, finds anger to increase feelings of efficacy and the desire to learn. But in a laboratory study, MacKuen et al. (2010) find that, among subjects exposed to challenging news stories, anger (aversion in the authors' terminology) decreases the number of opposition web pages viewed as well as the ratio of opposition web pages to total web pages viewed. Further analysis of these data hints that, among subjects who instead viewed reinforcing news stories, anger (aversion) whets the appetite for reinforcing information.[5]

The discrete view suggests that the effects of specific emotions need to be understood in terms of their functionality. By producing hedonic output, emotions steer people to adaptive coping strategies (Folkman et al., 1986; Cosmides and Tooby, 2000). Thus, some have theorized that anxiety would elicit approach behaviors when they are low in cost, but withdrawal or avoidance when they are costly (Valentino et al.,

[4]This review highlights some terminological inconsistencies. AIT suggests that "aversive" emotions like anger, disgust, contempt, and hatred motivate *confrontation*, which sounds like an approach-related behavior. What Carver and Harmon-Jones (and much other work in psychology) call aversion relates instead to *avoidance*. But the terms are not simply reversed, as both frameworks would expect an aversive emotion to decrease information seeking.

[5]The authors report a statistical model that explains the ratio of opposing web pages view to total pages viewed as a function of emotions evoked and other factors. I apply the same model with a different, but complementary dependent variable: the ratio of reinforcing pages viewed to total pages viewed. For subjects exposed by random assignment to reinforcing news stories, aversion carries a positive coefficient that is twice as large as the negative coefficient the authors report to explain the influence of aversion on the ratio of challenging stories viewed, and which, despite the smaller number of subjects assigned to the reassuring condition (111 rather than 84) approaches traditional significance thresholds ($p < .12$, two tailed). I am thankful to the authors for providing these data and helpful replication files.

2011).

What, then, is the functional nature of anger? Although anger exists across cultures and individuals (Brown, 1991; Ekman and Rosenberg, 2005) and has a neurological basis (Panksepp, 1998), its evolved function is not as clear as anxiety's.[6] For many years, scholars recognized factors that contribute to the arousal of anger while giving little attention to functional explanations (Lazarus, 1991; Berkowitz, 1989; Dollard et al., 1939; Buss, 1961; Bandura, 1973). Now, however, there is some evidence that anger was designed by evolution to elicit concessions during interpersonal negotiations (Sell, 2006; Sell, Tooby and Cosmides, 2009) while others theorize that behaviors such as moral condemnation arose to punish behavior that harmed group-level fitness (Descioli and Kurzban, 2009). These views seem compatible with findings that anger evokes risk-seeking behavior (Lerner and Keltner, 2000, 2001; Huddy, Feldman and Cassese, 2007).

Hypotheses

My first objective is to discriminate between existing theories, which expect different things of anger. Because AIT sees anger as an aversive emotion, it should decrease information seeking, all things equal.

***H1a (AIT)*:** Individuals made to feel angry should seek less political information than individuals who do not feel angry.

In contrast, because anger is mobilizing (Valentino et al., 2011), efficacy-inducing (Weber, 2008), or appetitive (Carver and Harmon-Jones, 2009) it might well lead people to seek more information.

***H1b*:** Individuals made to feel angry should seek more political information than individuals who do not feel angry.

A second objective is to confirm the role of anxiety in information seeking. AIT expects anxiety to increase information seeking. Refinements such as offered by Valentino and colleagues expect the same, although perhaps only when the information seeking is low in cost (Valentino et al., 2011). Because the test below concerns low-cost information seeking, these expectations converge.

[6]For reviews of why fear is the most extensively studied emotion, see Öhman and Mineka (2001); LeDoux (1996, ch. 6).

***H2*:** Individuals made to feel anxious should seek more political information than individuals who do not feel anxious.

A third objective is to develop our understanding of the *conditional* nature of emotional responses. As reviewed above, past work gives us reason to believe the behavioral effects of anxiety are not fixed, but rather depend on a match with behavioral outlets.[7] If we view emotions as mechanisms designed to motivate problem-oriented coping, the same might well be true of anger. Anxiety appears to motivate protection-oriented coping in response to a threat (LeDoux, 1996). As reviewed above, anger, on the other hand, appears to motivate confrontation and retribution. I therefore hypothesize that these emotions will elicit more information seeking when the outlets available are compatible with these themes.

H3 (Affect/outlet matching): Anxiety will evoke more information seeking when there is protection-related information available, while anger will evoke more information seeking when there is retribution-related information available.

Field experiments for the digital age

In three separate experiments, I expose Internet users to randomly assigned political advertisements during the course of routine web browsing. The ads were displayed on the popular website Facebook.com, which has approximately 130 million users in the United States. The ads invited subjects to "click for more information" about a political topic. The design allowed me to record the click-through rate of each advertisement, a passive and very naturalistic measure of information seeking. Facebook allows ads to be targeted based on information that users voluntarily provide in their profiles. Because many users include information that hints at political leanings, treatments can be tailored to include properties especially likely to elicit politically relevant emotions.

Experiments 1 and 2

Experiments 1 and 2 both employ political advertisements with 3×2 manipulations of emotion (anxiety, anger, or neutral) and informational outlet (protection or retribution). They differ, however, in timing and instrumentation. Experiment 1, which was conducted from March 1-2, 2010, was a pilot study undertaken

[7] See also Brehm and Self (1989) and Harmon-Jones et al. (2003).

to test the efficacy of a new research design. As such, although the instrumentation in Experiment 1 has face validity, a manipulation check was not conducted to ensure that its stimuli evoke the intended emotions. Experiment 2 ran from October 15th - 18th, 2010 and used different instrumentation that was validated with a separate manipulation check. Both experiments reach substantively similar results.

Experiment 1 took place at a moment of high drama surrounding the health care reform package championed by Barack Obama. One month earlier, Scott Brown was sworn in to the U.S. Senate seat previously held by Ted Kennedy, leading to dramatic legislative maneuvering and energetic grassroots campaigning over the fate of the legislation, which had been passed in different forms by both the House and Senate, but which now lacked a supermajority necessary to pass a conference report.[8] The experimental stimuli sought to take advantage of the high level of salience surrounding this landmark legislation. Because I expect ads to be most effective when they are narrowly tailored (cf. Goldstein, Cialdini and Griskevicius, 2008), I leveraged Facebook's ability to target ads at a political subgroup: liberals, specifically the approximately 4.5 million users over the age of 18 who choose to be Facebook "fans" of Barack Obama.

Emotions were induced by text and an image. In the first condition, the title of the advertisement is "Afraid?" and subjects saw a masked surgeon leaning toward the camera wielding a scalpel, an image designed to remind subjects of their mortality. In the second condition, the title of the advertisement is "Angry?" and subjects saw a clenched fist, an image designed to remind subjects of their ability to inflict costs on others. In a control condition, the title of the advertisement is "Health care" and subjects saw an image of the Capitol Building.

Isolating and manipulating a single emotion is difficult. In particular, it is difficult to disentangle anxiety and anger, as the two often occur together. Efforts to manipulate emotions are perhaps converging on the notion that feeling anxiety is a sufficient, but not necessary, condition for feeling anger. Plant and Devine (2003), for instance, find anxiety about an interracial reaction to evoke feelings of hostility and anger. Similarly, Wacker, Heldmann and Stemmler (2003, 185) find a fear induction to activate anger to an equal degree. Political scientists similarly find anger to come with fear, although not necessarily the reverse (Valentino et al., 2008, Table A1; MacKuen et al., 2010, Figure 3). As I explain more fully below, my manipulation check reveals a similar pattern: anger can come alone, but anxiety brings anger along with it. It is still possible to study the two emotions discretely by observing differences as they are added

[8]The House went on to approve the Senate version of the bill, along with a highly controversial reconcilliation amendment, on March 21st.

one at a time (i.e., first introducing anger alone, and then introducing anger and anxiety together). For clarity I refer to the condition that induces anxiety as the Anxiety + Anger condition.

In a second manipulation, the treatments also indicate what kind of information will be provided by clicking an advertisement. In the protection conditions, the text read, "The Republicans are blocking health care reform. Get the facts you need to *protect your health*." In the argumentation conditions, the text read, "The Republicans are blocking health care reform. Get the facts you need to *win your next argument* [emphases added]." This text was chosen in an attempt to make the available coping outlet seem to match – or not – the behavioral inclination evoked by the emotion manipulation.

Experiment 2 followed the conceptual pattern established by Experiment 1, but employs different instrumentation. Emotions were evoked using text paired with images of emotionally charged facial expressions. These stimuli were chosen for two reasons. First, substantial work on emotional contagion demonstrates viewing facial expressions to elicit congruent emotional responses in the viewer (Hsee, Hatfield and Chemtob, 1992; Hatfield, Cacioppo and Rapson, 1993; Laird et al., 1994; Schneider et al., 1994; Hess, Philippot and Blairy, 1998), a finding compatible with the notion, advanced by evolutionary psychologists, that facial expressions evolved to signal (Cosmides and Tooby, 2000, 105). Facial expressions are also effective at capturing attention, again likely for evolutionary reasons (Schupp et al., 2004; Bannerman, Milders and Sahraie, 2010; de Jong et al., 2010). Second, because the facial stimuli are carefully designed to manipulate emotional content while holding all other factors constant,[9] I can be confident that the emotional content of the image, and not some other feature, is responsible for differences across treatment assignments.

Figure 1 lays out the conceptual pattern by showing the stimuli used in Experiment 2. I continue to refer to the anxiety-inducing advertisements as ads A and B, the anger-inducing advertisements as ads C and D, and the neutral advertisements as ads E and F, as indicated in the figure.

Manipulation check Although the images employed in Experiment 2 have been heavily validated,[10] it is possible that other features of the advertisement – the outlet manipulation, for instance – contain important emotional content. To better understand precisely which emotions subjects experience upon seeing my advertisements, I conducted a separate manipulation check. To do so, I employ another valuable,

[9] I use one of the publicly available sets of images constructed at the Max Planck Institute for Human Development. These images feature identical individuals expressing different emotions with all other factors (e.g. clothes, lighting, and so forth) held constant and have been heavily validated to ensure that viewers perceive the same emotion that actors were asked to express (Ebner, Riediger and Lindenberger, 2010).

[10] Ibid.

emerging research tool, Amazon.com's Mechanical Turk (MTurk) service. MTurk is an online community in which workers are paid to complete Human Intelligence Tasks (HITs) designed by employers. As with the main study, the manipulation check thus relies on a self-selected sample. However, MTurk is growing in prominence as a research tool (Horton, Rand and Zeckhauser, 2010; Paolacci, Chandler and Ipeirotis, 2010; Mason and Suri, 2010). Analyses of MTurk demographics show them to mirror the general population much more closely than the samples of convenience frequently employed for experimental research (Berinsky, Huber, and Lenz 2010, Ross et al., 2010; see also Gosling et al., 2004). The tool, moreover, has been used successfully to replicate canonical political science experiments (Berinsky, Huber and Lenz, 2010).

The manipulation check took the form of a brief survey. First, subjects were asked to report their age and partisanship. Then the computer randomly assigned each respondent to view one of the six advertisements used for Experiment 2, whereupon they were asked to report on the extent to which they felt hopeful, angry, sad, afraid, excited, happy, nervous, and outraged. MTurk includes workers from all over the world, but because partisanship is only meaningful to U.S. respondents (and for other reasons), the manipulation check was only administered to respondents who live in the United States. Further, to minimize careless or haphazard responses, the assignment was offered only to workers with quality ratings above 95%, indicating that their past work had been approved at least 95% of the time (Mason and Suri, 2010). Because Experiments 1 and 2 focus on Democrats, the manipulation check below focuses only on self-identified Democrats.

The manipulation check provides evidence that the treatments affect emotions in a way that allows us to disentangle anxiety and anger. Table 1 presents the mean responses for each emotion by treatment condition.[11] Relative to the control, one set of advertisements (C and D) evokes anger alone, while the other (A and B) evokes anger and anxiety together. As Table 1 shows, as one moves from the neutral condition (E and F) to the anger condition, the two anger-related emotions, "angry" and "outraged" both exhibit significant differences ($p < .06$). Differences for all other emotions are much smaller and have p values of .21 or larger. As one moves from the anger condition to the anger + anxiety condition, the two anxiety-related emotions, "afraid" and "nervous" exhibit large, significant differences ($p < .02, .03$) while the other emotions all exhibit much smaller differences that, with one exception (see below), fall far short of significance. Comparing the anger + anxiety condition (treatments A and B) to the neutral condition

[11] The responses are to the question, "When you look at this advertisement, how [emotion] do you feel?" Response options were, Not at all = 0, A little, Somewhat, Very, and Extremely = 4.

(E and F) confirms this interpretation.

The one difficulty for the pattern concerns hopefulness, which exhibits a marginally significant decrease as anger and anxiety are aroused. This trend speaks to the difficulty in isolating discrete emotions. It may be that increases in anxiety generally lead to decreases in hope. Nevertheless, the inferential complications are surmountable for two reasons. First, the changes for anger and anxiety are much larger. Moving from conditions C & D to conditions A & B increases fear and nervousness by .75 and .84, respectively, while hope decreases by only .28. Second, Experiment 3 successfully replicates the substantive conclusion about anger while holding hope constant.[12]

Random assignment The ideal way to randomly assign advertisements to Facebook users would be at the individual level, but that is not possible. Here, I explain why not and how to achieve a truly random assignment by randomizing arbitrary constructed subject cohorts.

When a given Facebook user loads a page on the site, a proprietary mechanism conducts an instant auction among all the advertisements competing to target people with his or her attributes. Such a mechanism has some stochastic properties, but is not truly random. The "bids" in this auction can be for an "impression," industry parlance for a single display of the ad on a user's computer, or for clicks, where the ad's sponsor pays only if the user clicks on the ad. In a study of this sort, it is important to bid for impressions, rather than clicks, because under the pay-per-impression scheme, the auction mechanism does not attempt to assign ads to the users most likely to click on them.[13] If it were otherwise, a number of inferential problems would arise because part of the assignment mechanism would, by design, be attempting to correlate with potential outcomes.[14]

Nevertheless, the auction mechanism differs from a traditional random assignment in that the probability of receiving a treatment (*at all*, as opposed to relative to a different treatment) is probably not equal for all users. The mechanism might give preference to some users over others for inclusion in the

[12] An additional concern is that the emotion manipulation would interact with the outlet manipulation such that emotions are evoked differently depending on the outlet manipulation. Thus, I additionally test differences in emotional arousal *within* each emotion condition. The results raise no concerns. There are two differences of marginal significance for sadness ($p < .08$; .10) that might merit more consideration if the main results reported below depended on the outlet manipulation, but they do not. Otherwise, all p values are larger than .25. The main contribution here is to neutralize any worry that the claim that treatments A and B evoke both anxiety and anger, while C and D evoke only anger, is driven by a particularly strong result for just one member of a given pair.

[13] Personal communication with Facebook ads sales staff.

[14] The problem probably would not be as bad as it might sound at first consideration. The mechanism would attempt to optimize *both* treatment and control ads. The bias would arise if the optimization were more successful in one case than the other. Given the very subtle differences between the ads, this is unlikely. However, there is no need to introduce the additional assumption.

study. This would happen, for instance, if competing advertisers highly value young Internet users such that they offer higher bids for them. Ads with comparatively low bids might systematically be directed by the auction mechanism toward older users. This tendency would represent a problem for generalizability because any results could be driven by some subpopulation of Facebook users, rather than the community as a whole. It would *not* represent a problem for internal validity because, assuming comparable bid levels, the tendency would be the same for treatment and control ads.

To minimize the latter difficulty, however, I devise an alternative, more conservative assignment mechanism that is fully random. First, I define a population of Facebook users – in these experiments, the 4.4 million fans of Barack Obama between the ages of 18 and 64 (18 and 59 for Experiment 1) living in the United States. I then use information in the users' profiles to divide them into arbitrary, disjoint cohorts. For Experiment 1, the cohorts are defined by the users' ages. For Experiment 2, they are further subdivided by sex and two geographical groups.[15] Thus, Experiment 1 included 42 age cohorts, while Experiment 2 included 47 (age) $\times$ 2 (sex) $\times$ 2 (geography) = 188 cohorts. I then randomly assigned each cohort to receive precisely one version of the treatment. To maximize efficiency, I conducted a block randomization to ensure that treatments would be balanced across all three cohort-defining variables (Cox and Reid, 2000; Horiuchi, Imai and Taniguchi, 2007). This approach is not a full solution to the problem of generalizability. However, it minimizes the difficulty by ensuring good comparisons along the cohort-defining variables and, to the extent they correlate with the cohort-defining variables, unconsidered characteristics potentially related to the auction mechanism.

The difficulty is further diminished by placing competitive ad bids. Given a target population, Facebook's ad purchasing utility recommends a competitive bid amount. The ads in this study always bid well within the recommended range.

Results Tables 2 reports the number impressions and clicks by condition for Experiments 1 and 2. It is immediately clear that, while impressions are cheap, click through rates are very low. Still, the differences across conditions are large enough to be informative.

Table 3 reports an OLS regression of the click through rate (in terms of percentages) for each cohort in the experiment on the treatment assignments. Because these rates are averages with different variances

[15]There were two geographical divisions. The first was Florida, Georgia, Illinois, Michigan and California. The second was New York, Texas, North Carolina, Ohio, and Pennsylvania. These states were chosen because they are high in population and, on their face, quite diverse. Any systematic differences between the two groups would not be problematic for internal validity because the assignment is random across them.

– for instance, because older people are less active on Facebook than younger people, and therefore received fewer impressions – I weight each observation by the number of impressions for that cohort. Cognizant of recent concerns about regression adjustments to experimental data (Freedman, 2008), I include only randomized variables in the regressions. There are two models for each experiment: one omitting interactions between the two treatment dimensions, the other including them.

The results of the first two experiments are consistent, if surprising. Hypothesis 1a, Affective Intelligence, predicts that evoking anger should lead to less information seeking – that conditions C and D should exhibit less information than conditions E and F, in other words. It is quite the opposite. Conditions C and D exhibit considerably more information seeking than any other conditions. The coefficients for this condition are far larger than any others in the model and are statistically significant in each case.[16] H1a is thus rejected. On the other hand, the comparison of C and D to E and F is consistent with Hypothesis 1b.

Hypothesis 2 predicts that anxious individuals will seek more information than individuals who do not feel anxious. As such, we would expect to see more information seeking in conditions A and B, where anxiety is present, than in any other conditions. In fact, conditions A and B exhibit similar levels of information seeking to the control condition, and far less than conditions C and D. We are thus far from rejecting the null of no effect on the part of anxiety. If anything, the comparison of A and B to C and D suggests that anxiety decreases information seeking.

Hypothesis 3 predicts an interaction such that conditions A and D, where the emotional arousal and coping outlet match, will exhibit more information seeking than conditions B and C, respectively. In fact, the level of information seeking is nearly the same across the outlet manipulation, again making it impossible to reject the null of no effect.

There are several null results, but the stark and consistent pattern for anger if and only if it is evoked alone contributes much to our understanding of emotions in political communication, as I explain more fully in the discussion.

[16] As a check, I estimate identical models with heteroskedasticity consistent standard errors (not reported). The results are nearly identical. The coefficients for Anger remain significant at the same level in three of the four models. For model 2, it becomes marginally significant (SE=.015, $p < .12$). Additionally, as a check against the possibility that significance levels are driven by parametric assumptions, I compute randomization inference-based p-values for Experiment 2's anger coefficient, as recommended by Rosenbaum (2009). I compute the weighted difference in means between the anger assignment and the control assignment for 100,000 hypothetical randomizations under the hypothesis of no treatment effect. None of the hypothetical randomizations produced a difference as large as the one observed, suggesting it is all but impossible that the effect is due to chance. (It is not surprising that even 100,000 randomizations would not produce a comparable difference in means, since the parametric p-value is .99998.)

It is worth a moment to consider the substantive significance of the ability of the anger conditions to evoke information seeking. In one respect, it is small. The click through rate for condition E (the constant term in the model) is, in Experiment 1 a mere .015%, equating to perhaps one click for every 7,000 impressions. The anger condition is similarly sparse – amounting to just three clicks over the same campaign. But in an important sense, the effect is large. The anger-inducing advertisement nearly *triples* the click through rate. If a campaign were to purchase advertisements in tremendous bulk, as their low cost permits, the anger-evoking advertisement would permit it to accrue the same number of clicks at *one third* the expense. Moreover, it is worth noting that other online advertising forums, such as Google's Adwords, enjoy substantially higher base click-through rates – often around 2%.[17] If anger-inducing ads were similarly to multiply such a baseline, the results would be impressive by any measure.

Experiment 3

The results of Experiments 1 and 2 are strikingly inconsistent with AIT, suggesting that anger, when evoked alone, leads to information seeking. Still, there is reason to be cautious in drawing conclusions too quickly. Experiment 1 did not include a manipulation check. There is evidence that the stimuli used in Experiment 2 did evoke the intended emotions, but one can also imagine that the observed effects are attributable to an unrelated difference between the treatment conditions. In particular, conditions C and D contain a partisan mention, raising the possibility their success is attributable, for instance, to some social identity effect (cf. Green, Palmquist and Schickler, 2002). For all of these reasons, I undertake to replicate the established result a third time.

Experiment 3 compares one of the anger inducing ads from Experiment 2 – condition D – to a new neutral condition. The new condition used the image from conditions E and F above, but different text. The title was "November" and the test below read, "Get the facts you need to help the Democrats win the election." The two conditions in Experiment 3 are thus highly parallel. They both contain a partisan mention. They both make reference to the November election. But, as in Experiment 2, they differ in the emotions they evoke in the expected way.[18]

[17] Google's much higher conversion rate is likely due to the fact that its consumers are actively searching for information online, and the advertisements often provide precisely what they are looking for. On Facebook, in contrast, clicking an ad almost certainly represents a *deviation* from what one was doing.

[18] The second manipulation check was conducted on October 18th and 19th, 2010. As earlier, the check exposed respondents to different versions of the advertisements and asked them to report their emotional arousal. Twenty-four Democrats evaluated the anger-inducing advertisement, while fifteen evaluated the neutral advertisement. In addition, because the anger advertisement is identical to condition D from Experiment 2, I combine the ten Democrats who earlier evaluated advertisement D with the evaluators from the second round. (T-tests that evaluations of the same advertisement differed by

Like Experiments 1 and 2, Experiment 3 divided Facebook users into a series of arbitrary cohorts for random assignment. Because Experiment 3 employs only two treatments, rather than six, I constructed fewer cohorts. There were 47 (age) $\times$ 2 (sex) = 94 cohorts, each of which geographically encompassed the entire United States. The experiment was fielded among Facebook fans of Barack Obama on October 20th, 2010 and received 261,818 impressions and 80 clicks.

Table 3 reports the results of the experiment. As before, the model is an OLS regression of the click through percentage, weighted by each observation's number of impressions, on the assignment to the anger condition.

Despite the different instrumentation, the results once again suggest that anger, induced alone, effectively caused information seeking. Subjects who saw an anger advertisement were approximately twice as likely to click on it as subjects who saw the emotionally neutral advertisement, a highly significant difference ($p = .011$).[19] In light of the results from Experiments 1 and 2, the pattern is very stable.[20]

Discussion

Emotions and engagement reconsidered

The results above are not fully consistent with any existing theory. Valentino and colleagues expect anger, more than anxiety, to mobilize (Valentino et al., 2011). Indeed, I find anger to elicit information seeking, but only when evoked alone. I am aware of no prior reason to expect the addition of anxiety where anger already exists to neutralize the effect of anger, yet that is precisely what the convergent results of Experiments 1 and 2 suggest occurred.

One possibility that would explain the anomaly is that the effects of different emotions such as anger and anxiety are not additive, but rather interact in surprising ways. For instance, it is possible that when

when the manipulation check was completed revealed no significant differences ($.25 < p < 1.0$), suggesting it is reasonable to pool the two sets.) Thus, there are 24 + 10 = 34 evaluations of the anger condition, and 15 evaluations of the neutral condition.

The figures confirm that the anger condition does in fact evoke anger ($p < .01$) and, related, outrage ($p < .10$). Fear and nervousness are actually *lower* – albeit insignificantly – for the anger condition than the neutral condition, providing a good, discriminating test of AIT, which would expect the condition higher in "surveillance" emotions to evoke information seeking. Other emotions are far from significance, with one exception. Sadness is significantly higher ($p < .03$) in the neutral condition than the anger condition. As such, one cannot completely dismiss the possibility that any observed differences in how the ads perform are due to differences in sadness. However, since sadness was quite stable in Experiment 2, similar effects in Experiment 3 would make an attribution to anger much more likely.

[19] Using heteroskedasticity consistent standard errors makes virtually no difference (SE = .08, $p < .015$).

[20] In the spirit of transparency, I further note that these results are not attributable to a "file-cabinet" effect. The three experiments described here are the only three experiments in this vein at the time of this writing.

anger and anxiety are evoked together, the effects of anxiety dominate, as it is the more powerful and primordial emotion (Bradley, 2000; LeDoux, 1996, ch. 5). In the current context, such an explanation would hinge on the effect of anxiety being neutral or negative – for instance because clicking an advertisement is not a sufficiently expressive act, as may be necessary for anxiety-related coping (Folkman et al., 1986). Perhaps the online context gives rise to appraisals that cause anxiety to evoke a "freezing" effect (Arduino and Gould, 1984; Barlow, 2002; Schmidt et al., 2008; Marks, 1987).

The predictions of AIT are not born out. AIT predicts anger will decrease information seeking, but across three experiments, anger increases information seeking. AIT predicts anxiety will increase information seeking, but here we see an advertisement that evokes anger and anxiety together decreases information seeking relative to one that evokes anger alone, and exhibits no significant effect on information seeking relative to a control.

Design

Because the digital-age tools I describe here represent something of a departure from the standard social scientific repertoire, I offer a brief aside to consider some of their advantages and proper role in a methodologically pluralistic toolkit.

The methods I describe offer four clear-cut advantages that will be especially valuable for future efforts. The first is cost. The manipulation check described above included 121 subjects[21] and cost less than $15. Experiment 1 purchased 588,294 ad impressions for less than $100. Experiment 2 purchased 924,457 impressions and cost less than $200.

A second advantage is fast turnaround time. Both the tools described here – Facebook advertising and Mechanical Turk crowdsourcing – shrink the data collection stage of an experiment from a phase that often takes months to one that can be accomplished in days or, in some circumstances, hours. Combined with the low cost, the result is an ability to collect data and refine hypotheses in a very rapid, iterative manner.

Third, scholars have long worried about threats to internal validity coming from expectancy bias – researchers' conscious or unconscious tendency to push subjects' responses in the direction of expected or desired findings (Rosenthal and Rubin, 1978). This pitfall is less likely to the extent that designs are transparent, replicable, and inflexible (Ioannidis, 2005; Lupia, 2008), characteristics this approach

[21] The higher number than reported in Table 1 is because Table 1 excludes non-Democrats.

achieves by using a computer to standardize treatments and avoid interpersonal interactions between the researcher and subjects.

Finally, this design is high in "mundane" realism (Aronson, Brewer and Carlsmith, 1985), the extent to which the experimental context mirrors the real world. When subjects see the experimental stimuli, they are going about their ordinary business and do not know they are part of a study. Other scholars have criticized emphasis on mundane realism, seeing "experimental" realism, the degree to which "an experiment is realistic, if the situation is involving to the subjects, if they are forced to take it seriously, [and] if it has an impact on them" (Aronson, Brewer and Carlsmith, 1985, 485) as a more important concern (McDermott, 2002). The point – that it is helpful for subjects to be engaged in a "meaningful phenomena of interest" (McDermott, 2002, 333) – is well taken, but I argue that establishing whether existing findings are robust to mundane realism is a crucial step in drawing out the real-world implications of a research finding. To demonstrate some treatment to have an effect *if* the situation is "involving" and *if* subjects "are forced to take it seriously" is far less interesting when the people we are trying to understand are not thus constrained. In contrast, to replicate as closely as possible – while preserving good validity and measurement – the communicative strategies used by real campaigns is to speak very directly to what we are trying to understand. This is especially true when, as is the case with emotions, situational features such as involvement might well be endogenous to the way treatment effects work. Thus, where McDermott argues that "just because a situation appears to look like a real-world event or problem on the surface does not mean that it elicits any meaningful behavior worthy of investigation or consideration" (McDermott, 2002, 333), I remind that just because some effect occurs in an artificial context meticulously designed to coax it out does not mean that we have learned very much about how things work in the helter-skeltered buzz of the real world.

Conclusion

The above results evoke two emotions: enthusiasm and humility. On one hand, they add to a rapidly accumulating literature that is overturning how political psychologists long thought about how automatic cognitive processes inform campaign strategy and the way citizens engage the political environment. There is now a chorus of studies showing the impact of emotional cues to come relatively *early* in the chain of events leading to preference formation, information seeking, and political action. In short, work in this vein has the potential to clarify a facet of political communication that scholars, with limited success,

have long grappled to understand.

Yet we should not reach too quickly. There is plenty of evidence suggesting that emotions need to be studied discretely and with particular attention to their precipitants, coping outlets, and other interactive feature of the situation. The results I present are at odds with the predictions of AIT. Yet I do not mean to dismiss the theory as misguided or lacking empirical support – only that it is now sufficiently mature to benefit from a more fine-grained view. We have much more to learn about the conditions under which emotional arousal motivates behavior.

Why do clicks on a website matter? First, citizens continue to turn to online sources for political information with greater frequency in every election, a trend that shows little sign of weakening (Smith and Rainie, 2008). These studies shows that politicians seeking to entice viewership can double or even triple their success rate with subtle changes that evoke different emotions. Given what we know about how information can change political attitudes, it seems likely that such strategies have remarkable potential to influence opinions and engagement. More broadly, the results herein may help us understand not only clicks on a webpage, but also engagement in other arenas. Anger might well be effective in enticing citizens to scan headlines, subscribe to blogs, read flyers, and open direct mail, for instance.

I also mean to call attention to a rich set of methodological tools that we are only beginning to use to their full potential. New media is unquestionably taking on a more central role in political communication. We ought test, rather than assume, the extent to which existing explanations transfer to the digital media. For all the reason field experimentation is attractive in the tangible world (Gerber and Green, 2008), it should be attractive in this important new domain.

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Figure 1 – Stimuli for Experiment 2

	Protection condition	Retribution condition
Anger + Anxiety	(A) I'm frightened  A double dip recession? Could it ruin your retirement? Get the facts you need to protect the money you've saved.	(B) I'm frightened  A double dip recession? Could it ruin your retirement? Get the facts you need to win the election in November.
Anger	(C) Republicans make me mad  Republicans want to steal your money. Get the facts you need to protect what you've saved.	(D) Republicans make me mad  Republicans want to steal your money. Get the facts you need to win the election in November.
Neutral	(E) Politics  Get the facts you need to protect the money you've saved.	(F) Politics  Get the facts you need to win the election in November.

Table 1: Manipulation check: Emotions aroused, by condition

	Means reported emotion			*p* values		
	(1) Anxiety + Anger (A & B)	(2) Anger (C & D)	(3) Neutral (E & F)	(1) vs. (2)	(2) vs. (3)	(1) vs. (3)
Afraid	1.38	0.63	0.42	0.02	0.45	<.01
Nervous	1.67	0.83	0.46	0.03	0.21	<.01
Angry	1.19	1.13	0.54	0.85	0.06	0.04
Outraged	1.29	0.96	0.38	0.41	0.06	<.01
Happy	0.29	0.42	0.17	0.60	0.23	0.61
Hopeful	0.05	0.33	0.50	0.10	0.46	0.02
Excited	0.33	0.21	0.17	0.56	0.80	0.47
Sad	1.29	0.96	1.00	0.35	0.89	0.32
n	21	24	24			

Numbers represent mean reported value for each emotion (0 = Not at all; 4 = Extremely), depending on which ad subjects viewed.

Table 2: Impressions and clicks by condition

	Experiment 1			*Experiment 2*			*Experiment 3*
	Protection	Retribution	Total	Protection	Retribution	Total	
Anxiety + Anger							
impressions	100,576	91,878	192,454	138,133	119,622	257,755	-
clicks	9	17	26	13	17	30	-
rate	0.009%	0.019%	0.014%	0.009%	0.014%	0.012%	-
Anger							
impressions	84,556	95,802	180,358	121,999	126,757	248,756	122,272
clicks	34	38	72	33	37	70	51
Rate	0.040%	0.040%	0.040%	0.027%	0.029%	0.028%	0.042%
Neutral							
impressions	102,806	112,676	215,482	280,678	137,268	417,946	139,546
clicks	16	22	38	26	18	44	29
rate	0.016%	0.020%	0.018%	0.009%	0.013%	0.011%	0.021%
	287,938	300,356	588,294	540,810	383,647	924,457	261,818
	59	77	136	72	72	144	80
	0.020%	0.026%	0.023%	0.013%	0.019%	0.016%	0.031%

Table 3	Experiment 1		Experiment 2		Experiment 3
Click-through Percentage	(1)	(2)	(3)	(4)	(5)
Anxiety & Anger (A, B)	-0.0039	-0.0066	0.0006	0.0001	-
	(0.007)	(0.009)	(0.004)	(0.006)	
Anger (C, D)	0.0222***	0.0246**	0.0170***	0.0178***	.0209**
	(0.007)	(0.010)	(0.004)	(0.006)	(.008)
Retribution (B, D, F)	0.0044	0.0040	0.0036	0.0038	-
	(0.005)	(0.009)	(0.004)	(0.006)	
Anxiety & Anger × Retribution (B)	-	0.0056	-	0.0010	-
		(0.013)		(0.009)	
Anger × Retribution (D)	-	-0.0045	-	-0.0017	-
		(0.014)		(0.009)	
Constant: Neutral, Protection (E)	0.0153***	0.0156**	0.0093***	0.0093***	.0208***
	(0.005)	(0.007)	(0.003)	(0.003)	(0.005)
Observations	42	42	188	188	94
R^2	0.3218	0.3316	0.0914	0.0918	0.0690
F	6.010	3.573	6.169	3.677	6.818

Standard errors in parentheses

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